ESOPHAGUS

S386

An Objective Spatialomics Test Standardizes Management Decisions With Potential to Improve Health Outcomes for Barrett's Esophagus Patients

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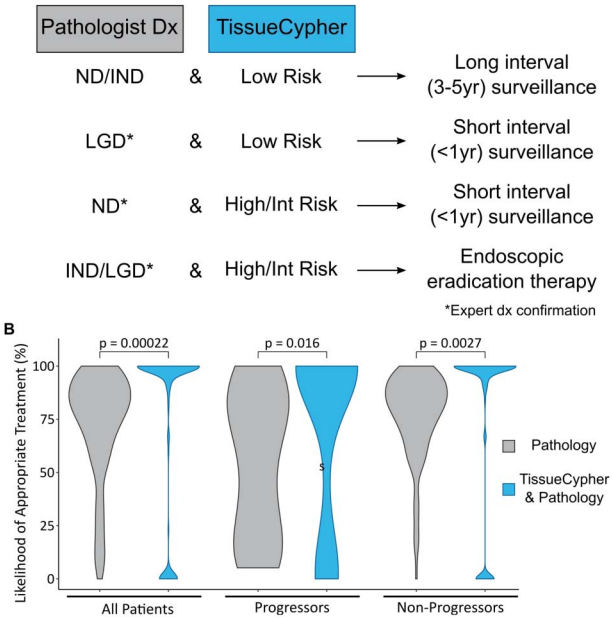
Introduction: The diagnosis of low-grade dysplasia (LGD) in Barrett's esophagus (BE) is associated with increased risk of progression to high grade dysplasia (HGD) or esophageal adenocarcinoma (EAC). However, due to substantial observer variability in the diagnosis of LGD, a patient's management plan and health outcome depends largely on which pathologist reviews their case. Recent studies have shown that an objective spatialomics test (TissueCypher) predicts neoplastic progression in BE patients with higher sensitivity than pathology review. This study evaluated the test's potential to augment pathology to standardize clinical management in a manner consistent with improved health outcomes for BE patients.
Methods: 154 BE patients with community-based LGD from the prospectively-followed screening cohort of the SURF trial were studied. All biopsies from the baseline endoscopy were independently reviewed by 16 generalist and 14 expert pathologists from five countries, and also assessed by the spatialomics test that scores patients as low-, intermediate or high-risk for progression to HGD/EAC. Each patient's journey from diagnosis to surveillance and treatment was simulated 500 times with varying pathology reviewers to determine the most likely care plan with or without the test to guide management (Figure A). The percentage of patients receiving appropriate management was calculated based on known progression/non-progression outcomes.
Results: Use of the spatialomics test in conjunction with pathology review of LGD increased the likelihood of appropriate management from median 80% (IQR 63-91) to 100% (89-100) (p=0.00022). Likelihood of appropriate management was significantly increased in the patients who progressed to HGD/EAC from median 63% (IQR 24-83) to 100% (IQR 23-100) (p=0.016) and from 82% (IQR 70-93) to 100% (IQR 91-100) (p=0.0027) for patients that did not progress within 10 years (Figure B).
Conclusion: The spatialomics test offers an effective solution to subjective and variable pathology review by providing objective risk stratification in BE patients with a community-based diagnosis of LGD. Management guided by this test may help to standardize care plans, increasing the early detection of progressor patients who can receive interventions that effectively prevent progression, while also increasing the percentage of non-progressors who can safely avoid unnecessary therapy and be managed by a surveillance-only approach.



[0386] **Figure 1.** TissueCypher-guided management increases the percentage of BE patients with community-based diagnosis of LGD who receive appropriate management with the potential to improve outcomes. (A) TissueCypher-guided management in conjunction with pathology review of patients with initial community-based diagnosis of LGD; (B) Likelihood of appropriate management using pathology review alone vs TissueCypher-guided management in conjunction with pathology. Appropriate management for progressors was endoscopic eradication therapy or short interval surveillance in less than 1 year. Appropriate management for non-progressors was long interval surveillance in 3-5 years. The pathology alone arm assumed that clinicians followed the current standard of care guidelines. Maximum width of violin plots held constant; within each paired group (All, Progressors, Non-Progressors) observation number is the same. p values calculated by Wilcoxon paired test.

S387 Outstanding Research Award in the Esophagus Category

Dupilumab Improves Clinical, Symptomatic, Histologic, and Endoscopic Aspects of EoE up to 24 Weeks: Pooled Results From Parts A and B of Phase 3 LIBERTY-EoE-TREET

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Introduction: Eosinophilic esophagitis (EoE) is a chronic, progressive, type 2 inflammatory disease of the esophagus. Current treatment offers suboptimal long-term disease control. Dupilumab, a fully human mAb, blocks the shared receptor component for IL-4/IL-13, key and central drivers of type 2 inflammation. In a phase 2 proof-of-concept study, dupilumab significantly improved histological and clinical outcomes of EoE with an acceptable safety profile. Here we report the pooled results from Parts A and B of a three-part, randomized, placebo-controlled phase 3 study (NCT03633617) which evaluated the efficacy and safety of weekly dupilumab 300 mg vs placebo in adult and adolescent patients with EoE for 24 weeks.
Methods: Patients were randomized 1:1 to weekly dupilumab (N=122) or placebo (N=118). Endpoints (all at Week 24): proportion of patients achieving peak eosinophil count ≤6/high-power field (hpf); absolute and % change in Dysphagia Symptom Questionnaire (DSQ) score; % change in peak eosinophil count; absolute change in Histologic Scoring System (HSS) grade and stage scores and Endoscopic Reference Score (EREFS); proportion of patients achieving peak eosinophil count < 15/hpf. Binary endpoints were assessed using the Cochran-Mantel-Haenszel (CMH) test. Continuous endpoints were analyzed using an analysis of covariance (ANCOVA) model. Nominal *P*-values are reported for this post-hoc analysis. (Table)
Results: Baseline characteristics were comparable between treatment groups. More patients treated with dupilumab versus placebo achieved peak eosinophil count ≤6/hpf (59.0% vs 5.9%; *P*< 0.0001). Dupilumab vs placebo had greater absolute (LS mean –23.2 vs –12.7; LS mean difference [95% CI] –10.5 [–14.5, –6.6]; *P*< 0.0001) and % (–65.5% vs –38.3%; –27.3 [–38.2, –16.2]; *P*< 0.0001) change in DSQ.

Dupilumab vs placebo had a greater % change in peak eosinophil count (–80.1 vs 1.5; –81.7 [–96.2, –67.1]); proportion of patients achieving < 15 eos/hpf (77.0% vs 7.6%); change in HSS grade (–0.82 vs –0.1; –0.71 [–0.81, –0.62]) and stage (–0.79 vs –0.09; –0.70 [–0.79, –0.61]) scores; and change in EREFS score (–3.95 vs –0.41; –3.54 [–4.27, –2.81]); all $P < 0.0001$. Dupilumab was generally well tolerated. The most common TEAEs for dupilumab/placebo were injection-site reactions (37.5/33.3%).

Conclusion: Dupilumab improved clinical, symptomatic, histologic, and endoscopic aspects of EoE and was well tolerated.

Table 1. Effect of dupilumab qw vs placebo in patients with EoE

	Placebo (n = 118)	Dupilumab 300 mg qw (n = 122)
Peak esophageal intraepithelial eos count[a] Proportion achieving ≤6 eos/hpf, n (%) Difference versus placebo (95% CI)	7 (5.9)	72 (59.0) 52.3 (43.5, 62.8)
Absolute change from baseline in DSQ score[b] LS mean (SE) Difference versus placebo (95% CI)	−12.7 (1.6)	−23.2 (1.5) −10.5 (−14.5, −6.6)
Percent change from baseline in DSQ score[b] LS mean (SE) Difference versus placebo (95% CI)	−38.2 (4.4)	−65.5 (4.2) −27.3 (−38.3, −16.2)
Proportion of patients achieving peak esophageal intraepithelial eosinophil count (from all 3 regions) of < 15 eos/hpf LS mean (SE) Difference versus placebo (95% CI)	9 (7.6)	−94 (77.0) −69.4 (60.6, 78.2)
Percent change from baseline in peak eos count[a] LS mean (SE) Difference versus placebo (95% CI)	1.5 (6.6)	−80.1 (5.3) −81.7 (−96.2, −67.1)
Absolute change from baseline in EoE-HSS grade score[a,c] LS mean (SE) Difference versus placebo (95% CI)	−1.04 (0.04)	−0.8 (0.04) −0.71 (−0.8, −0.6)
Absolute change from baseline in EoE-HSS stage score[a,d] LS mean (SE) Difference versus placebo (95% CI)	−0.09 (0.04)	−0.8 (0.04) −0.7 (−0.8, −0.6)
Absolute change from baseline in EoE EREFS total score[d] LS mean (SE) Difference versus placebo (95% CI)	−0.41	−3.95 (0.3) −3.54 (−4.3, −2.8)

[a]Pinch biopsies were collected from 3 esophageal regions (proximal, mid, distal) at screening and Week 24 for histology.
[b]The Dysphagia Symptom Questionnaire is a patient-reported outcome measure that is administered daily and assesses the frequency and severity of dysphagia. The biweekly total DSQ score ranges from 0 to 84; higher scores indicate greater dysphagia-related symptom burden.
[c]Biopsies were scored for eosinophil density, basal zone hyperplasia, eosinophil abscesses, eosinophil surface layering, dilated intercellular spaces, surface epithelial alteration, dyskeratotic epithelial cells, and lamina propria fibrosis. Each region was scored separately from 0 to 1, and the 3 regions were summed for the final score which ranges from 0 to 3; 0 represents normal and 3 maximum change.
[d]Endoscopies were performed at screening and Week 24, and the proximal and distal esophageal regions scored for edema, rings, exudates, furrows, and strictures. The overall score ranges from 0 to 18; higher scores indicate greater severity.
CI, confidence interval; DSQ, Dysphagia Symptom Questionnaire; EoE, eosinophilic esophagitis; eos, eosinophil; EREFS, Endoscopic Reference Score; hpf, high power field; HSS, histologic scoring system; LS, least squares; SE, standard error; qw, weekly.

S388 ACG Governors Award for Excellence in Clinical Research (Trainee)

Risk of Esophageal Cancer in Achalasia: A Matched Cohort Study Utilizing the Veterans Affairs Achalasia Cohort (VA-AC)

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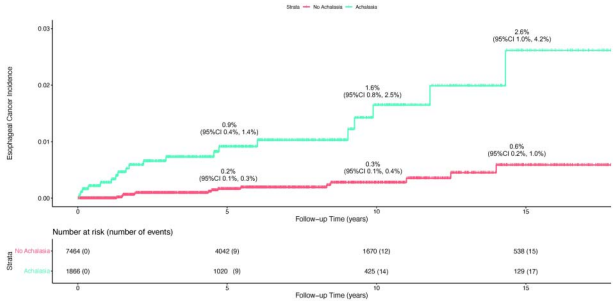
Introduction: Achalasia is a postulated risk factor for esophageal cancer (EC) – both squamous cell carcinoma (SCC) and adenocarcinoma (AC). Evaluation of EC-associated risk factors and outcomes in achalasia are limited due to a lack of large, validated cohorts available for study. Our aim was to evaluate the risk of EC among individuals with compared to without achalasia utilizing a large, validated achalasia cohort: the Veterans Affairs Achalasia Cohort (VA-AC).

Methods: We conducted a matched cohort study among US Veterans aged ≥18 years between 1999-2020. Individuals with achalasia from the VA-AC were matched to individuals without achalasia at a ratio of 1:4 on index achalasia encounter date, and by sex, year of birth, and first VA visit date +/- 180 days. Follow-up was censored at the outcome (EC), death from a non-EC related cause, or end of the study period. EC cases were ascertained from cancer registry and cause-specific mortality, with all cancer cases reviewed for verification. Descriptive statistics were performed for baseline characteristics. EC hazard functions were assessed using Cox regression models.

Results: 1,866 Veterans with achalasia were matched to 7,464 Veterans without achalasia. Median age was 55 years (IQR 48-63), and 92% were male (**Table**). There were 17 EC cases among Veterans with achalasia (3 AC, 12 SCC, 2 unknown type) compared to 15 EC cases among Veterans without achalasia (11 AC, 1 SCC, 3 unknown). Median time from achalasia diagnosis to EC development was 3.0 years (IQR 1.3-9.1). Patients with achalasia had a 5.4-fold higher risk of EC (HR 5.4, 95% CI 2.8,10.5) compared to patients without achalasia. Higher cumulative incidence of EC ($p < 0.0001$, based on log-rank test; **Figure**) in those with vs without achalasia at 5-, 10- and 15-years follow-up was observed. In *post hoc* analysis, several individuals with EC also had candida esophagitis preceding their cancer diagnosis (12.5%) by median time 1.3 years (IQR 0.2-2.7). Based on univariate cox regression model, patients with vs without candida esophagitis had a 18.3-fold higher risk of EC (95% CI 6.2, 53.7).

Conclusion: Using a national cohort of US Veterans, we found achalasia was associated with 5-fold increased EC risk compared to those without achalasia. Candida esophagitis exposure may also predict higher EC risk. Additional studies are needed to understand if this increased risk of EC warrants routine endoscopic surveillance in individuals with achalasia.



[0388] **Figure 1.** Cumulative Incidence of Esophageal Cancer Kaplan Meier curve demonstrating cumulative incidence at 5-, 10- and 15-year time points. Incidence at each time point was significantly higher for individuals with achalasia compared to individuals without achalasia.

Table 1.

	Achalasia^ N = 1866	No Achalasia N = 7464
Age, median (IQR)	55.0 (48.0 – 63.0)	55.0 (48.0 – 63.0)
Males, n (%)	1725 (92.4)	6900 (92.4)
Race/Ethnicity, n (%)		
Asian/Pacific Islander	23 (1.2)	113 (1.5)
Black	378 (20.3)	1164 (15.6)
Hispanic	125 (6.7)	326 (4.4)
Multiracial/Other	25 (1.3)	157 (2.1)
White	1208 (64.7)	4755 (63.7)
Unknown	107 (10.1)	949 (12.7)
BMI, median (IQR)	28.6 (25.1 – 32.9)	28.6 (25.4 – 32.6)
Diabetes, n (%)	528 (28.3)	1686 (22.6)
Smoking Status, n (%)		
Current	532 (28.5)	1592 (21.3)
Former	386 (20.7)	1293 (17.3)
Never	556 (29.8)	2398 (32.1)
Unknown	392 (21.0)	2181 (29.2)
Aspirin Exposure, n (%)	683 (36.6)	1699 (22.8)
Barrett's Esophagus, n (%)	125 (6.7)	189 (2.5)
Candida Esophagitis, n (%)	64 (3.4)	7 (0.1)
Esophageal Cancer, n (%)	17 (0.9)	15 (0.2)
Squamous Cell Carcinoma	12	1
Adenocarcinoma	3	11
Unknown	2	3

*All variables are significant with p-value <.0001, except Age (Matched), Gender (Matched), and BMI which were not statistically significant at alpha=0.05.
^Achalasia subjects were previously validated using an algorithm consisting of 3 or more ICD9 or ICD10 codes in a subject's lifetime plus a CPT code for esophageal manometry; the positive predictive value (PPV) for this algorithm to diagnose true achalasia subjects was 94% (95% confidence lower bound of 88.5%) BMI = body mass index; IQR = interquartile range.

S389 ACG Auxiliary Award (Trainee)

Development and Validation of a Clinical Tool to Identify Patients Who Do Not Need Biopsies When Eosinophilic Esophagitis Is Suspected

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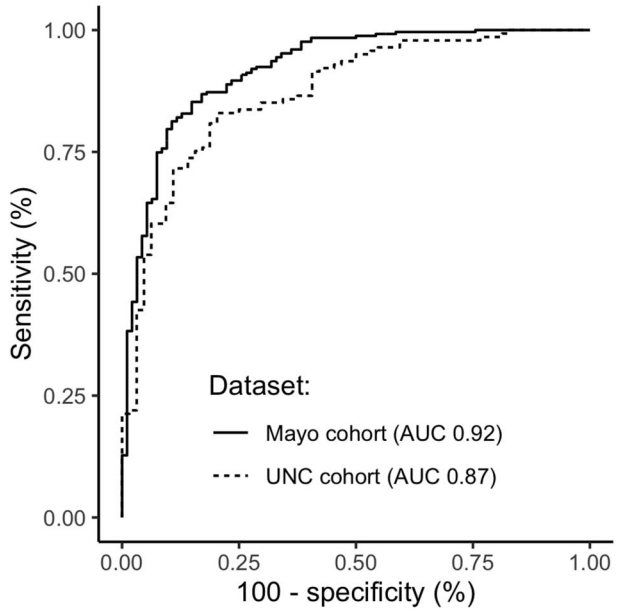
Introduction: There is a low threshold for esophageal biopsy in all patients with esophageal symptoms to assess for eosinophilic esophagitis (EoE). As predictive models of EoE may not fully rule-in EoE, we aimed to develop a reverse model that reliably predicts against a diagnosis of EoE to eliminate unnecessary esophageal biopsies.
Methods: In this two-center study, a predictive model was developed (Mayo Clinic [Mayo]) and then validated (University of North Carolina [UNC]). At both centers, cross-sectional data from consecutive adult patients without prior EoE who underwent index endoscopy (EGD) with esophageal biopsies were used. EoE cases were diagnosed per consensus guidelines; controls did not meet these guidelines. A priori, we sought to have at least a 1:2 ratio of EoE:non-EoE. Data were collected on patient demographics, clinical characteristics, and endoscopic findings. Multiple variable logistic regression was used to identify associations with non-EoE status using backward selection method to identify a parsimonious predictive model, while maintaining a specificity ≥95%.
Results: The Mayo and UNC cohorts consisted of 345 (EoE=94, non-EoE=251) and 297 patients (EOE=84, non-EoE=213), respectively. In the Mayo cohort, non-EoE compared to EoE patients were significantly more likely to be older and women, and less likely to report solid food dysphagia, prior food impactions, family history of EoE, or have esophageal rings, strictures, edema, furrows, or exudates at index endoscopy. The resulting multiple variable model (Table, Figure) was predictive against a diagnosis of EoE (c-statistic=0.92, 95% CI:0.88-0.96). At a probability of ≥0.91 with this model, the specificity was 95.0% (89/94), meaning that choosing to biopsy patients with a model predicted probability of < 0.91 resulted in biopsying 89 of the 94 patients with EoE. This resulted in a sensitivity of 64.5% (162/251), meaning that choosing not to biopsy patients with a model predicted probability of ≥0.91 results in correctly not biopsying 162 of 251 patients that did not have EoE. The model was validated using the UNC cohort (c-statistic=0.87, 95% CI:0.82-0.92). At a probability of ≥0.91 with this model, the specificity was 93.8% and sensitivity 57.4%.
Conclusion: This reverse model accurately identifies the large group of patients with a low likelihood of EoE where unnecessary biopsies can be avoided, potentially resulting in cost and time savings, and lower risk.



[0389] **Figure 1.** ROC curves for the logistic regression model to predict against a diagnosis of eosinophilic esophagitis based on the Mayo and UNC cohorts.

Table 1. Multiple variable logistic regression model to predict against a diagnosis of eosinophilic esophagitis

	Mayo Cohort		UNC Cohort	
	Odds Ratio (95% CI)	**p-value**	**Odds Ratio (95% CI)**	**p-value**
Age at index EGD, per 5 years	1.31 (1.17-1.47)	p< 0.01	1.25 (1.08-1.47)	p< 0.01
Sex				
Male	1.0 (reference)	p=0.01	1.0 (reference)	p=0.38
Female	2.63 (1.30-5.36)		1.0 (0.64-3.41)	
Presence of any atopic disorder/food allergy		p< 0.01		p=0.27
No	3.88 (1.83-8.21)		1.67 (0.59-4.24)	
Yes	1.0 (reference)		1.0 (reference)	
Presence of dysphagia		p=0.01		p=0.35
No	4.03 (1.40-11.54)	p=0.01	2.95 (0.40-60.8)	p=0.98
Solid foods only	1.0 (reference)		1.0 (reference)	
Solids+liquids/unspecified	4.16 (1.44-12.02)		0.99 (0.41-2.32)	
History of food impaction		p< 0.01		p< 0.01
No	7.47 (1.88-29.68)		6.23 (2.65-15.4)	
Yes	1.0 (reference)		1.0 (reference)	
Presence of rings, strictures, edema, furrows, or exudates on index EGD		p< 0.01		p< 0.01
No				
Yes	16.28 (7.76-34.18)		10.6 (3.97-33.2)	
	1.0 (reference)		1.0 (reference)	

S390

Efficacy and Safety of On-Demand Vonoprazan versus Placebo in the Treatment of Heartburn in Symptomatic Nonerosive Reflux Disease (NERD) Patients: A Phase 2 Randomized Controlled Trial

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Introduction: Current treatment for NERD is daily acid-suppressive therapy; however, on-demand treatment is an attractive option for long-term management. Vonoprazan, a potassium-competitive acid blocker, rapidly and profoundly suppresses gastric acid. The aim of this study was to evaluate the efficacy and safety of vonoprazan vs placebo for on-demand treatment of symptomatic NERD.

Methods: This Phase 2, double-blind, placebo-controlled study (NCT04799158) enrolled NERD patients (normal endoscopy, heartburn episodes for ≥6 months, heartburn on ≥4/7 consecutive days) into a 4-week run-in period of once-daily vonoprazan 20mg. Patients without heartburn in the last 7 days of the run-in period were randomized 1:1:1:1 to receive vonoprazan 10mg, 20mg, 40mg, or placebo on-demand for 6 weeks. Patients were asked to take no more than one dose of study drug for 24h after a heartburn episode and to take no rescue antacids ≤3h after taking study drug. Patients recorded heartburn symptoms, drug and antacid use in an electronic diary. The primary endpoint was the % of evaluable heartburn episodes with complete and sustained relief (within 3h and with no further heartburn reported for 24h after taking study drug) during the on-demand treatment period. The onset of complete and sustained relief was evaluated within 30min and 1, 1.5, 2, and 3h after study drug.

Results: Of 458 patients entering the run-in period, 207 (females: 125; mean age: 54y) were eligible and randomized to treatment. For the primary endpoint, in the vonoprazan 10, 20, and 40mg groups, 56.0% (201/359), 60.6% (198/327) and 70.0% (226/323) of heartburn episodes met the criteria for complete and sustained relief, respectively, vs 27.3% (101/370) for placebo ($P< 0.0001$ for each vonoprazan treatment vs placebo) (Table). Significant differences in complete and sustained relief occurred as early as 1h after study drug for all vonoprazan doses. In the on-demand period, 21.3% of patients receiving placebo reported a treatment-emergent adverse event (TEAE) vs 16.3%, 18.4%, and 16.7% of those on vonoprazan 10, 20, and 40mg, respectively. No TEAE was reported by >1 patient per group. No serious TEAEs were reported.

Conclusion: The results suggest that on-demand vonoprazan treatment for the relief of episodic heartburn in NERD patients is efficacious and well-tolerated. On-demand vonoprazan treatment may offer NERD patients an attractive alternative to daily heartburn therapy.

Table 1. Comparison of efficacy endpoint results between the different vonoprazan doses and placebo

Endpoint	Vonoprazan 10 mg n=52	Vonoprazan 20 mg n=52	Vonoprazan 40 mg n=51	Placebo n=52
Heartburn episodes with complete and sustained relief within 3 hours[a]				
n/N evaluable episodes[b] (%)	201/359 (56.0)	198/327 (60.6)	226/323 (70.0)	101/370 (27.3)
P-value (vs placebo)	< 0.0001	< 0.0001	< 0.0001	-
Timing of complete and sustained relief[a], n/N evaluable episodes[b] (%)				
Within 30 minutes	31/359 (8.6)	17/327 (5.2)	9/323 (2.8)	21/370 (5.7)
P-value (vs placebo)	0.15	0.87	0.09	-
Within 1 hour	101/359 (28.1)	63/327 (19.3)	74/323 (22.9)	44/370 (11.9)
P-value (vs placebo)	< 0.0001	0.0083	0.0002	-
Within 1.5 hours	151/359 (42.1)	103/327 (31.5)	139/323 (43.0)	67/370 (18.1)
P-value (vs placebo)	< 0.0001	< 0.0001	< 0.0001	-
Within 2 hours	182/359 (50.7)	151/327 (46.2)	187/323 (57.9)	81/370 (21.9)
P-value (vs placebo)	< 0.0001	< 0.0001	< 0.0001	-

(a)Complete and sustained relief is defined as complete relief with no antacid taken within the indicated time frame after taking study drug and no further heartburn reported for 24 hours after taking study drug.
(b)An evaluable heartburn episode is defined as any for which study drug was taken and for which the subject completed ≥1 entry in the heartburn episode diary.

S391 Presidential Poster Award

Co-Localization of Immunoglobulin G4 (IgG4) and Milk Proteins Is Associated With Eosinophilic Esophagitis Disease Activity

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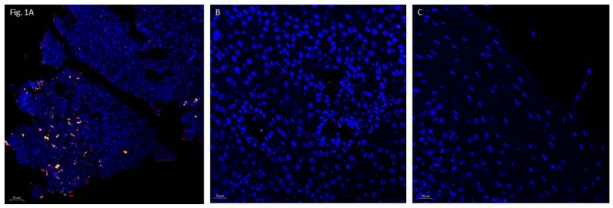
Introduction: Eosinophilic esophagitis is a chronic disease of the esophagus predominantly triggered by food antigens but diagnostic tests to identify food triggers in individual patients do not yet exist. Recent studies have shown that immunoglobulin G4 (IgG4) co-localizes with food proteins in the esophageal tissue of eosinophilic esophagitis (EoE) patients. Knowing that cow's milk is the main food trigger of EoE, we hypothesized that co-localization with IgG4 is associated with EoE disease activity.
Methods: We performed a case control study nested within the prospective University of Virginia (UVA) EoE Cohort. Fifteen patients were selected from the UVA EoE Cohort (10 EoE patients and 5 controls). Esophageal biopsies were obtained at the time of each endoscopy. We examined paired samples from individuals with a) active EoE and remission on swallowed steroids, b) active EoE and remission on diet elimination, c) non-EoE controls (n=5 in each group). Immunofluorescence was performed using primary antibodies directed against IgG4 and milk proteins (Bos d 4,5,8). Images were captured using a Leica confocal microscope. Co-localization was determined using Pearson's Correlation Coefficient on Imaris imaging software. Between-group comparisons were made using Mann-Whitney U test on GraphPad Prism software.
Results: Immunofluorescence staining was performed on 75 esophageal biopsies (15 patients, ages 19-41 yo, 53% male). There was significantly more IgG4-milk protein co-localization in patients with active EoE compared to remission samples in the same patients (p=0.02, p=0.002, and p=0.002 for Bos d 4, 5, and 8, respectively). There was no significant difference in co-localization between remission samples and controls (p=0.57, p=0.21, p=0.74 for Bos d 4, 5, and 8, respectively). Median co-localization levels in active EoE patients were also significantly higher than non-EoE controls. Notably, all five patients in remission on swallowed steroids still demonstrated co-localization but at a lesser intensity compared to active samples and was not statistically significant (p=0.07). (Figure)
Conclusion: Our findings demonstrate that IgG4 co-localization with milk proteins is associated with disease activity in EoE. Whether these deposits contribute to the underlying inflammation of EoE, and whether IgG4 co-localization could be used to identify specific food triggers in EoE patients remains unknown and warrants further study.



[0391] **Figure 1.** Esophageal biopsies with immunofluorescence staining for IgG4 (green), Bos d 5 (red), and nuclei (blue). (A) Active EoE and co-localization of IgG4 and Bos d 5 (yellow). (B) Paired remission sample (swallowed steroids) from patient in fig. 1A. (C) Control patient consuming dairy.

S392 Presidential Poster Award

The Impact of Centralized Care in the Management of Barrett's Related Neoplasia: A Systematic Review and Meta-Analysis

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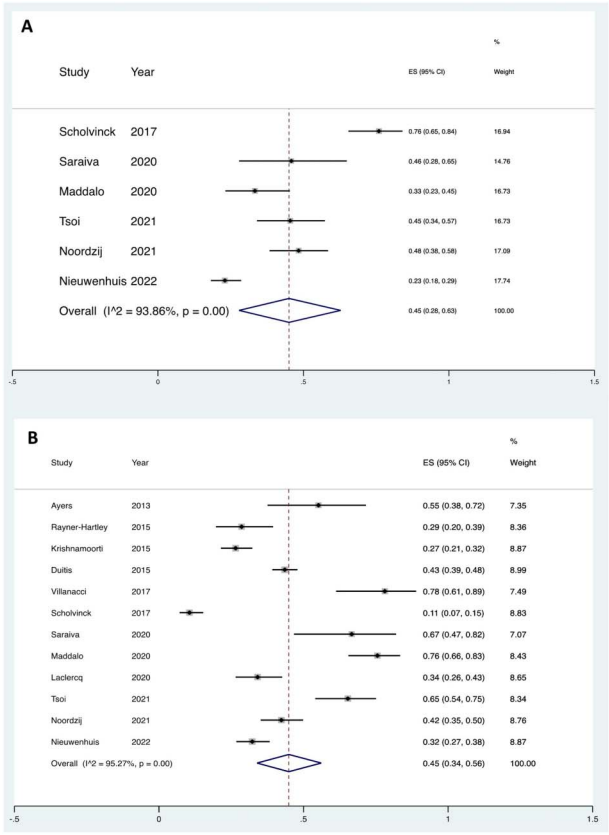
[1]University of Colorado, Anschutz Medical Center, Aurora, CO; [2]University of Texas Southwestern, Dallas, TX; [3]Columbia University, New York, NY.

Introduction: Endoscopic eradication therapy (EET) is well-established for management of Barrett's esophagus (BE) related neoplasia and increasingly being performed at tertiary care and community centers. While it has been suggested that these patients should be evaluated at expert centers, the impact of this practice has not been evaluated. We aimed to assess the impact of referral of BE-related neoplasia patients to expert centers by performing a systematic review and a meta-analysis and assessing the proportion of patients with change in pathologic diagnosis and visible lesions detected.
Methods: We searched multiple databases from inception until December 2021 for studies of patients with BE found in the community and referred to an expert center. Studies were included if they reported endoscopic and/or histologic findings in the community and after referral to an expert center. Studies were excluded if conducted in one setting only, insufficient data to determine the number of new visible lesions or pathology grade and studies with fewer than 10 subjects. The proportions of newly detected visible lesions and pathology grade change were pooled and weighted using a random effects model.
Results: Twelve studies met inclusion criteria that included 1829 patients. The pooled proportion of newly detected visible lesions was 45% (95% CI: 28%-63%, I2: 93.9%) (Figure A). The pooled proportion of pathology grade change when reviewed at an expert center was 45% (95% CI: 34%-56%, I2: 95.3%) (Figure B). The pooled proportion of pathology grade change after the endoscopy was repeated at an expert center was 47% (95%: 26% - 69%, I2: 97.2%). Patients referred with low-grade dysplasia (LGD) to expert centers had a pooled proportion of newly detectable visible lesions of 27% (95% CI: 22% - 32%, I2: 0%). The pooled proportion of pathologic grade change in patients referred with LGD when reviewed by an expert GI pathologist was 59% (95% CI: 40% - 77%, I2: 96.3%) and after repeat endoscopy was 40% (95% CI: 34% - 45%).

Conclusion: An alarmingly high proportion of newly detected visible lesions and pathology grade change were found when patients were referred from the community to expert centers supporting the need for centralized care for BE-related neoplasia patients.



[0392] **Figure 1.** Forest plot of pooled proportions of newly detected visible lesions among patients with BE related neoplasia referred from the community to expert centers (A). Forest plot of pooled proportions of pathological grade change among patients with BE related neoplasia referred from the community to expert centers (B).

S393 Presidential Poster Award

Health Care Resource Utilization and Costs Among Eosinophilic Esophagitis Patients in the United States

Mirna Chehade, MD, MPH[1], Andrew J. Epstein, PhD[2], Eilish McCann, PhD[3], Sarette T. Tilton, BSc, PharmD[4], Arpita Nag, MBA, MS, PhD[5], Chao Chen, BSc, PhD[3], Degang Wang, BSc, PhD[3], Tiffany Pela, MPH, PharmD[5], Angela Khodzhayev, PharmD[3], Ryan Thomas, PharmD, MS[6].
[1]Mount Sinai Center for Eosinophilic Disorders, Icahn School of Medicine at Mount Sinai, New York, NY; [2]Medicus Economics, Milton, MA; [3]Regeneron Pharmaceuticals, Tarrytown, NY; [4]Sanofi, Cambridge, MA; [5]Sanofi, Bridgewater, NJ; [6]Regeneron Pharmaceuticals, Montclair, NJ.

Introduction: Eosinophilic esophagitis (EoE) is a chronic, progressive type 2 inflammatory disease which negatively affects quality of life. The economic burden of EoE is unclear. We aimed to describe the healthcare resource utilization (HCRU) and economic burden of EoE in the US.
Methods: In this retrospective cohort analysis of claims data from the IQVIA PharmMetrics Plus database (Jan 1, 2017–Jun 30, 2020), patients with ≥1 EoE diagnosis (ICD-10 code K20.0) between Jan 1, 2018–Jun 30, 2019 were compared with non-EoE controls. Index was a randomly selected claim with an EoE diagnosis code (for patients with EoE) or random date (for controls) within the identification window. Included patients required 365 days of pre-index baseline data, and 365 days of follow-up. Patients were 1:1 matched for age, sex, insurance, and geographic region. Per patient HCRU and costs during follow-up were reported and compared by Wilcoxon signed-rank tests. Adjusted HCRU and costs were determined via regression adjusting for non-EoE-related comorbidities. A subanalysis assessed patients who received dilation for EoE during baseline.
Results: In total, 15,432 patients with EoE and 15,432 matched controls were included (mean age: 36.2 years; male: 62.8%). During baseline, considerable proportions of patients with EoE received swallowed topical corticosteroids (29.6%), proton pump inhibitors (63.7%) or esophageal dilation (21.4%). Unadjusted HCRU burden and costs were consistently higher for EoE cases (**Table**). When adjusting for non-EoE related comorbidities, HCRU and costs were significantly higher in patients with EoE compared with controls, especially prescription use (mean: 20.6 vs 11.6 fills), outpatient visits (mean: 15.3 vs 8.4 days), days with emergency room (ER) visits (mean: 0.5 vs 0.2 days) and total healthcare costs ($15,354 vs $7,262). Inpatient visits, days with inpatient visits and inpatient costs were not significantly different between patients with EoE and non-EoE controls. EoE patients with baseline dilations (n=3,310) had high total costs ($16,964) and frequently experienced days with ER visits (1.1 days).
Conclusion: Annual HCRU and costs were higher in patient with EoE versus matched controls, particularly for prescription use, outpatient visits, and ER visits. EoE patients experiencing dilation had high HCRU and cost burden, highlighting the importance of achieving disease control to prevent fibrostenotic complications and consequent esophageal dilations.

Table 1. Annual HCRU and Healthcare Costs of Patients With EoE and Non-EoE Controls During Follow-up

	Unadjusted			Adjusted		
	EoE n=15,432	Non EoE n=15,432	P-value	EoE n=15,432	Non EoE n=15,432	P-value
Mean HCRU per patient, (SD)						
Number of prescriptions filled	20.0 (22.4)	10.5 (17.9)	< 0.0001	20.6 (0.2)	11.6 (0.2)	< 0.0001
Number of days with outpatient visit	16.5 (19.9)	7.3 (11.5)	< 0.0001	15.3 (0.2)	8.4 (0.1)	< 0.0001
Number of inpatient visits	0.5 (4.0)	0.3 (5.5)	< 0.0001	0.6 (0.2)	0.5 (0.1)	0.05
Number of days with inpatient visit	0.6 (5.8)	0.4 (5.6)	< 0.0001	0.9 (0.4)	0.8 (0.3)	0.134
Number of days with ER visit	0.6 (1.6)	0.2 (0.8)	< 0.0001	0.5 (0.0)	0.2 (0.0)	< 0.0001
Number of days with another medical visit	1.3 (2.8)	0.7 (1.6)	< 0.0001	1.2 (0.0)	0.8 (0.0)	< 0.0001
Mean costs per patient, $ (SD)						
Prescription costs	4,385 (17,990)	1,938 (11,322)	< 0.0001	3,908 (140)	2,270 (113)	< 0.0001
Outpatient costs	7,533 (14,579)	2,760 (8387)	< 0.0001	7,316 (143)	3,103 (78)	< 0.0001
Inpatient costs	1,842 (18,466)	1,173 (11,832)	< 0.0001	1,549 (138)	1,466 (128)	0.69
ER costs	1,039 (4517)	422 (3233)	< 0.0001	943 (33)	478 (30)	< 0.0001
Other medical costs	255 (2086)	92 (512)	< 0.0001	232 (17)	105 (6)	< 0.0001
Total medical costs	10,669 (26,555)	4,448 (16,314)	< 0.0001	10,214 (239)	4,985 (146)	< 0.0001
Total healthcare costs	15,054 (35,801)	6,386 (21,528)	< 0.0001	15,354 (418)	7,262 (206)	< 0.0001

S394 Presidential Poster Award

Esophageal Cytology Collection Device for Assessment of Esophageal Eosinophilia in Eosinophilic Esophagitis: Real World Experience

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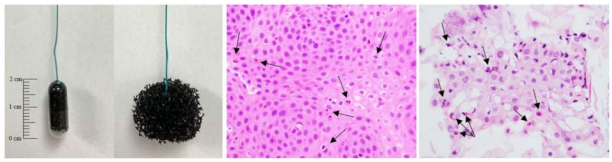
[1]University of Virginia, Charlottesville, VA; [2]UVA Health, Charlottesville, VA.

Introduction: Eosinophilic esophagitis (EoE) is a chronic condition characterized by symptoms of esophageal dysfunction and tissue eosinophilia. One barrier to clinical care in EoE is the need for repeat upper endoscopy (EGD) with biopsies to assess for tissue esophageal eosinophilia. A non-endoscopic esophageal cytology collection device (Cytosponge™) may be a viable alternative to assess for esophageal eosinophilia, but few studies have examined its use in EoE.
Methods: We first performed a pilot study in which individuals with confirmed EoE underwent Cytosponge™ procedure prior to a clinically-indicated EGD. The cytology results were compared to histology obtained via EGD (gold standard). Cytology and histology from mucosal biopsies were classified as active disease (≥1 eos/hpf cytology; ≥15 eos/hpf, respectively) or remission (0 eos/hpf; < 15 eos/hpf, respectively). The eosinophil-associated protein, eosinophil-derived neurotoxin (EDN) was assayed in the supernatant using ELISAs. We subsequently used the Cytosponge™ to assess for mucosal eosinophils, in place of standard EGD with biopsy, in a subset of patients for clinical care.
Results: For the pilot study, 7 patients (ages 20-53; 57% males) underwent the Cytosponge™ procedure 1 hour prior to EGD. When using a cut-off of 1 eos/hpf on cytology, there was 100% concordance between the Cytosponge™ cytology and esophageal biopsies for identifying active EoE and remission (3 active, 4 remission). There was also a trend towards higher concentrations of EDN in the Cytosponge™ supernatant of active EoE (median 34.11 ng/mL) versus remission (median 9.5 ng/mL, p=0.057). Between September 2020 and May 2022, 15 Cytosponge™ procedures were performed for clinical care (9 patients; ages 30-61; 56% male). Eight patients were undergoing food elimination diets and one was undergoing surveillance after sustained deep remission. No eosinophilia was seen in 10/15 cytology specimens and 5/15 had eosinophilia (range 1-15 eos)(Table). One patient underwent EGD shortly after Cytosponge™ (1 eos on cytology), which demonstrated 10-30 eos/hpf on mucosal biopsy. The Cytosponge™ procedure was well-tolerated with no significant adverse events. (Figure)
Conclusion: The Cytosponge™ is a novel mucosal assessment tool that is easily performed and correlates well with gold standard esophageal biopsies in EoE. It should be considered for use in eosinophilic esophagitis to avoid numerous EGD procedures.



[0394] **Figure 1.** a) Esophageal cytology collection device (CytospongeTM), b) Histology from standard esophageal biopsy, c) Cytology from CytospongeTM (same patient as b). Arrows point to eosinophils. Note: images previously published in McGowan EC, Aceves SS, CME Review: Noninvasive tests for eosinophilic esophagitis: Ready for use?. Ann Allergy Asthma Immunol 129 (2022); 27-34.

Table 1. Esophageal Cytology Collection Device (CytospongeTM) Results in Clinical Use

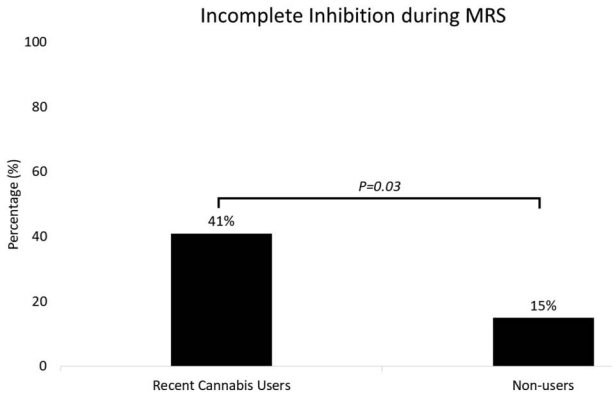
Patient	Age/Sex	Current Treatment	Cytosponge™ Results	Interpretation
1	61M	Food Elimination Diet - reintroduced soy	0 eos/hpf	Soy is not a trigger
2	50F	Food Elimination Diet - reintroduced dairy	2 eos/hpf	Dairy is a trigger
3a	30F	Food elimination diet - reintroduced soy	0 eos/hpf	Soy is not a trigger
3b		Food elimination diet - reintroduced egg	0 eos/hpf	Egg is not a trigger
3c		Food elimination diet - reintroduced wheat	0 eos/hpf	Wheat is not a trigger
4	44F	Food elimination diet - four food elimination (4FED)	3 eos/hpf	Not in remission on 4FED
5a	40F	Food elimination diet - reintroduced wheat	0 eos/hpf	Wheat is not a trigger
5b		Food elimination diet - reintroduced dairy	1 eos/hpf	Dairy is a trigger
6a	32M	Food elimination diet - two food elimination (2FED)	0 eos/hpf	Remission on 2FED
		Food elimination diet - reintroduced wheat	0 eos/hpf	Wheat is not a trigger
7a	43M	Food elimination diet - reintroduced fish	0 eos/hpf	Fish is not a trigger
		Food elimination diet - reintroduced soy	0 eos/hpf	Soy is not a trigger
8a	39M	Food elimination diet - two food elimination (2FED)	6 eos/hpf	Not in remission on 2FED
		Food elimination diet - four food elimination (4FED)	15 eos/hpf	Not in remission on 4FED
9	36M	Swallowed steroids twice daily and PPI	0 eos/hpf	Maintenance of remission

S395 Outstanding Research Award in the Esophagus Category (Trainee), Presidential Poster Award

Cannabis Interferes With Deglutitive Inhibition Assessed by Response to Multiple Rapid Swallows During High-Resolution Esophageal Manometry

Kevin Song, MD[1], Diana Snyder, MD[2], Michael Crowell, PhD[1], Marcelo F. Vela, MD[1].
[1]Mayo Clinic, Scottsdale, AZ; [2]Mayo Clinic Rochester, Rochester, MN.

Introduction: Data regarding cannabis effects on esophageal function are limited. Prior studies showed that cannabinoids decrease transient lower esophageal sphincter relaxations (TLESRs), suggesting that cannabis may interfere with inhibitory signals. Assessment of response to multiple rapid swallows (MRS) during high-resolution esophageal manometry (HRM) enables detection of impaired inhibition during MRS. In healthy subjects, deglutitive inhibition is seen during MRS, followed by a peristaltic contraction with higher vigor compared to single swallows. We hypothesize that cannabis impairs deglutitive inhibition during MRS and increases contractile vigor after MRS.
Methods: Retrospective review of cannabis users (N=36) and consecutive patients not on cannabis (N=47) who underwent HRM with MRS for evaluation of esophageal symptoms. Demographics, clinical information, and cannabis use (inhaled or ingested) were documented through a prospectively maintained motility database and chart review. Patients with prior gastroesophageal surgery, per-oral endoscopic myotomy, pneumatic dilation, esophageal botulinum toxin injection within 6 months of HRM, esophageal stricture, and current opioid use were excluded. Response to MRS was evaluated for intact versus impaired inhibition (defined as contractility with DCI >100mmHg-sec-cm during MRS) and presence of post MRS contraction augmentation (defined by a DCI post MRS greater than mean DCI for single swallows). Recent cannabis use was defined as less than 7 days from HRM. Categorical variables were analyzed by Fisher's exact test. (Figure)
Results: Overall, the rate of impaired inhibition during MRS was similar between cannabis users and control patients (22% vs 15%, P=0.56). However, in patients with recent cannabis use, impaired inhibition during MRS was significantly more frequent compared to control patients (41% vs 15%, P=0.03). The proportion of patients with augmentation post MRS was similar for cannabis users (overall and recent use) compared to patient controls (64% vs 74%, P=0.42). (Table)
Conclusion: Compared with controls, patients with recent cannabis use were significantly more likely to present with impaired deglutitive inhibition during MRS. These findings support our hypothesis that cannabis interferes with inhibitory signals in the esophagus, which could manifest as achalasia, EGJOO, or DES. A larger sample size and additional studies are needed to confirm these findings and to elucidate the underlying mechanisms.



[0395] **Figure 1.** Percentage of Incomplete Inhibition during MRS

Table 1. Clinical Characteristics of the Study Population

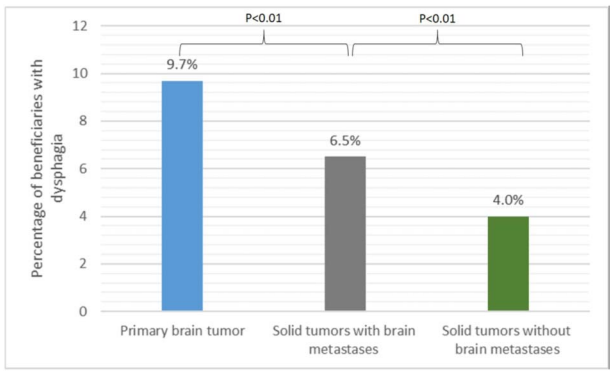
Characteristic	Cannabis (N = 36)	Non-Cannabis (N = 47)
Mean age (SD)	52 (±19)	58 (±14)
Male Sex, N (%)	18 (50%)	18 (38.3%)
Cannabis Type	15 (41.6%)	
Smoke	1 (2.8%)	
Chew	11 (30.6%)	
Eatable	3 (8.3%)	
Oil	3 (8.3%)	
Assorted	3 (8.3%)	
Unknown		
Last Cannabis Use	22 (61.1%)	
< 7 days	14 (38.9%)	
> 7 days		

S396 Presidential Poster Award

Higher Rates of Dysphagia Incidence Among Patients With Malignant Primary Brain Tumors Compared to Brain Metastases: A National Study of Medicare Beneficiaries

David A. Leiman, MD[1], Alice Parish, MSPH[2], Seth Cohen, MD[1], Donna Niedzwiecki, PhD[2], Margaret O. Johnson, MD[1].
[1]Duke University School of Medicine, Durham, NC; [2]Duke University, Durham, NC.

Introduction: Dysphagia occurs frequently with central nervous system (CNS) diseases. Additionally, rates of dysphagia increase with age. However, there are no population-based estimates of dysphagia among older patients with malignant primary brain tumors (PBTs) or brain metastases. Therefore, we aimed to describe the incidence of new-onset dysphagia among Medicare beneficiaries with CNS malignancies and compare rates of dysphagia between those with malignant PBTs and solid tumor brain metastases.
Methods: Using the 2013-2018 Medicare 5% Data sample and ICD-9/10 codes, we identified beneficiaries at least 65 years of age with malignant PBTs as well as the five most common solid tumors metastasizing to the brain (lung, breast, melanoma, renal, and colorectal). Those with coexisting disorders predisposing to symptomatic dysphagia such as head and neck cancer, achalasia, or relevant neurological conditions, were excluded. We estimated rates of new onset dysphagia, defined as occurring within one year from the time of cancer diagnosis, among those with continuous Medicare enrollment for at least six months of follow-up time. Comparisons were made between 1) beneficiaries with malignant PBTs and those with brain metastases and 2) beneficiaries with brain metastases and their counterparts without CNS metastases. A Chi-squared test was used to assess differences between groups.
Results: Of the 80,187 beneficiaries identified, the median age of all patients was 72 and most patients (64.9%) were female, primarily due to the large number of breast cancer patients in the cohort. There were 3,018 (3.8%) beneficiaries with malignant PBTs and 805 (1.0%) had brain metastases (Table). Dysphagia occurred in 3,396 (4.2%) of the overall population. Patients with malignant PBTs were significantly more likely to have dysphagia than those with brain metastases (9.7% vs 6.5%, p< 0.01). Patients with brain metastases were more likely to have dysphagia than those without CNS involvement (6.5% vs 4.0%, p< 0.01) (Figure).
Conclusion: The incidence of dysphagia is high among older patients with CNS malignancies, with significantly higher rates among those with PBTs compared to brain metastases. The presence of CNS metastases among commonly occurring solid tumors is also associated with the development of dysphagia. These results warrant further investigation to identify predictors of dysphagia among this population as well as to describe its impact on clinical outcomes and overall health care utilization.



[0396] **Figure 1.** Rates of new onset dysphagia within one year of cancer diagnosis among Medicare beneficiaries by disease subgroups: primary brain tumors, solid tumors (lung, breast, melanoma, renal, and colorectal cancer) with brain metastases, and solid tumors without brain metastases.

Table 1. Clinical and demographic data among Medicare beneficiaries studied. #Primary tumor type by brain metastases are not reported to meet CMS censoring reporting requirements.

	Primary Brain Tumors (N=3,018)	Solid tumors with brain metastases (N=805)	Solid tumors without brain metastases (N=76,364)
Age, median (Q1, Q3)	73 (68, 78)	71 (67, 76)	72 (67, 79)
Female	1,672 (55.4%)	478 (59.4%)	49,866 (65.3%)
Race	2,520 (83.5%)	671 (83.4%)	66,284 (86.8%)
White	248 (8.2%)	9 (8.6%)	5,727 (7.5%)
Black	250 (8.3%)	65 (8.1%)	4,353 (5.6%)
Other			
Primary tumor type	–	–#	29,739 (38.9%)
Breast			14,378 (18.8%)
Colorectal			13,464 (17.6%)
Lung			12,225 (16.0%)
Melanoma			6,558 (8.6%)
Renal			
New onset dysphagia (within 1 year of cancer diagnosis)	293 (9.7%)	52 (6.5%)	3,055 (4.0%)

S397 Presidential Poster Award

Anesthesia Choice Can Affect EndoFLIP® Measurements and Thereby Misdiagnose Esophageal Motility Disorders

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[1]University of Maryland Medical Center, Baltimore, MD; [2]University of Maryland School of Medicine, Baltimore, MD.

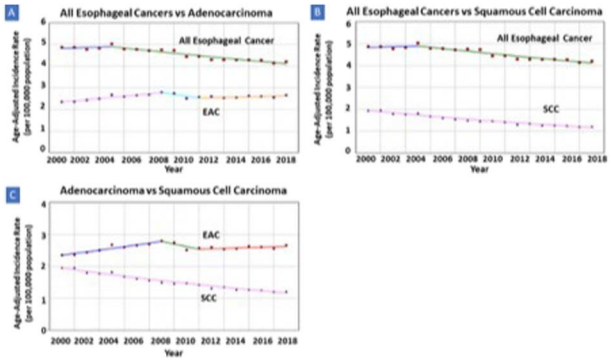
Introduction: Endoscopic functional lumen imaging probe (EndoFLIP®) is utilized during endoscopy to diagnose esophageal motility disorders (EMDs). EndoFLIP uses a balloon inflated to different sizes to measure the pressure (P) and diameter (D) of the lower esophageal sphincter and the distensibility index (DI) at the gastroesophageal junction. These parameters are crucial for differentiating spastic EMDs, which have high P and low D and DI, from non-spastic EMDs, which have lower P and higher D and DI. Sevoflurane (sevo) is used for general anesthesia. Propofol (prop) is used for monitored anesthesia care. Sevo induces a stronger neuromuscular blockade than prop. This study compares the effect of these anesthetics on EndoFLIP measurements.
Methods: Patients with non-spastic (Type 1) achalasia, spastic (Types 2 and 3) achalasia, or Jackhammer esophagus (JE) who underwent peroral endoscopic myotomy at the University of Maryland Medical Center between 2/2017 and 2/2022 were retrospectively reviewed. Those who had EndoFLIP while sedated with prop and sevo were included. The differences in P, D, and DI using prop vs sevo (PS-P, SP-D, SP-DI) with a 30mL and 60mL balloon were obtained. The differences were divided into terciles and compared between diagnoses.
Results: 49 patients were included. 19 (39%) had Type 1, 21 (43%) had Type 2 or 3, and 9 (18%) had JE. Sevo induced lower P and higher D and DI on average. Compared to all other diagnoses, Type 1 correlated with the lower tercile PS-P at 60mL (aOR 10.0, 95%CI 2.23-45.3, p=0.003) and inversely correlated with the higher tercile PS-P at 60mL (aOR 0.12 95%CI 0.02-0.70, p=0.02) and 30mL (aOR 0.14, 95%CI 0.02-0.76, p=0.02). Types 2 and 3 correlated with the higher tercile PS-P at 30mL (aOR 6.29, 95%CI 1.03-38.4, p=0.05) and inversely correlated with the lower tercile PS-P at 60mL (aOR 0.16, 95%CI 0.03-0.78, p=0.02) compared to Type I. JE correlated with the higher tercile PS-P at 30mL (aOR 18.8, 95%CI 1.40-252, p=0.03) compared to Type I.
Conclusion: Esophageal pressure measured by EndoFLIP was significantly reduced when patients were sedated with sevo vs prop. This affects the diagnostic accuracy of the EndoFLIP. The most important distinguishing factor for Type 1 achalasia vs spastic esophageal disorder is the pressure and spasm of the esophageal body. Thus using sevo for diagnostic EndoFLIP can potentially cause spastic achalasia to be misdiagnosed as Type 1 achalasia. Therefore, prop should be considered over sevo for sedation during the diagnostic test.

S398 Presidential Poster Award

Dramatic Stabilization of Trend of Esophageal Adenocarcinoma (EAC) in the United States: A Population-Based Time-Trend Analysis of Surveillance, Epidemiology and End Results Program Database (SEER), 2001-2018

Navkiran Randhawa, DO[1], Janice Eunsoo Oh, MD[2], Yazan Abboud, MD[2], Kevin Waters, MD, PhD[2], Mohamad Othman El Helou, MD[2], Jun Gong, MD[2], Harmik Soukiasian, MD[2], Kenneth Park, MD[2], Quin Liu, MD[2], Rabindra Watson, MD[2], Simon Lo, MD[2], Srinivas Gaddam, MD[2].
[1]Franciscan Health, Olympia Fields, IL; [2]Cedars-Sinai Medical Center, Los Angeles, CA.

Introduction: Prior studies showed that EAC had dramatically increased by 611% from 1973 to 2001. Therefore, the aim of this study was to determine the recent incidence trends of EAC by histopathology in the United States from 2000-2018 using the SEER database.
Methods: Incidence rates of esophageal cancer per 100,000 population (age-adjusted to the 2000 US population) from 2000 to 2018 were calculated from the SEER 21 database using SEER*Stat software (v8.4.1, National Cancer Institute (NCI). Esophageal cancer was defined as any cancer located within the esophagus, and the histopathology subtypes were grouped as EAC or squamous cell cancer (SCC) based on ICD-O-3 Codes (Table). Time-trends reported as annual percentage change (APC) and average APC (AAPC) were quantified by Joinpoint Regression Program (v4.9.0.1, NCI), utilizing Monte Carlo permutation analysis to identify the best fit. A 2-tailed t-test was utilized to access statistical significance (p-value < 0.05). Pairwise comparison between the segmented-linear trends was performed to test parallelism and identicalness of the trends.
Results: A total of 103,117 (79% male) patients were diagnosed with esophageal cancer from 2000-2018. Of those, 58,782 were diagnosed with EAC while 34,084 were diagnosed with SCC (Table). The overall incidence rate of esophageal cancer was found to be stable from 2000-2004 [APC 0.37% (95% CI, -1.32-2.07%)] but significantly decreased from 2004-2018 [APC -1.24% (95% CI, -1.48% - -1.01%)]. In SCC, the trend has shown a consistent decrease in incidence rate from 2000-2018 [APC -2.81% (95% CI, -3.03% - -2.59%)]. EAC trends showed two joinpoints. with a peak incidence noted in 2007 (Table and Figure). Despite slight variation in trends across joinpoints , the overall trend of EAC incidence was not statistically significant and therefore stable over this time period [0.61% (95% CI, -0.30% - 1.53%)], p-value = 0.19. The trends between the histopathology groups of EAC and SCC, were not identical nor parallel (p-value < 0.001), showing that the trends between these two groups differed from one another.
Conclusion: While previous studies showed a >600% increase in incidence of EAC from 1973 to 2001, our updated large population-based study, covering more than a third of the US population, shows a dramatically improved stable trend from 2000 to 2018. Future studies should evaluate the impact of proton pump inhibitor use and endoscopic therapies on these trends.



[0398] **Figure 1.** Age-Adjusted Incidence Rates Per 100,000 Population for Esophageal Cancer A: The incidence of esophageal cancers significantly decreased [AAPC -0.89% (95% CI, -1.26%--0.51%)] while the incidence of EAC had 3 varying segments of incidence rate: 2000 to 2008 had an increase [APC 2.13% (95% CI, 1.46% - 2.80%)], 2008-2011 had a decrease [APC -3.05% (95% CI, -8.34% - 2.54%)] and 2011 to 2018 had a stable trend [APC 0.49% (95% CI, -0.23% - 1.21%)]. B: The incidence of SCC consistently decreased [APC -2.81% (95% CI, -3.03% - -2.59%)] C: The incidence of EAC and SCC were not identical nor parallel (both p-value < 0.001).

Table 1. Incidence Trends of Esophageal Cancer in the United States by Histopathology (2000-2018)

		Trends				Pairwise Comparison	
	Cases n (% of N)	Years	APC (95% CI)	AAPC[a] (95% CI)	AAPC P-value[b]	Test of Coincidence p-value[c]	Test of Parallelism p-value[d]
All Esophageal Cancer	103,117	2000 - 2004 2004 - 2018	0.37% (-1.32% - 2.07%) -1.24% (-1.48% - -1.01%)	-0.89% (-1.26% - -0.51%)	< 0.001	-	-
Histopathology							
Esophageal Adenocarcinoma[e]	58,782 (57.0%)	2000 - 2008 2008 - 2011 2011 - 2018	2.13% (1.46% - 2.80%) -3.05% (-8.34% - 2.54%) 0.49% (-0.23% - 1.21%)	0.61% (-0.30% - 1.53%)	0.19	< 0.001	< 0.001
Squamous Cell Carcinoma[f]	34,084 (33.1%)	2000 - 2008	-2.81% (-3.03% - -2.59%)	-2.81% (-3.03% - -2.59%)	< 0.001		

[a]AAPC is calculated as average of APCs over the time period of 2000-2008.
[b]P-values < 0.05 were considered significant.
[c]Tests whether histopathology-specific trends were identical. P-value < 0.05 signifies the trends were not identical.
[d]Tests whether histopathology-specific trends were parallel. P-value < 0.05 signifies the trends were not equal.
[e]*ICD-O-3* Codes: 8140–8141, 8143–8145, 8190–8231, 8260–8263, 8310, 8401, 8480–8490, 8550–8551, 8570–8574, 8576
[f]*ICD-O-3* Codes: 8050-8078, 8083-8084

S399 Presidential Poster Award

Dupilumab Treatment Leads to Rapid and Sustained Improvements in Dysphagia

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Introduction: Eosinophilic esophagitis (EoE) is a chronic, type 2 inflammatory disease of the esophagus with substantially impaired quality of life; dysphagia symptoms are particularly burdensome. Dupilumab, a fully human monoclonal antibody, blocks the shared receptor component for IL-4/IL-13, key and central drivers of type 2 inflammation in EoE. In the 3-part LIBERTY-EoE-TREET phase 3 trial (NCT03633617), Parts A and B demonstrated that weekly (qw) dupilumab 300mg improved clinical, symptomatic, histologic, and endoscopic EoE aspects and was generally well tolerated in patients (pts) ≥12 years at Week 24; results from Part A were sustained up to 52 weeks in Part C. The objective of this analysis is to assess the effect of dupilumab vs placebo on the Dysphagia Symptom Questionnaire (DSQ) score through the 24-week double-blind treatment period and the 28-week extended treatment period of the EoE-TREET trial.
Methods: In Part A, 42 pts were randomized to dupilumab 300mg qw, and 39 to placebo. In Part B, 80 pts were randomized to dupilumab 300mg qw, and 79 to placebo for 24 weeks. From Part A, 40 dupilumab-treated and 37 placebo-treated pts continued to Part C and received dupilumab 300mg qw for an additional 28 weeks. The DSQ is a patient-reported outcome measure, comprising four questions on dysphagia; daily responses are collected and a biweekly total score calculated over 14 days ranging from 0-84 with higher scores indicating greater dysphagia frequency and severity.
Results: Baseline (BL) mean (standard deviation [SD]) DSQ scores in Parts A and B ranged from 32.2(12.66) to 38.4(10.70). The least squares mean change from BL in DSQ total score (standard error) for dupilumab vs placebo was –9.15(1.74) vs –3.50(1.88) in Part A (P=0.0166), and –12.32(1.40) vs –6.44(1.43) in Part B (P=0.0018) at Week 4; and –21.92(2.53) vs –9.60(2.79) in Part A (P=0.0004), and –23.78(1.86) vs –13.86(1.91) in Part B (P< 0.0001) at Week 24. In pts from Part A who continued to Part C, mean (SD) change in DSQ score from Part A BL was –23.44(16.15) for dupilumab/dupilumab pts and –21.71(17.14) for placebo/dupilumab pts. (Table)
Conclusion: In Parts A and B of the EoE-TREET trial, treatment with dupilumab 300mg qw resulted in a significant improvement in DSQ score compared to placebo as early as Week 4 and maintained through Week 24; improvements observed after 24 weeks in Part A were maintained through 52 weeks in Part C. Placebo/dupilumab pts saw similar improvement in Part C as Part A dupilumab pts.

Table 1. Absolute change from baseline in DSQ total score during the 24-week double-blind treatment period and 28-week extended active treatment period of weekly dupilumab 300mg or placebo.

DSQ total score	Placebo	Dupilumab 300mg qw
Part A		
N	39	42
Baseline, mean (SD)	35.1 (12.11)	32.2 (12.66)
Week 4, LS mean change (SE) LS mean difference (95% CI) P value vs placebo	–3.50 (1.88)	–9.15 (1.74) –5.65 (-10.28, -1.03) 0.0166
Week 24, LS mean change (SE) LS mean difference (95% CI) P value vs placebo	–9.60 (2.79)	–21.92 (2.53) –12.32 (–19.11, –5.54) 0.0004
Part B		
N	79	80
Baseline, mean (SD)	36.1 (10.55)	38.4 (10.70)
Week 4, LS mean change (SE) LS mean difference (95% CI) P value vs placebo	–6.44 (1.43)	–12.32 (1.40) –5.88 (–9.58, –2.18) 0.0018
Week 24, LS mean change (SE) LS mean difference (95% CI) P value vs placebo	–13.86 (1.91)	–23.78 (1.86) –9.92 (–14.81, –5.02) < 0.0001
	Placebo/Dupilumab 300mg qw	**Dupilumab 300mg qw/ Dupilumab 300mg qw**
Part A→C		
N	37	40
Week 52, mean change from Part A baseline (SD)	–21.71 (17.14)	–23.44 (16.15)

CI, confidence interval; LS, least squares; SD, standard deviation; SE, standard error; qw, weekly.

S400

A Cost Utility Model Supports Changes in Post-Treatment Surveillance Associated With the 2022 American College of Gastroenterology Guidelines

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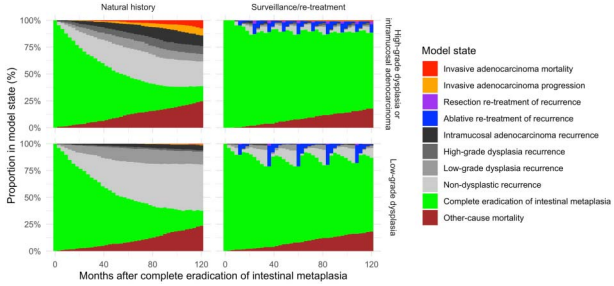
Introduction: Radiofrequency ablation is a safe and effective treatment for neoplastic Barrett's esophagus (BE), but surveillance after endoscopic eradication has only been studied observationally without any studies of this disease's natural history. Recent natural history modeling work has allowed qualified estimation of a natural history scenario. We sought to apply our multi-state model of post-ablation natural history to study the cost effectiveness of surveillance after endoscopic eradication of neoplastic BE.
Methods: We constructed a microsimulation cost-utility model of endoscopic surveillance after complete eradication of intestinal metaplasia (CEIM) with intervals as recommended by the 2022 American College of Gastroenterology BE guideline. A cohort of participants were modeled after the United States (US) Radiofrequency Ablation cohort in terms of demographics, worst prior histologic grade, and pre-treatment BE segment length. Transition probabilities for the natural history were estimates from published multi-state models. The model was Markov generalized to allow differing rates of progression based on BE characteristics as covariates to the multi-state model and for other-cause mortality to depend on age. There were states for: no recurrence, recurrence with various histologic grades, ablative re-treatment, endoscopic mucosal resection, invasive adenocarcinoma, and death. We considered a willingness-to-pay threshold of 100,000 2017 US dollars ($) per quality-adjusted life year (QALY). Model parameters and their sources are described in the Table.
Results: In the base case scenario of the model, surveillance and re-treatment decreased progression to invasive esophageal adenocarcinoma at ten years by 1.2% in LGD and 13.0% in HGD/IMC (Figure). Compared to the natural history scenario, the incremental cost effectiveness ratio for surveillance at ten years was $79,125 for LGD and $10,952 for HGD/IMC.
Conclusion: In the base case scenario of this cost-utility model, newly recommended surveillance intervals were highly cost effective for HGD/IMC and approached the margins of cost-effectiveness for LGD in a microsimulation cost-utility model. This supports the new guideline recommendation to decrease the frequency of post-treatment surveillance of HGD/IMC and LGD. While development of the model requires probabilistic sensitivity analysis and calibration, the model has the potential to inform the health economics of clinical processes after CEIM.

Table 1. Microsimulation model parameters in the base case scenario and their sources.

Model variable	*Base case value*	*Reference/details*
	Structural model assumptions	
Model cycle length	3 months	
Model time horizon	10 years	
Model starting year	2017	For other-cause mortality and inflation adjustment
Other cause mortality	Population	2020 Social Security actuarial cohort life Tables
Time for resection	1 cycle	Resection for all recurrent HGD or IMC
Resection success rate	100%	Simplifying assumption
Time for ablation	1 cycle	Repeated until successful
Discounting of costs/utilities	3%	Per year
	Probabilities per cycle from the literature	
Death from invasive adenocarcinoma	7.63%	SEER 5-Year Relative Survival Rates 2012-2018*
Complete eradication of intestinal metaplasia after recurrence	57.7%	Guthikonda et al., *The American Journal of Gastroenterology,* 2017
Cancer progression from recurrence	0.1625%	Guthikonda et al., *The American Journal of Gastroenterology,* 2017
	Utilities per cycle from the literature	
Surveillance after CEIM	97%	Boger et al., *Alimentary Pharmacology and Therapeutics,* 2010
Retreatment endoscopy	94%	Boger et al., *Alimentary Pharmacology and Therapeutics,* 2010
Esophageal adenocarcinoma	96%	Boger et al., *Alimentary Pharmacology and Therapeutics,* 2010
	Costs per cycle from the literature	
Surveillance endoscopy	$1,019	Inadomi et al., *Gastroenterology,* 2009†
Cost of cancer care	$13,532	Inadomi et al., *Gastroenterology,* 2009†
Cost of ablation re-treatment	$4,317	Inadomi et al., *Gastroenterology,* 2009† Assumed half cost of initial treatment
Cost of resection re-treatment	$934	Filby et al., *Journal of Comparative Effectiveness Research,* 2017**

*Assumes cumulative incidence = 1 – e^(-incidence x time).
†Assuming 17.7% inflation.
**Assumes 133% exchange rate with the British Pound.



[0400] **Figure 1.** Model state occupancy by months after complete eradication of intestinal metaplasia.

S401

Dupilumab Improves Clinical, Symptomatic, Histologic, and Endoscopic Aspects of EoE, Regardless of Prior Swallowed Topical Steroid Use

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Introduction: Swallowed topical corticosteroids (STC) are a first-line treatment for eosinophilic esophagitis (EoE) but are not uniformly effective. Dupilumab, a fully human monoclonal antibody, blocks the shared receptor component for IL-4/IL-13, key and central drivers of type 2 inflammation. In Parts A and B of the phase 3 LIBERTY-EoE-TREET (NCT03633617) study, weekly dupilumab 300mg improved clinical, symptomatic, histologic, and endoscopic aspects of EoE and was generally well tolerated in adult and adolescent patients with EoE. The objective of this analysis was to assess the efficacy of weekly dupilumab 300mg vs placebo at Week 24 in patients from Part B with and without prior STC use history for EoE.
Methods: Patients who received STCs for EoE ≤8 weeks prior to baseline were excluded from the study. Endpoints at Week 24 were: proportion achieving peak eosinophil count (PEC) ≤6/high-power field (hpf); absolute and % change in Dysphagia Symptom Questionnaire (DSQ) score; % change in PEC; absolute change in Histologic Scoring System (HSS) grade and stage scores and Endoscopic Reference Score (EREFS).
Results: 55/80 (69%) and 56/79 (71%) of dupilumab- and placebo-treated patients had STC use history; 38/80 (48%) and 39/79 (49%) of dupilumab- and placebo-treated patients had inadequate response/intolerance/contraindication to STCs. For patients treated with dupilumab qw vs placebo PEC≤6/hpf was achieved by 63.6% vs 5.4% of patients with, and 48.0% vs 8.7% without prior STC use. Difference vs placebo (95% CI) for patients with/without prior STC use: absolute change in DSQ −11.63 (−17.64,−5.62)/−6.79 (−15.78,2.20); % change in PEC −86.97 (−116.38,−57.57)/−91.23 (−124.23,−58.24); absolute change in EoE-HSS grade −0.73 (−0.86,−0.60)/−0.58 (−0.80,−0.35) and stage −0.74 (−0.87,−0.62)/−0.54 (−0.75,−0.33); absolute change in EREFS −4.2 (−5.31,−3.18)/−2.7 (−4.58,−0.86); % change in DSQ −49.3 (−72.3, −26.2)/−20.8 (−58.3,16.7). Dupilumab was generally well tolerated in the intent-to-treat population; the most common TEAEs for dupilumab/placebo were injection-site reactions (37.5/33.3%).
Conclusion: In Part B of this phase 3 study, dupilumab improved clinical, symptomatic, histologic, and endoscopic aspects of EoE regardless of STC use history.

S402

Voice Enabled Artificial Intelligence for Detection of Pathologic Gastroesophageal Reflux Disease and Barrett's Esophagus

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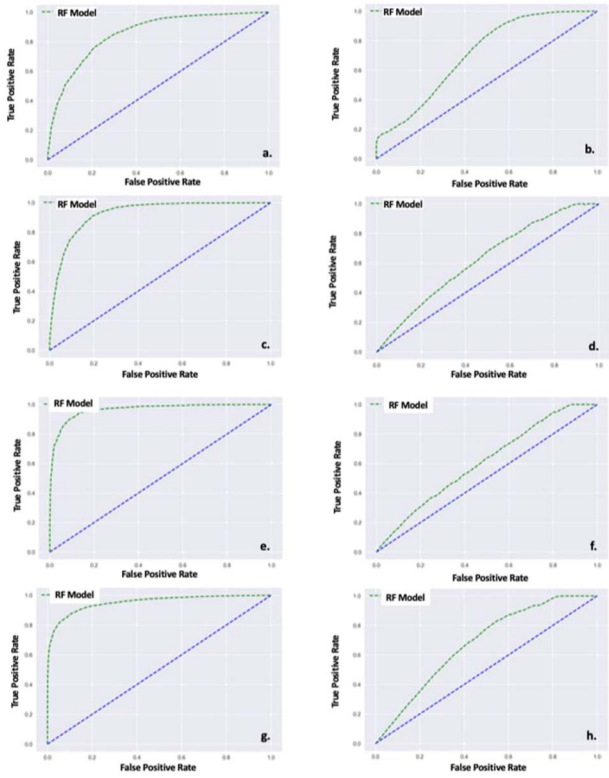
Introduction: Gastroesophageal reflux disease (GERD) can lead to voice alterations, including hoarseness. The study aim was to identify specific voice biomarkers associated with pathologic GERD using advanced machine learning tools. Detection of pathologic GERD, including Barrett's esophagus (BE), with voice biomarkers can serve as a simple non-invasive screening tool.
Methods: Voice recordings were obtained from patients undergoing clinically indicated esophagogastroduodenoscopy (EGD) and/or ambulatory pH monitoring studies. Patients were excluded if they had another condition (pulmonary, cardiac, neurologic, etc) associated with voice disturbance. Voice recording consisted of a 6-sentence standard script read over 25-45 seconds. GERD(+) patients were defined as those with erosive esophagitis (LA grade B-D) or peptic stricture or acid exposure time >6%. BE was defined as columnar mucosa >1 cm with confirmed specialized intestinal metaplasia. Patients without these findings were considered GERD(-). A vocally normal group consisting of individuals with normal voice as judged by speech pathology evaluation was used as an independent control group. Random forest models were trained using a balanced number of subjects per condition using random participant selection from the majority class. Using a 5-fold nested cross validation strategy, features were selected and ranked within fold, and a series of models were trained within each fold using recursive feature elimination. The average F1 score, a harmonic mean of precision and recall (range 0-100), across all folds was reported to assess performance.
Results: The study sample consisted of 245 patients (vocally normal, n=98; GERD(-), n=78; GERD(+), n=34; BE, n=35) (Table). Feature rankings suggested voice quality differences between groups relating to voice signal periodicity. The model demonstrated excellent ability to discern BE and GERD(+) from the vocally normal group with F1 scores 82 (males) and 89 (females) and 80 (males) and 80 (females) for BE and GERD(+) respectively. There was also a good voice signal distinguishing BE and GERD(+) groups from GERD(-) with F1 scores ranging from 60-70. Figure shows model Receiver Operating Characteristics.
Conclusion: These results suggest that voice biomarkers may be useful as a non-invasive tool in the detection of pathologic GERD/BE. A deep learning diagnostic model will be developed using the identified voice biomarkers.



[0402] **Figure 1.** Receiver Operating Characteristics for a Random Forest (RF) Model for males a) BE vs. Normal Voice b) BE vs. GERD(-) c) GERD(+) vs. Normal Voice d) GERD(+) vs. GERD(-); females e) BE vs. Normal Voice f) BE vs. GERD(-) g) GERD(+) vs. Normal Voice h) GERD(+) vs. GERD(-).

Table 1. Baseline patient characteristics in study subgroups

Subgroup	Sex	Number of patients	Mean age in years (SD)
Barrett's esophagus	Female Male	13 22	65 (15) 67 (9)
Gastroesophageal reflux disease (+)	Female Male	23 11	51 (14) 53 (19)
Gastroesophageal reflux disease (-)	Female Male	48 30	55 (15) 59 (15)
Vocally normal	Female Male	64 34	28 (11) 34 (15)

S403

Dupilumab Reduces the Emotional and Dysphagia-Related Impacts of Eosinophilic Esophagitis to Improve Health-Related Quality of Life

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Introduction: Eosinophilic esophagitis (EoE) is a chronic, type 2 inflammatory disease of the esophagus which substantially impairs quality of life (QoL). Dupilumab, a fully human mAb, blocks the shared receptor component for IL-4/IL-13, key drivers of type 2 inflammation in EoE. In the 3-part LIBERTY-EoE-TREET phase 3 trial (NCT03633617), Parts A and B demonstrated that weekly (qw) dupilumab 300mg improved clinical, symptomatic, histologic, and endoscopic aspects of EoE and was generally well tolerated in patients (pts) ≥12 years at Wk 24. The objective of this post-hoc analysis was to assess the effect of dupilumab vs placebo on improving aspects of QoL using the EoE Impact Questionnaire (EoE-IQ), a novel disease-specific measure of health-related QoL in EoE patients, during the 24-wk double-blind treatment period in Parts A and B.
Methods: In Part A, 42 pts received dupilumab 300mg qw, and 39 received placebo. In Part B, 80 pts received dupilumab 300mg qw, and 79 received placebo for 24 wks. The EoE-IQ is a patient-reported 11-item questionnaire that measures the impact of EoE on emotional, social, work and school, and sleep aspects of a patient (over a 7-day recall period). It was developed in line with best practices in the field of clinical outcomes assessment and includes the most relevant QoL impacts of EoE as identified through literature review and discussion with therapeutic area experts and confirmed via patient interviews. Response to each item is on a 5-point scale ranging from 1-5 with a higher score indicating a more negative impact on QoL.
Results: The most burdensome impacts of EoE at baseline were related to overall emotional impact and anxiety around dysphagia (Table). Dupilumab showed a nominally significant reduction vs placebo in 6 items in Parts A and B: 'bothered', 'worried about swallowing', 'worried about choking', 'worried about swallowing in public', 'social activities', 'sleep disruption' (all nominal $p< 0.05$), and in 1 additional item in Part B ('embarrassed', nominal $p< 0.05$). The largest placebo adjusted change from baseline to Wk 24 was observed in items relating to overall emotional impact and anxiety, including 'worried about swallowing in public' (Part A: –0.90; Part B: –0.45), 'bothered' (–0.64; –0.53), 'worried about swallowing' (–0.73; –0.65), and 'worried about choking' (–0.61; –0.57).
Conclusion: EoE QoL was improved among pts on dupilumab 300mg qw, with improvement driven by emotional and social impacts, and sleep.

Table 1. EoE-IQ at baseline and after 24 weeks treatment with weekly dupilumab 300mg or placebo. Values after first rescue treatment use were set to missing (censoring), then multiple imputation was used to impute missing values.

EoE-IQ Item	Mean absolute value at baseline Dupilumab 300 mg qw	Mean absolute value at Week 24 Dupilumab 300 mg qw	LS Mean Difference vs placebo	*P* value
Part A				
1. Bothered	3.08	1.80	–0.64	**0.0043**
2. Worried swallowing	2.88	1.69	–0.73	**0.0011**
3. Worried choking	2.42	1.60	–0.61	**0.0040**
4. Embarrassed	1.91	1.34	–0.21	0.2336
5. Worried swallowing public	2.80	1.46	–0.90	**0.0001**
6. Social activities	2.06	1.40	–0.43	**0.0311**
7. Family	1.44	1.29	–0.20	0.2560
8. Friends	1.39	1.28	–0.31	0.0813
9. Keep up work/school	1.48	1.30	–0.28	0.1379
10. Miss work/school	1.37	1.34	–0.09	0.5504
11. Sleep disruption	1.82	1.21	–0.42	**0.0027**
Part B				
1. Bothered	3.50	1.97	–0.53	**0.0004**
2. Worried swallowing	3.10	1.60	–0.65	< **0.0001**
3. Worried choking	2.72	1.45	–0.57	< **0.0001**
4. Embarrassed	2.21	1.28	–0.28	**0.0141**
5. Worried swallowing public	2.96	1.53	–0.45	**0.0020**
6. Social activities	2.34	1.35	–0.30	**0.0117**
7. Family	1.72	1.22	0.01	0.8765
8. Friends	1.68	1.19	–0.06	0.4409
9. Keep up work/school	1.81	1.32	–0.08	0.4170
10. Miss work/school	1.32	1.18	–0.09	0.3390
11. Sleep disruption	1.94	1.36	–0.22	**0.0409**

EoE-IQ, Eosinophilic Esophagitis Impact Questionnaire; LS, least squares; qw, weekly.

S404

Quality Indicator Development for the Approach to Ineffective Esophageal Motility: A Modified Delphi Study

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Introduction: Ineffective esophageal motility (IEM) is identified in up to 30% of patients undergoing esophageal high resolution manometry (HRM) based on the Chicago Classification version 4.0. The clinical significance of this pattern is not established and management remains challenging due to a limited framework guiding gastroenterologists when IEM is identified. **Aim**: To establish quality indicators for approaching IEM when identified on esophageal HRM.
Methods: Using RAND/University of California, Los Angeles (UCLA) Appropriateness Methods, we employed a modified-Delphi approach for quality indicator statement development. Quality indicators were proposed based on prior literature. Experts independently and blindly scored proposed quality statements on importance, scientific acceptability, usability, and feasibility in a three-round iterative process. Highly valid quality indicators reached scores with ≥80% agreement in the 7-9 range (on a 9-point Likert scale) across all four categories.
Results: There were 10 experts in the management of esophageal diseases invited to participate and all (100%) rated 12 proposed quality indicator statements. In round one, 7 (58.3%) quality indicators were rated with mixed agreement (< 80% agreement across all four categories). Statements were modified based on panel suggestion, modified further following round two's virtual discussion, and in round three voting identified 2 highly valid quality indicators, 4 moderately valid, and 1 invalid. In total, 2 (16.7%) quality indicators reached high validity. The panel agreed on the concept of determining if IEM is clinically relevant to the patient's presentation and managing GERD rather than the IEM pattern (Table). The panel disagreed in all four domains on the use of promotility agents (e.g., prucalopride, metoclopramide) in IEM, and had mixed agreement that IEM with contraction reserve on pre-operative HRM can be viewed similar to a manometric pattern without IEM specific to anti-reflux surgery, probably reflecting the lack of solid scientific evidence on this pattern.
Conclusion: Using a robust methodology, two IEM quality indicators were identified. These quality indicators can track performance when physicians identify this manometric pattern on HRM with the goal of ultimately improving patient outcomes. This study further highlights the challenges met with IEM, and the need for additional research to better understand the clinical importance of this manometric pattern.

Table 1. Proportion of Expert Agreement on Proposed Quality Indicators: Round #2

Statements	Proportion Agreement (%) with high validity			
	Importance	Scientific Acceptability	Usability	Feasibility
IF a high resolution esophageal manometry reveals >70% ineffective swallow sequences then the manometric pattern is consistent with IEM	60	60	90	100
IF a high resolution esophageal manometry reveals >= 50%	50	60	90	100
IF a patient's high resolution esophageal manometry reveals IEM, THEN a member of the care team should assess if the manometric pattern is clinically relevant.	90	80	80	100
IF a patient's high resolution esophageal manometry reveals IEM, THEN a member of the care team should communicate the clinical relevance of this manometric pattern to the patient.	80	70	60	90
IF a patient has gastroesophageal reflux disease (GERD) and a manometric pattern of IEM, THEN control of GERD is the main approach to patient management.	90	80	90	100
IF a patient with a manometric pattern of IEM and contractile reserve on pre-operative high resolution esophageal manometry is being considered for anti-reflux surgery, THEN surgical management should not differ from a patient without IEM.	40	50	60	60
IF a patient with a manometric pattern of IEM and absent contractile reserve on pre-operative high resolution esophageal manometry is being considered for anti-reflux surgery, THEN the care team should discuss the increased risks of post-operative dysphagia.	70	60	60	80

S405

Gene Expression and Pathway Analyses Reveal Distinctions Between Eosinophilic Esophagitis Pre and Post Treatment With Glucocorticoids

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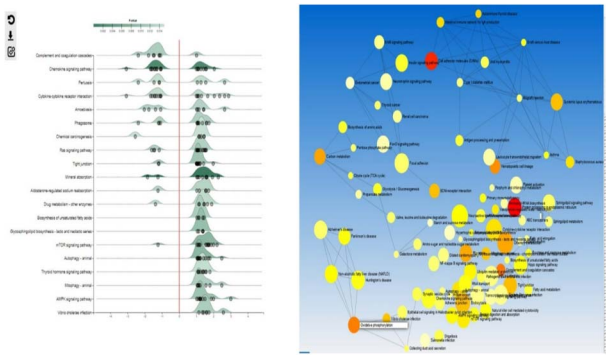
Introduction: Eosinophilic esophagitis (EoE) is a distinct entity causing significant morbidity and that which responded to anti-allergic treatment. We performed a secondary analysis of gene expression microarray GSE36725 dataset published in the Gene Expression Omnibus using samples of patients with EoE before and after successful treatment with glucocorticoids.
Methods: Total RNA was extracted from the formalin fixed tissue and hybridized to Affymetrix Gene ST 1.0 Arrays and microarray data analyzed for 10 samples (5 pairs). The Affymetrix probe IDs of all the rows were converted to their respective gene IDs by DAVID (Database for Annotation, Visualization and Integrated Discovery) (https://david.ncifcrf.gov/) tool. The converted dataset was analyzed using the Networkanalyst.ca software.
Results: A total of 32 significant pathways were found after Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment analysis by Welch's t test ranking. $P < 0.05$ was regarded as indicating statistical significance. The top two enriched pathways were Mineral absorption (P=0.0067) and chemokine signaling (P=0.0084) and the top two enrichment categories were protein processing in endoplasmic reticulum (P< .05) and cell adhesion molecules (P< .05) (Figure). The top genes upregulated with glucocorticoid treatment included CRISP3 (5.49-fold change), SPINK7 (5.49-fold change), TGM3 (5.49-fold change), EPGN (5.49-fold change) and UPK1A (5.49-fold change). Among genes downregulated with glucocorticoid treatment included TNFAIP6 (-5.29-fold change), POSTN (-4.57-fold change), JCHAIN (-4.55-fold change), ALOX15 (-3.36-fold change) and CCL26(-3.07-fold change). Based on our results, CRISP3, SPINK7 and TGM3 genes seem to be upregulated with glucocorticoid treatment whereas, TNFAIP6, POSTN and JCHAIN are the top genes that are downregulated with glucocorticoid treatment that have the highest sensitivity and specificity as diagnostic markers for successful treatment of EoE.
Conclusion: CRISP3(Cysteine-rich secretory protein 3) and SPINK7(serine peptidase inhibitor, kazal type 7) are part of the differentiation program of human esophageal epithelium and that SPINK7 depletion occurs in a human allergic, esophageal condition termed eosinophilic esophagitis and are called as key barrier genes. This study shows that Glucocorticoid treatment improves the esophageal epithelial barrier integrity in cases of EoE.



[0405] **Figure 1.** Network analysis of enriched pathways.

S406

Post-Reflux Swallow-Induced Peristaltic Wave Index and Mean Nocturnal Baseline Impedance Predict PPI Response in Patients With Reflux Hypersensitivity

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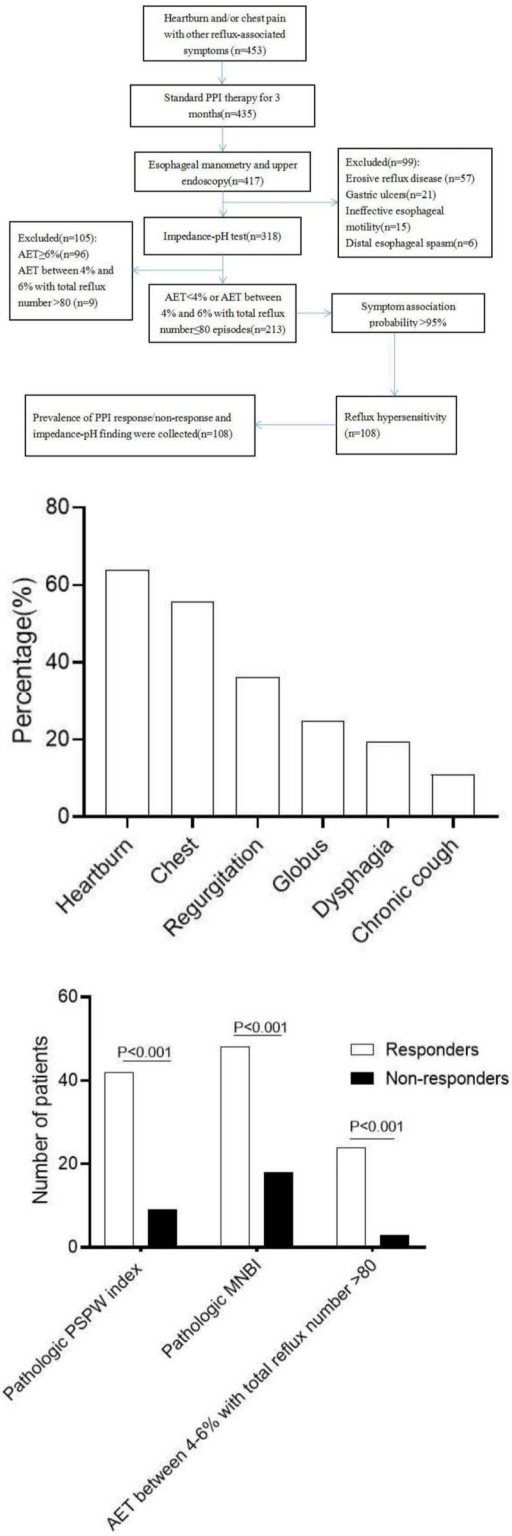
Introduction: Post-reflux swallow-induced peristaltic wave (PSPW) index and mean nocturnal baseline impedance (MNBI) are associated with proton pump inhibitor (PPI) response in GERD patients. Few data concerning these variables in patients with reflux hypersensitivity (RH) are available. This study aimed to assess, in RH patients, the prevalence of PPI responders and nonresponders, and investigate the role of the predictive value of impedance-pH variables, including PSPW and MNBI for PPI response.
Methods: A total of 108 patients RH patients who met ROME IV criteria were prospectively recruited from June 2018 to May 2021. The prevalence of PPI responders/nonresponders was calculated, and impedance-pH variables were compared between the response and non-response groups. Multiple logistic regression was used to investigate predictors for PPI response (Figure).

Results: In a total of 108 patients with RH, 60 patients (55.56%) were the PPI responders, and 48 (44.44%) were the nonresponders. When compared with the nonresponderss, the PPI responders had a lower PSPW index (54.55±14.78 vs. 60.56±13.00, P=0.032) and a decreased value of MNBI (2391.36±337.44 vs. 2595.32±361.14, P=0.017). Multivariate logistic regression revealed that only pathologic PSPW index (OR: 2.064) and MNBI (OR: 1.800) exerted a significant influence on PPI response (Table).

Conclusion: Nearly half of RH patients were PPI nonresponders. Pathologic PSPW index and MNBI were independently associated with PPI response in RH patients, highlighting the importance of performing impedance-pH tests.



[0406] **Figure 1.** Flow chart of study participation. (2) Frequency of each RH in the studied population. The majority of patients presented heartburn(69, 63.89%) and chest pain (60, 55.56%); 75 out of the 108 patients (69.44%) presented typical symptoms. RH: Reflux hypersensitivity. (3) The comparison of the pathologic PSPW index, pathologic MNBI, AET between 4-6% with total reflux number >80 between PPI response group and non-response group. There were more patients in PPI response group than non-response group (42 vs. 9, P<0.001) with regard to pathologic PSPW index.

Meanwhile, more patients in PPI response group were noted for pathologic MNBI (48 vs. 18, P<0.001) and AET between 4-6% with total reflux number >80 (24 vs. 3, P<0.001) when compared with non-response group.

Table 1. Multivariate logistic regression analysis of odds ratio of PPI response in the studied population

	RH patients(n=108)		
	OR	95%CI	P
AET< 4%	1.176	0.297-5.681	0.289
Pathologic PSPW index	2.064	1.356-7.367	0.026
Pathologic MNBI	1.800	0.999-4.302	0.049
Presence of typical symptoms	0.580	0.065-5.156	0.625

S407

Baseline Impedance Measured During High Resolution Manometry Correlates With the Endoscopic Presence and Degree of Esophagitis

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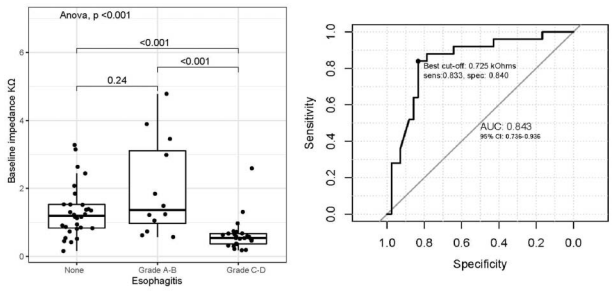
Introduction: Baseline impedance measured during high-resolution impedance manometry (HRIM) showed adequate performance in distinguishing patients with gastroesophageal acid reflux disease (GERD) from controls. Hypothetically, this metric might also detect the presence and severity of esophagitis, however data is limited. We investigated the performance of baseline impedance measured during HRIM in identifying esophagitis, particularly grades C and D (as those typically benefit from long term acid suppression and Barrett's esophagus screening).
Methods: This is a retrospective study including patients with pH study proven GERD, who underwent an upper endoscopy and HRIM at the University of Kentucky between 9/2015 and 10/2021. Baseline impedance was calculated using the smart mouse tool as the mean impedance for the 3 cm above the lower esophageal sphincter during the 30 seconds landmark period. Esophagitis severity was defined on endoscopy using the Los Angeles classification system. The ability of impedance values to detect severe esophagitis was assessed using receiver operator curves (ROC).
Results: We included 67 patients (30 with no esophagitis, 2 grade A, 10 grade B, 19 grade C and 6 with grade D esophagitis). Baseline impedance were significantly different (overall anova, p < 0.001) between no esophagitis, mild (grade A-B) and severe (grade C-D) esophagitis (being lower as esophagitis severity increases). The difference was less pronounced between no vs. mild esophagitis (p=0.24), compared to no vs. severe esophagitis (p< 0.001) and mild vs. severe esophagitis (p< 0.001) (Figure A). The ROC analysis (Figure B) showed that the baseline impedance had good ability to discriminate those with severe esophagitis; area under the curve 0.843 (95% CI: 0.736-0.936). Using a baseline impedance threshold of 0.725 kOhms, this metric had a sensitivity 83.3%, specificity 84%, and negative predictive value 90% in identifying severe esophagitis. The baseline impedance measurements were then independently repeated by three of the study authors, blinded to each other's reading. The measurements had high intra-class correlation coefficient (ICC) 0.87 (95% CI: 0.82-0.91) indicating excellent agreement among operators.
Conclusion: Baseline impedance measured during HRIM using the described technique had an acceptable performance and reproducibility in assessing the presence and severity of esophagitis. After further validation, this can serve as a rapid, less invasive complementary tool in GERD diagnostics.



[0407] **Figure 1.** (A) Boxplots demonstrating individual data points, median and interquartile range for baseline impedance among the esophagitis subgroups. (B) Receiver operating characteristic curve of baseline impedance to discriminate severe esophagitis (C-D) from those with mild / no esophagitis. anova: Analysis of Variance; AUC: area under the curve; CI: confidence interval *confidence interval was calculated using 1000 stratified bootstrap replicates.

S408

Risk of Barrett's Esophagus After a Negative Index Endoscopy: An Analysis Using the GIQUIC National Benchmarking Registry

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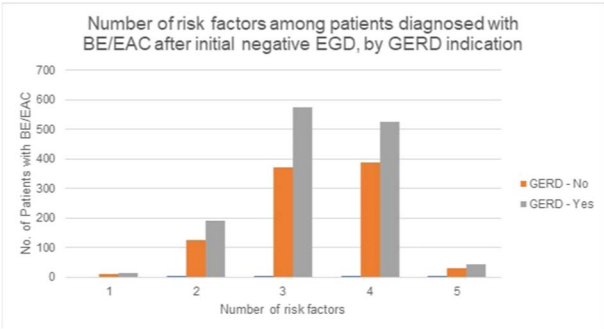
Introduction: Current guidelines recommend single screening endoscopy in patients with multiple risk factors for Barrett's esophagus (BE). Data suggesting a low risk of BE after a negative esophagogastroduodenoscopy (EGD) are limited by small sample size and short follow-up after initial EGD. There remains a possibility of missed or incident BE after a negative index EGD. With the advent of cost-effective, non-endoscopic BE screening tools, repeat screening may be a consideration in high-risk patients. We aimed to determine the prevalence and predictors of BE after a negative index evaluation, on repeat EGD in a large national endoscopic database.
Methods: We analyzed data from the GI Quality Improvement Consortium Registry (GIQuIC), a large nationwide quality benchmarking clinical registry, from 2013-2020. We included patients who underwent at least 2 EGDs. Patients diagnosed with or with a history of BE or esophageal adenocarcinoma (EAC) at index EGD were excluded. Data on prevalence of BE/EAC on second/subsequent EGDs, and known risk factors for BE were collected. Univariate and multivariate logistic regression analyses were performed to assess association between predictors and outcome of BE/EAC on repeat EGD.
Results: The prevalence of BE at index endoscopy in the GIQuIC database is 4.2%. A total of 124,223 patients underwent at least 1 EGD (mean number of repeat EGDs 1.39, range 1-63). Of these, 2,272 (1.83%, 95% CI 1.75, 1.90%) were found to have BE/EAC. Table shows the prevalence of BE/EAC stratified by risk factors. Risk factors associated with BE/EAC on repeat endoscopy included GERD (OR: 3.36, p < 0.01), male sex (OR: 1.85, p< 0.01), White race (OR: 1.76, p< 0.01), age 50-80 years (OR: 1.53, p< 0.01), and obesity (OR: 1.20, p=0.04). In patients with GERD and an additional risk factor, the prevalence of BE/EAC was higher at 3.4% at a mean (SD) time interval of 13.1 (14.1) months after a negative index EGD. The prevalence of BE/EAC increased with increasing number of risk factors (Figure).
Conclusion: The prevalence of BE/EAC after an initial negative index EGD was approximately 2% (44% of baseline BE prevalence in GIQuIC), with most cases diagnosed within 5 years. In patients with two or more risk factors, the prevalence was two fold higher. Repeat evaluation for BE, particularly with non-endoscopic techniques, may be considered in patients with multiple risk factors, 1-5 years after initial negative evaluation.



[0408] **Figure 1.** The distribution of BE/EAC diagnosed after initial negative endoscopy stratified by the number of risk factors present per patient and GERD.

Table 1. Baseline characteristics of patients with and without BE/EAC on follow-up EGD after negative index EGD

Characteristic	No BE/EAC (N = 121,951, 98.17%)	BE/EAC (N = 2,272, 1.83%)	p-value
Age (years)			< 0.0001
< 50	27,466 (22.8%)	411 (18.1%)	
50-80	85,262 (69.9%)	1,762 (77.6%)	
>80	8,890 (7.3%)	99 (4.4%)	
Male sex	48,224 (39.5%)	1,247 (54.9%)	< 0.0001
White race	82,8384 (82.8%)	1,663 (90.0%)	< 0.0001
GERD*	39,035 (32.0%)	1,346 (59.2%)	< 0.0001
Obesity (BMI >30)	6,600 (35.5%)	217 (40.3%)	0.0204
Time interval between EGDs			< 0.0001
< 1year	69,485 (57.0%)	1,475 (64.9%)	
1 to < 3 years	41,828 (34.3%)	617 (27.2%)	
v3 to < 5 years	10,134 (8.3%)	174 (7.7%)	
>=5 years	504 (0.4%)	6 (0.3%)	
Indication for second EGD			
Screening for BE	1,218 (1.0%)	130 (5.7%)	< 0.0001
Reflux	39,035 (32.0%)	1,346 (59.2%)	< 0.0001
Ulcer	15,071 (12.4%0	264 (11.6%)	0.2890
Weight loss	2,493 (2.0%0	19 (0.8%)	< 0.0001
Dysphagia	41,391 (33.9%)	547 (24.1%)	< 0.0001
Esophagitis	11,607 (9.5%)	570 (25.1%)	< 0.0001
GI bleeding/anemia	25,296 (20.7%)	227 (10.0%)	< 0.0001
Vomiting	6,657 (5.5%)	84 (3.7%)	0.0002
Other	12,346 (10.1%)	185 (8.1%)	0.0019
*Based on indication of 2nd EGD			

S409

The Prevalence of Dysplasia in Ultrashort Barrett's Esophagus in a United States Veteran Population

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Introduction: Surveillance of Barrett's esophagus (BE), the only known precursor to esophageal adenocarcinoma (EA), is the basis for secondary prevention of EA. Length of BE has been associated with EA risk, and current guidelines recommend against biopsies of ultrashort BE (i.e., BE length < 1cm), however this is based on limited evidence. Our study aims to characterize the prevalence of dysplasia in ultrashort BE.

Methods: We conducted a retrospective cohort study at the Houston VA of consecutive patients with new BE diagnosis from 11/1990-1/2019 with follow-up through 12/2021. We classified ultrashort BE as length < 1cm at initial BE-diagnosing (index) EGD. We defined persistent ultrashort BE as those with ultrashort BE on index EGD and all follow-up EGDs through the entire study period, requiring 2 or more EGDs. We calculated the prevalence of any dysplasia (indefinite [IND], low-grade [LGD], and high-grade [HGD]) and definite dysplasia (LGD and HGD). We examined the association of age, race, gender, body mass index (BMI), smoking history, and alcohol history with dysplasia in ultrashort BE and BE ≥1cm with chi-square test.

Results: Our cohort had 741 patients with BE. The mean follow-up time was 4.6 years (standard deviation, 5.5 years). Ultrashort BE was present in 20.2% (n=150) of BE patients. Of the 150 with ultrashort BE, 131 underwent at least two EGDs. Persistent ultrashort BE was present in 92 patients with BE (12.4%). The prevalence of any dysplasia and definite dysplasia were 24.0% (n=36, 29 IND, 2 LGD, 5 HGD) and 4.7% (n=7) among those with ultrashort BE, and 52.6% and 23.8% respectively among those with BE ≥1cm. Of those with ultrashort BE, 4 (2.7%) developed any dysplasia after the index EGD. Of those with persistent ultrashort BE, the prevalence of any dysplasia was 21.7% (n=20, 16 IND, 2 LGD, 2 HGD), while the prevalence of definite dysplasia was 4.4% (n=4). All cases of dysplasia in persistent ultrashort BE were diagnosed at the index EGD. Normal BMI was associated with any dysplasia among those with ultrashort BE (p-value 0.003), while non-Hispanic White race/ethnicity was associated with any dysplasia among those without ultrashort BE (p-value 0.009; Table).

Conclusion: While the prevalence of dysplasia is lower than that for BE ≥1cm, the prevalence of dysplasia in ultrashort BE in this study was as high as 24.0%. These patients may not be safely excluded from surveillance. Further studies should be conducted to confirm these findings.

Table 1. Sociodemographic and clinical characteristics of any dysplasia (indefinite for dysplasia, low-grade dysplasia, and high-grade dysplasia) among those with and without ultrashort Barrett's esophagus

	Ultrashort BE < 1cm at Index EGD			BE ≥1cm at Index EGD		
	No Dysplasia N=114 N (%)	Any dysplasia N = 36 N (%)	p-value	No Dysplasia N = 280 N (%)	Any Dysplasia N = 311 N (%)	p-value
Age						
< 60 years	45 (39.5%)	9 (25.0%)	0.115	94 (33.6%)	104 (33.4%)	0.973
60+ years	69 (60.5%)	27 (75.0%)		186 (66.4%)	207 (66.6%)	
Sex						
Male	106 (93.0%)	34 (94.4%)	0.759	269 (96.1%)	304 (98.1%)	0.147
Female	8 (7.0%)	2 (5.6%)		11 (3.9%)	6 (1.9%)	
Race						
Non-Hispanic White	86 (75.4%)	26 (72.2%)	0.47	216 (77.1%)	264 (85.9%)	**0.009**
African American	17 (14.9%)	4 (11.1%)		36 (12.9%)	16 (5.1%)	
Hispanic	11 (9.7%)	6 (16.7%)		26 (9.3%)	30 (9.7%)	
Other/Missing	0 (0.0%)	0 (0.0%)		2 (0.7%)	1 (0.3%)	
BMI Categories						
Normal (< 25)	18 (15.8%)	11 (30.6%)	**0.003**	52 (18.6%)	51 (16.4%)	0.878
Overweight (25-29.9)	38 (33.3%)	18 (32.1%)		106 (37.9%)	126 (40.5%)	
Obese (30+)	58 (50.9%)	7 (19.4%)		120 (42.9%)	132 (42.4%)	
Missing	0 (0.0%)	0 (0.0%)		2 (0.7%)	2 (0.6%)	
Smoking						
Never Smoker	29 (25.4%)	8 (22.2%)	0.813	78 (27.9%)	83 (26.7%)	0.429
Former Smoker	59 (51.8%)	18 (50.0%)		121 (43.2%)	150 (48.2%)	
Current Smoker	26 (22.8%)	10 (27.8%)		81 (28.9%)	78 (25.1%)	
Alcohol Use						
Never Alcohol use	36 (31.6%)	12 (33.3%)	0.862	128 (45.7%)	115 (37.0%)	0.088
Former Alcohol Use	28 (24.6%)	10 (27.8%)		58 (20.7%)	70 (22.5%)	
Current Alcohol Use	50 (43.9%)	14 (38.9%)		94 (33.6%)	126 (40.5%)	

Abbreviations: BE (Barrett's esophagus), cm (centimeter), BMI (body mass index)

S410

Algorithm Training and Independent Test Set Performance for a Molecular Non-Endoscopic Test for Detection of Esophageal Adenocarcinoma and Barrett's Esophagus in Multicenter Cohorts

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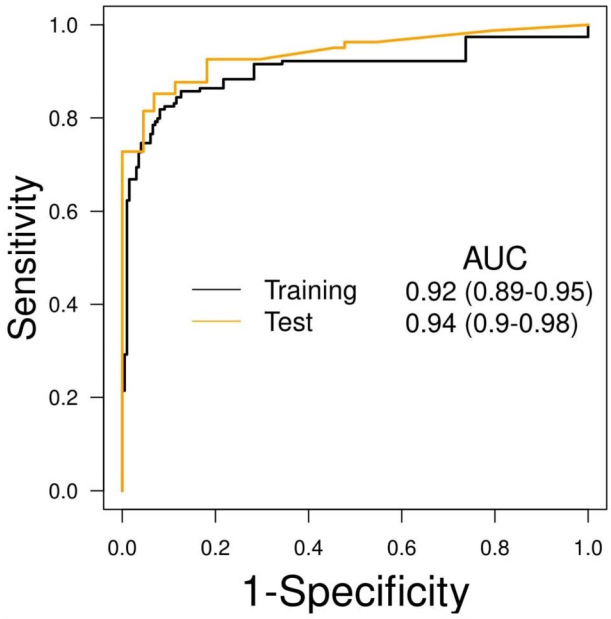
Introduction: Sedated endoscopy for Barrett's esophagus (BE) and esophageal adenocarcinoma (EAC) detection is invasive and expensive. Non-endoscopic BE/EAC detection tools have been guideline-endorsed to facilitate higher patient participation at lower cost. We previously described a promising panel of 5 methylated DNA markers (MDMs) assayed on esophageal specimens obtained by a sponge-on-a-string (SOS) cell collection device in phase II studies. We aimed to train an algorithm (establishing marker cut offs, to adjudicate samples as positive/negative) using a final MDM panel followed by testing in an independent sample set.

Methods: Algorithm training samples (N=352) were prospectively collected from patients seen at 6 US medical centers. Test samples (N=125) were obtained from an independent, NIH-funded study conducted at 3 US medical centers. Cases had columnar metaplasia with intestinal metaplasia; controls had no endoscopic evidence of BE. Histology was reviewed by expert GI pathologists. The SOS device (25 mm, 10 ppi) was swallowed and withdrawn after 6-8 minutes followed by criterion standard endoscopy within 24 hours. DNA was extracted and bisulfite treated. Five MDMs were blindly assayed using the long probe quantitative amplified signal method. The algorithm was set using cross-validated logistic regression. The locked algorithm was applied to assay results from the test set.

Results: Baseline characteristics of patients in training and test sets were comparable (Table). The final panel included 3 MDMs (*NDRG4, VAV3, and ZNF682)* and a reference marker *(B3GALT6)*. Overall sensitivity for BE/EAC detection in the training set was 81% (95% CI 76-88%) at 90% (85-94%) specificity. Overall BE/EAC sensitivity in the test set was 88% (78-94%) at 84% (70-93%) specificity. Sensitivity for HGD and EAC was 100% in the training and test sets. Sensitivity for short segment NDBE in the test set was 63% (38-84%). Areas under the receiver operating characteristic (AUROC) curve for BE/EAC detection were 0.92 (95% CI 0.89-0.95) and 0.94 (0.90-0.98) in the training and test sets, respectively (Figure). The algorithm was not influenced by age, sex, or smoking history. 97% of participants in the training set and 85% in the test set successfully swallowed the SOS device, which was well tolerated and safe.

Conclusion: A 3-MDM panel for BE/EAC detection demonstrated excellent sensitivity for high risk BE cases in multi-center case control training and test sets.



[0410] **Figure 1.** Area under the receiver operating characteristics curves for a 3-marker methylated DNA panel assayed from cytology specimen extracted DNA in training and test sets.

Table 1. Baseline characteristics of patients and performance characteristics of SOS test (overall sensitivity and specificity, and stratified by BE dysplasia grade) in training and test sets

Variable	Training Set (N=198 controls,154 cases)		Test Set(N= 44 controls,81 cases)		P value (comparing training and test sets)
	Control	Case	Control	Case	
Mean (SD) age	55 (13)	65 (10)	52 (15)	65 (11)	0.312
Male Sex (%)	102 (52)	119 (77)	17 (39)	64 (79)	0.992
Mean (SD) BMI	29 (7)	30 (6)	30 (7)	30 (6)	0.283
Ever Smokers %	77 (39)	87 (56)	18 (41)	47 (58)	0.733
Mean *SD) BE length, cm	-	4 (3)	-	5 (3)	0.070
Long segment BE, N, (%)	-	97 (63)	-	56 (69)	0.426
Short segment BE, N (%)	-	57 (37)	-	25 (31)	
BE dysplasia grade, N (%)					
EAC	-	12 (8)	-	2 (2)	
HGD	-	18 (12)	-	11 (14)	
LGD	-	7 (4)	-	10 (12)	
IND	-	18 (12)	-	14 (17)	
NDBE (long segment)	-	57 (37)	-	25 (31)	
NDBE (short segment)	-	42 (27)	-	19 (24)	

	Training Set % Positive (95% CI)	Test Set % Positive (95% CI)
Overall	81% (76-88%)	88 (78-94)
Dysplasia grade		
EAC	100 (100-100)	100 (16-100)
HGD	100 (100-100)	100 (72-100)
LGD	71 (0-100)	90 (55-100)
IND	74 (0-100)	93 (66-100%)
NDBE (long segment)	91 (73-100)	96 (80-100%)
NDBE (short segment)	61 (25-100)	63 (38-84%)
Control (No BE)	10 (2-21)	16 (7-30)

S411

The Use of Mean Nocturnal Baseline Impedance for Aiding in Reflux Disease Diagnosis and Etiology Evaluation

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Introduction: Traditional parameters for reflux disease evaluation are often limited in their diagnostic value when evaluating the etiology of the reflux. We used a novel parameter, mean nocturnal baseline impedance (MNBI), to determine if this value can help further characterize the reflux disease. The aim of our study was to determine if the MNBI value could be used to delineate the diagnosis of pathological GERD from functional heartburn in patients with possible non-erosive reflux disease (NERD) and to evaluate how well the MNBI value correlates with erosive reflux disease (ERD) vs NERD.
Methods: We performed a retrospective study at a tertiary care, academic center in North Carolina of patients with gastroesophageal reflux symptoms who underwent an esophagogastroduodenoscopy (EGD) and 24 h multichannel intraluminal impedance-pH (MII-pH) testing from January 2018 to October 2021. Reviewers blindly analyzed EGD and MII-pH findings of 73 patients with confirmed ERD and 527 patients with non-erosive reflux disease evaluating for MNBI value, esophageal acid exposure time (AET), number of total reflux events, and the response to PPI therapy.
Results: The major findings of our study were that patients with normal total AET were more likely to have a normal MNBI value ($p< 0.0001$), with an abnormal MNBI value cutoff of 2.292 (kOhm), than pH-positive NERD patients as shown in Tables 1a-1b and 1e-1f. Additionally, an abnormal MNBI value helped predict which patients were pH-positive patients with erosive esophagitis when either total AET cutoff criteria were used ($p< 0.0001$) as shown in Table 1c-1d. In addition, patients with an abnormal MNBI value were more likely to be pH-positive NERD patients ($p< 0.0001$).
Conclusion: Using the MNBI value increased the ability to determine if a patient with non-erosive reflux symptoms were more likely experiencing symptoms due to pathological GERD vs functional heartburn. This is due to patients with normal AET being more likely to have a normal MNBI value than patients with pH-positive NERD. These findings are consistent with previous findings from Frazzono, Savarino, etc. study and the study by Martinucci, de Bartoli, etc. Additionally, our results further confirmed previous studies that patients with ERD were more likely to have pH-positive ERD with an abnormal MNBI, which is reassuring for these characteristics to remain consistent. From these results, there is evidence that using MNBI enables us to better consistently diagnose and characterize GERD.

A. Variable	pH-positive NERD[1] N = 153[a]	pH-negative[2] N = 163[a]	*P*-Value
MNBI value (kOhm)	2.80 (± 1.42)	3.70 (± 1.38)	< 0.0001
Total Acid Exposure Time	13.6 (± 10.5)	1.67 (± 1.23)	< 0.0001
Abnormal MNBI value (kOhm)			< 0.0001
MNBI < 2.292	60 (39.2)	24 (14.7)	
MNBI ≥ 2.292	93 (60.8)	139 (85.3)	
Response to PPI Therapy			0.0979
No or poor	60 (39.2)	49 (30.1)	
Near max or good	93 (60.8)	114 (70.0)	

B. Variable	pH-positive NERD[3] N = 121[a]	pH-negative[4] N = 195[a]	*P*-Value
MNBI value (kOhm)	2.70 (± 1.46)	3.62 (± 1.35)	< 0.0001
Total Acid Exposure Time	15.9 (± 10.7)	2.21 (± 1.68)	< 0.0001
Abnormal MNBI value (kOhm)			< 0.0001
MNBI < 2.292	53 (43.8)	31 (15.9)	
MNBI ≥ 2.292	68 (56.2)	164 (84.1)	
Response to PPI Therapy			0.0285
No or poor	51 (42.1)	58 (29.7)	
Near max or good	70 (57.9)	137 (70.3)	

C. Variable	pH-positive EE[1] N = 33[b]	pH-negative EE[2] N = 9[b]	*P*-Value
Total Acid Exposure Time	15.5 (± 9.94)	1.28 (± 0.97)	< 0.0001
Erosive Esophagitis Patient			0.0050
With MNBI < 2.292	28 (84.8)	3 (33.3)	
With MNBI ≥ 2.292	5 (15.2)	6 (66.7)	

D. Variable	pH-positive EE[3] N = 30[b]	pH-negative EE[4] N = 12[b]	*P*-Value
Total Acid Exposure Time	16.6 (± 9.79)	2.16 (± 1.81)	< 0.0001
Erosive Esophagitis Patient			0.0056
With MNBI < 2.292	26 (86.7)	5 (41.2)	
With MNBI ≥ 2.292	4 (13.3)	7 (58.3)	

E. Variable	pH-positive EE[1] N = 120[c]	pH-negative EE[2] N = 91[c]	*P*-Value
MNBI value (kOhm)	2.06 (±1.10)	3.54 (1± 1.38)	<0.0001
Total Acid Exposure Time	14.4 (± 13.2)	1.61 (± 1.06)	<0.0001
Erosive Esophagitis Patient			<0.0001
With MNBI < 2.292	81 (67.5)	17 (18.7)	
With MNBI ≥ 2.292	39 (32.5)	74 (81.3)	

F. Variable	pH-positive EE[3] N = 98[c]	pH-negative EE[4] N = 113[c]	*P*-Value
MNBI value (kOhm)	1.92 (±1.06)	3.37 (1± 1.36)	<0.0001
Total Acid Exposure Time	16.6 (± 13.7)	2.21 (± 1.57)	<0.0001
Erosive Esophagitis Patient			<0.0001
With MNBI < 2.292	69 (70.4)	29 (25.7)	
With MNBI ≥ 2.292	29 (29.6)	84 (74.3)	

[0411] **Figure 1.** Area under the receiver operating characteristics curves for a 3-marker methylated DNA panel assayed from cytology specimen extracted DNA in training and test sets.

S412

Fundoplication Alone and Class II Obesity or Higher Are Associated With the Need to Restart Proton Pump Inhibitors After Anti-Reflux Surgery in Patients With Hiatal Hernia

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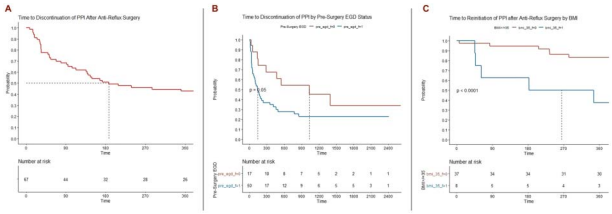
Introduction: Anti-reflux surgeries, including hiatal hernia repair (HHR), or fundoplication (F), improve acid reflux and decrease the need for proton-pump inhibitors (PPIs). Following surgery, most patients can discontinue PPIs. It remains unclear which factors are associated with the restarting of PPIs after their initial discontinuation. We aimed to determine features associated with the discontinuation and subsequent restarting of PPIs in patients with a hiatal hernia (HH) who undergo anti-reflux surgery.
Methods: We performed a retrospective study across four academic centers between January 2015 and December 2021 in patients with HH and GERD who underwent anti-reflux surgery, either HHR, F, or HHR+F. Wilcoxon Rank Sum and Fisher Exact Tests, and Kaplan-Meier Estimates with Cox Proportional Hazards Regression Analysis were utilized to determine features associated with PPI discontinuation and subsequent need to re-initiation. Statistical significance was defined as $p< 0.10$ given the small sample size. Statistical analysis was performed utilizing BlueSky Statistics software v. 7.0.
Results: A total of 75 patients were included. Table: Median times to PPI discontinuation and its subsequent restarting were 99.5 (IQR: 33.0-230.8) and 346.0 days (IQR: 183.0-880.0), respectively. At 3 months after surgery, being a never smoker, having had an upper endoscopy (EGD) or pH testing prior to surgery were associated with the initial discontinuation of PPI at $p< 0.10$. Having had an EGD increased the risk of discontinuation of PPI by 105%, $p=0.0540$. Body mass index (BMI), total percentage of acid exposure time, and DeMeester score were not associated with PPI discontinuation. After discontinuation, class II obesity or higher (BMI >/= 35.0 kg/m^2) was very strongly associated with the restarting of PPI, $p< 0.001$. Every increase of 5 kg/m^2 was associated with a 20% increased risk of needing to restart a PPI after anti-reflux surgery. Compared to HHR +/- F, a fundoplication alone increased the risk of restarting a PPI by 145% (HR 2.45, 95% CI: 0.92-6.49, $p=0.0722$). Figure**:** Having a large HH prior to surgery was not associated with restarting of PPI.
Conclusion: We found increasing BMI, class II obesity of higher, and a fundoplication alone were the strongest predictors for needing to restart a PPI after anti-reflux surgery in patients with HH. Failure of the fundoplication due to increasing body mass causing increased intrathoracic pressure may explain this finding. Further research is recommended.



[0412] **Figure 1.** Kaplan-Meier Estimates of A) Time to Initial Discontinuation of PPI after Anti-Reflux Surgery in Patients with Hiatal Hernia, B) Time to Discontinuation of PPI by Pre-Surgery EGD, and C) Time to Restarting of PPI after Anti-Reflux Surgery by Class II Obesity or Higher (>/= 35.0 kg/m2). Legend A: Red = All Patients; Legend B: Blue = EGD Performed Prior to Surgery, Red = EGD Not Performed Prior to Surgery; Legend C: Blue = BMI >/= 35 kg/m2, Red = BMI < 35 kg/m2.

Table 1. Baseline Characteristics According to Resolution of GERD at 1 Month after Anti-Reflux Surgery Followed by Cox Proportional Hazards Regression for Resolution of GERD and its Recurrence

	Unadjusted Univariable Analysis			Unadjusted Cox Proportional Hazards Regression			
	Median (IQR) or Fraction (%)			Initial Resolution of GERD		Recurrence of GERD	
	PPI Continued At 3 months N=39	PPI Discontinued At 3 months N=28	P value	HR (95% CI)	P value	HR (95% CI)	P value
Age at Surgery, per 10 years	69.0 (60.5-75.9)	63.3 (59.0-69.7)	0.12	0.83 (0.65-1.07)	0.15	0.80 (0.54-1.17)	0.25
Male	10 (25.6%)	6 (21.4%)	0.78	1.03 (0.53-1.98)	0.94	0.44 (0.13-1.50)	0.19
White race	39 (100%)	28 (100%)	NA	NA	NA	NA	NA
Hispanic ethnicity	0	0	NA	NA	NA	NA	NA
Height, per 30 cm	162.6 (156.1-174.5)	165.6 (163.-172.7)	0.19	1.60 (0.91-3.24)	0.19	0.63 (0.15-2.62)	0.53
Weight, per 10 kg	83.9 (69.7-92.2)	84.0 (73.8-93.2)	0.55	1.06 (0.91-1.24)	0.46	1.03 (0.77-1.38)	0.83
Body Mass Index, per 5 kg/m^2	30.7 (26.3-34.7)	31.2 (28.1-33.1)	0.83	1.09 (0.95-1.24)	0.22	1.20 (1.05-1.37)	**0.0074**
Body Mass Index ≥ 35 kg/m^2	8 (20.5%)	4 (14.3%)	0.75	0.81 (0.37-1.73)	0.58	8.45 (2.85-25.06)	**< 0.001**
Obesity	22 (56.4%)	16 (57.1%)	1.00	1.05 (0.58-1.88)	0.88	1.69 (0.68-4.21)	0.26
Never Smoker	27 (69.2%)	13 (46.4%)	**0.079**	0.77 (0.43-1.38)	0.38	0.81-5.09	0.13
Moderate to Severe Alcohol Use	7 (17.9%)	9 (32.1%)	0.25	1.20 (0.62-2.32)	0.59	0.34 (0.08-1.46)	0.15
Type 2 Diabetes	11 (28.2%)	3 (10.7%)	0.13	0.64 (0.30-1.37)	0.25	0.69 (0.20-2.36)	0.55
Interstitial Lung Disease	9 (23.1%)	3 (10.7%)	0.33	0.86 (0.41-1.79)	0.69	0.85 (0.28-2.58)	0.76
History of Aspiration	2 (5.1%)	0	0.51	1.15 (0.28-4.77)	0.85	1.13 (0.15-8.47)	0.91
Type of Surgery							
Hiatal Hernia Repair, alone	7 (17.9%)	4 (14.3%)	0.75	0.83 (0.48-1.63)	0.69	0.63 (0.15-2.72)	0.54
Mesh Utilized	7 (20.6%)	8 (36.4%)	0.23	1.44 (0.71-2.91)	0.32	0.51 (0.14-1.82)	0.30
Fundoplication, alone	5 (12.8%)	6 (21.4%)	0.51	1.47 (0.71-3.06)	0.30	2.45 (0.92-6.49)	**0.0722**
Nissen	27 (84.4%)	19 (79.2%)	0.73	1.28 (0.53-3.05)	0.58	1.22 (0.28-5.36)	0.79
Toupet	4 (12.5%)	4 (16.7%)	0.71	0.86 (0.33-2.20	0.75	0.42 (0.06-3.20)	0.41
Hiatal Hernia Repair and Fundoplication	27 (69.2%)	18 (64.3%)	0.79	0.89 (0.48-1.63)	0.69	0.65 (0.27-1.58)	0.35
Laparoscopic Approach	37 (94.9%)	28 (100%)	0.51	1.00 (0.24-4.14)	1.00	0.69 (0.09-5.19)	0.72
Estimated Blood Loss, per 20 mL	25.0 (10.0-30.0)	20.0 (10.0-30.0)	0.67	1.05 (0.95-1.15)	0.33	1.07 (0.95-1.19)	0.26
Elapsed Time for Surgery, per 30 minutes	140.0 (112.8-181.5)	142.0 (106.0-160.0)	0.58	1.07 (0.86-1.31)	0.56	1.09 (0.85-1.40)	0.51
Time ≥ 180 minutes	6 (30.0%)	3 (23.1%)	1.00	1.03 (0.40-2.68)	0.95	0.80 (0.21-2.97)	0.73
Pre-Surgical Evaluation							
EGD prior to surgery	26 (66.7%)	24 (85.7%)	**0.094**	2.05 (0.99-4.27)	**0.0540**	0.58 (0.22-1.50)	0.26
Esophagitis	5 (19.2%)	6 (25.0%)	0.74	1.37 (0.65-2.92)	0.41	1.37 (0.43-4.36)	0.60
Manometry Performed	16 (41.0%)	14 (50.0%)	0.62	1.43 (0.80-2.56)	0.22	0.38 (0.15-0.96)	**0.0407**
Normal Findings	4 (30.8%)	5 (38.5%)	1.00	1.45 (0.59-3.54)	0.42	0.71 (0.14-3.67)	0.68
pH Testing Performed	15 (38.5%)	4 (14.3%)	**0.053**	0.83 (0.43-1.57)	0.56	0.64 (0.24-1.76)	0.64
Total Acid Exposure, per 3 %	8.1 (5.3-14.1)	9.2 (7.1-11.8)	0.88	1.12 (0.85-1.48)	0.41	0.71 (0.42-1.22)	0.22
DeMeester Score, per 5 points	28.7 (20.5-48.3)	28.4 (21.4-40.8)	1.00	1.05 (0.92-1.19)	0.50	0.86 (0.21-2.97)	0.23
Large Hiatal Hernia on Endoscopy	13 (56.5%)	12 (57.1%)	1.00	1.04 (0.58-1.87)	0.90	0.54 (0.21-1.40)	0.21
Large Hiatal Hernia on CT Imaging	16 (41.0%)	13 (46.4%)	0.80	1.00 (0.51-1.99)	0.99	0.85 (0.29-2.44)	0.76
PPI prior to surgery	37 (94.9%)	25 (89.3%)	0.64	1.50 (0.47-4.85)	0.50	NA	NA
Endpoints							
All Patients (N=67, 8 patients discharged not on PPI after surgery)				Patients with Initial PPI Discontinuation (N=45)			
PPI Discontinued at Follow Up		46/67 (61.3%)		PPI Reinitiated at Follow Up		21/45 (60.0%)	
Median Time Discontinuation of PPI, days		99.5 (33.0-230.8)		Median Time to Reinitiation PPI, days		346.0 (183.0-880.0)	

S413

Variations in Barrett's Esophagus Screening, Diagnosis, and Management Among Experts: Myth or Reality?

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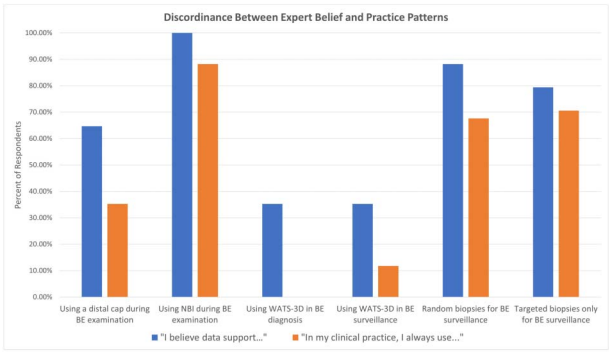
Introduction: Barrett's esophagus (BE) is the only known precursor to esophageal adenocarcinoma (EAC). Although clinical practice guidelines provide an evidence-based framework for BE diagnosis and management, lack of evidence in some areas may preclude definitive recommendations and controversies remain. BE experts are best positioned to provide guidance in these areas, but uniformity of their perspectives has not been assessed. We aimed to assess practice patterns specific to BE screening, diagnosis and management among recognized BE expert gastroenterologists.
Methods: We surveyed BE expert gastroenterologists (N= 38) throughout the United States. The investigator-developed online survey assessed expert beliefs and practice patterns specific to screening, diagnosis, and management of BE. We hypothesized practice patterns would vary, particularly in the category of management.
Results: Thirty-four experts responded to the survey (89%), of whom a majority were male (85%), focused their career on Barrett's esophagus (53%), and practiced in an academic tertiary hospital (82%). Only 19 (55.9%) were confident when BE was diagnosed in a community practice. Discordance between beliefs and clinical practice was common (Figure). Despite guideline recommendations to avoid sampling an irregular z-line or ablating non-dysplastic BE (NDBE), only 7 (20.6%) and 16 (47%) adhered strictly to these principles, respectively. All experts agreed that BE indefinite for dysplasia did not merit endoscopic therapy and should prompt repeat EGD after medical GERD optimization. Twenty-nine (85.3%) experts often or always recommended ablation for low-grade dysplasia (LGD). The use of wide-area transepithelial sampling (WATS-3D) was variable, with 22 (64.7%) never utilizing it and 7 (20.6%) saying they used it in most cases, regardless of BE length. Cryotherapy was the most utilized (Figure A) (67.6%) second-line ablative modality, followed by endoscopic resection (17.7%). Surveillance and management of recurrence after complete eradication of intestinal metaplasia (CEIM) was highly variable (Figure).
Conclusion: Despite available clinical practice guidelines, BE experts exhibit substantial variability in practice, particularly with respect to the use of WATS-3D, NDBE ablation, and post-CEIM management. These results shed light on continued controversies in BE management and emphasize the need for further research to better define management in these areas.



[0413] **Figure 1.**

S414

POEM Is Associated with Increased Reflux in All Positions Compared to Heller Myotomy

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Introduction: Achalasia is an esophageal motility disorder that results from a disruption of the neuromodulatory responses of the esophagus and lower esophageal sphincter (LES). A common consequence of treating the hypercontractile LES is worsened gastroesophageal reflux (GER). It is well-established that peroral endoscopic myotomy (POEM) leads to a higher absolute rate of GER than Laparoscopic Heller Myotomy with Dor fundoplication (LHM); however, the exact patterns of reflux have not been well-described.
Methods: The charts of patients who underwent LHM or POEM between 2017 and 2019 at our institution were reviewed, and patients who had completed a 2-month post-treatment esophageal pH study off acid-lower agents were included. We also included patients who underwent EGD but did not undergo pH monitoring due to finding erosive esophagitis. Patients with a history of prior myotomy or who underwent Heller without Dor fundoplication were excluded.
Results: Of the 236 patients included, 85 (36%) had undergone POEM while 151 (64%) had undergone LHM. Overall, 45% of POEM patients experienced more than 30 reflux episodes per day compared to 12% for LHM, $p< 0.001$. POEM patients had more GER in all positions compared to LHM, identified by a mean total % time spent in reflux of 9.3% vs 3.2%, upright 7.8% vs 2.6%, and supine 10.1% vs 3.5%, $p< 0.001$ for all. POEM patients also developed significantly more long refluxes (episodes $>$ 5 minutes) per day (4.0 vs 1.7, $p< 0.001$). 47% of POEM patients experienced at least one reflux episode longer than 30 minutes, compared to 19% of LHM patients ($p< 0.001$). POEM patients who developed relatively more reflux in the supine position than upright comprised 41.1% compared to 21.7% of LHM, $p=0.007$.
Conclusion: This study sheds light on the pattern of reflux in POEM as compared to LHM. POEM patients had evidence of significantly more esophageal acid exposure across all indices. POEM patients on average spent 9.3% of their day in reflux as compared to 3.2% for LHM. POEM patients had higher supine to upright ratios of reflux exposure. The finding of abnormal reflux in both the upright and supine position, with relative skew towards supine reflux after POEM may help to better tailor anti-reflux therapies in this population (Table).

Table 1. Reflux pattern differences between POEM and LHM. p-value significant if p<0.05

Characteristic	POEM	LHM	p-value
TOTAL			
Number of refluxes /24h	40.0	15.4	< 0.001
Percent time in reflux	9.3%	3.2%	< 0.001
Number of long refluxes /24h	4.0	1.7	< 0.001
Average of longest reflux (mins)	45.7	19.0	< 0.001
UPRIGHT			
Number of refluxes /1h	1.8	0.6	< 0.001
Percent time in reflux	7.8%	2.6%	< 0.001
Number of long refluxes /1h	0.18	0.06	< 0.001
Average of longest reflux (minutes)	19.0	9.9	< 0.001
SUPINE			
Number of refluxes /24h	1.4	0.5	0.003
Percent time in reflux	10.1%	3.5%	< 0.001
Number of long refluxes /1h	0.2	0.1	0.001
Average of longest reflux (minutes)	35.8	12.4	< 0.001
OVERALL			
DeMeester Score	37.2	13.2	< 0.001
% Time reflux in supine/upright >1	41.1%	21.7%	0.007

S415

Provider Beliefs, Practices, and Perceived Barriers to Dietary Elimination Therapy in Eosinophilic Esophagitis

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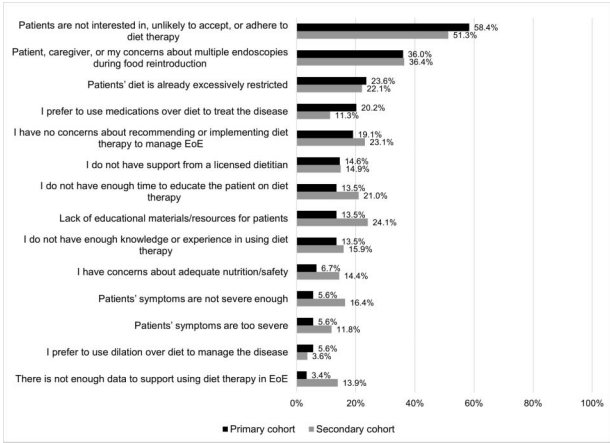
Introduction: Physicians prefer to use medications for eosinophilic esophagitis (EoE) even though elimination diet is an effective treatment with growing interest among patients. The beliefs, practices, and barriers that surround this clinical practice are unknown. We aimed to describe provider practice patterns around dietary approaches in EoE, and identify beliefs about, perceived barriers and needed resources to support diet therapy. (Figure)

Methods: We conducted a cross-sectional web-based survey of providers to assess the perceived effectiveness and barriers to starting dietary therapy, as well as practice patterns.

Results: Respondents included a primary cohort of gastroenterologists (n=94) recruited from professional societies and a secondary validation cohort of Medscape provider members (n=195; 76.9% gastroenterology, 23.1% allergy) with comparable spread across various practice settings, geographic regions, and access to dietitian support. Dietary therapy was viewed as the least effective short (46.8%, $p \leq 0.01$) and long-term (49.5%) treatment compared with topical corticosteroids (74.3%) and proton pump inhibitors (56.5%). The greatest barrier to recommending or starting diets in EoE was the perception that patients are not interested in, unlikely to accept, or adhere to diet therapy (58%). In contrast, few providers (14%) felt that their own lack of knowledge and experience in the diet was a barrier. While the majority of providers reported that dietitians should be primarily responsible for diet-focused education, private practice providers have less access to dietitians (55.6% vs 84.6%, $p \leq 0.05$) and are more likely try to manage dietary therapy alone compared to providers in academic centers. (Table)

Conclusion: Providers often lack dietitian support and prefer using medications because of a perceived lower efficacy and beliefs about patient acceptance and adherence to dietary therapy. With growing evidence that patients with EoE do accept dietary therapies and value shared decision making in electing treatments, our findings highlight discordances between provider and patient preferences, incomplete communication, and potentially unrecognized provider knowledge gaps. Given the dearth of approved medications for EoE, educating providers with evidence-based knowledge about non-pharmacologic options, understanding patient views and preferences for treatment, and improving dietitian-led education are essential in providing high-quality EoE care.



[0415] **Figure 1.** Barriers to recommending or starting EoE dietary therapy

Table 1. Overall provider characteristics

		Primary cohort		Secondary cohort	
Provider type	GI Allergy	94 0	70 (80.5%) Faculty/staff 10 (11.%) APP 5 (5.8%) Trainees	150 45	153 (78.5%) Faculty/staff 23 (11.8%) APP 19 (9.7%) Trainees
Practice setting	Private Academic VA Military/govt Hospital-based		43 (53.8%) 26 (32.5%) 0 (0.0%) 0 (0.0%) 11 (13.8%)		113 (64.2%) 34 (19.3%) 3 (1.7%) 3 (1.7%) 23 (13.1%)
Location	Northeast Midwest South West Undisclosed		15 (16.0%) 20 (21.3%) 26 (27.7%) 22 (23.4%) 11 (11.7%)		30 (15.4%) 29 (14.9%) 52 (26.7%) 46 (23.6%) 38 (19.5%)
Patient volume (number of EoE patients annually)	None 1-5 6-19 20-50 > 50		0 (0.0%) 5 (5.8%) 43 (49.4%) 25 (28.7%) 13 (14.9%)		1 (0.5%) 10 (5.1%) 36 (18.5%) 74 (38.0%) 74 (38.0%)
Patient population	Adults Children Both		62 (71.3%) 16 (18.4%) 8 (9.2%)		96 (49.2%) 15 (7.7%) 84 (43.1%)
Access to dietitian			58 (66.7%)		131 (67.2%)

S416

Degree of Ineffective Peristalsis Does Not Affect Frequency of Gastroesophageal Reflux, but May Facilitate More Proximal Reflux Events

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Introduction: Chicago Classification v4.0 (CC4) describes more stringent criteria for Ineffective Esophageal Motility (IEM), in order to identify patients with clinically significant dysmotility. IEM is a common finding in patients with gastroesophageal reflux disease (GERD). The aim of this study was to evaluate whether patients meeting CC4 IEM criteria also have more severe reflux, as defined by worse outcomes on 24-hour multichannel intraluminal impedance-pH testing (MII-pH).
Methods: A total of 684 patients undergoing GERD evaluation with MII-pH at a single high-volume center between 2019-22 were identified. Patients were included only if they had a diagnosis of either no CC4 abnormality or IEM based on either Chicago Classification v3.0 (CC3) or CC4. For the analysis, patients were divided into three groups: 50-69.9% ineffective swallows (CC3-only IEM), 70-100% ineffective swallows or at least 50% failed swallows (CC4 IEM), and no CC3/CC4 diagnosis (Controls). Demographic data and MII-pH results were collected and analyzed.
Results: Of 153 patients that met criteria, 29 had CC3-only IEM, 98 had CC4 IEM, and 26 were Controls. Age, gender, body mass index and tobacco/alcohol use were similar among groups. The mean total number of normalized reflux events actually was higher in the CC3-only IEM group (66.9) than for CC4 IEM (49.5) and Controls (51.9), but this was not significant ($p=0.61$ between all groups, $p=0.91$ between CC3-only IEM vs CC4 IEM). The mean number of proximal reflux episodes was higher for CC4 IEM patients (18.9) than CC3-only IEM patients (9.3) and Controls (6.3), though this also did not reach significance ($p=0.23$). Both acid exposure times (AETs) and DeMeester scores were higher in IEM patients compared to controls, but the differences also were not significant (Table).
Conclusion: The degree of ineffective peristalsis did not affect the overall number of reflux events seen on MII-pH. This finding is expected, as peristalsis is not thought to be involved in the generation of a reflux event. A trend toward more proximal reflux events in patients meeting CC4 criteria suggests a higher degree of esophageal dysmotility increases the likelihood reflux events are not cleared effectively, and therefore have a greater opportunity to move retrograde. Extended refluxate exposure may predispose to worsened symptoms. Future studies focusing on refluxate exposure times and symptom correlation may provide significant conclusions leading to improved care of these patients with dysmotility.

Table 1. Demographics and 24-hour Multichannel Intraluminal Impedance-pH Testing Parameters By Chicago Classification

	Control	CC3-only IEM	CC4 IEM	p-value (all groups)	p-value (CC3-only IEM vs. CC4 IEM)
Subjects (N%)	26 (17%)	29 (19%)	98 (64%)		
Age (mean, years)	49.5	46.4	46.7	0.68	
Gender				0.62	
Male	14 (54%)	12 (41%)	44 (45%)		
Female	12 (46%)	17 (59%)	54 (55%)		
BMI (mean, kg/m2)	28.8	27.0	28.4	0.32	
Tobacco Use				0.46	
Never	21 (81%)	22 (76%)	65 (66%)		
Former	4 (15%)	6 (21%)	28 (29%)		
Current	1 (4%)	1 (3%)	5 (5%)		
Alcohol Use				0.1	
Never	7 (27%)	19 (66%)	48 (49%)		
Former	8 (31%)	3 (10%)	11 (11%)		
Current	11 (42%)	7 (24%)	39 (40%)		
Distal AET (%)	0.44	3.02	3.82	0.08	0.32
DeMeester Score	2.77	12.63	16.46	0.26	0.94
Mean Number of Proximal Reflux Events	6.29	9.33	18.88	0.23	0.27
Mean Normalized Total Number of Reflux Events	51.86	66.92	49.46	0.61	0.91

CC3- Chicago Classification v3.0, CC4- Chicago Classification v4.0, BMI- Body Mass Index, AET- Acid Exposure Time

S417

Hospitalization Outcomes and Racial Disparities in Eosinophilic Esophagitis Patients: An Analysis of the National Inpatient Sample Data from 2016 to 2019

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Introduction: Eosinophilic esophagitis (EoE) has been historically more associated with Caucasians. There is currently increased evidence that this disease is underreported in other races especially African American population. In addition, other reports have suggested that EoE may manifest differently in the African American population. The aim of this study is to examine outcomes of EoE based on different racial backgrounds.
Methods: Patients hospitalized between 2016 and 2019 who were admitted primarily with EoE or with EoE associated complication (Food impaction, refractory GERD, Dysphagia) and with known EoE diagnosis were identified using International Classification of Diseases Code,10th Revision Clinical Modification (ICD-10) identified from the Healthcare Cost and Utilization Project databases (HCUP) using the National inpatient sample (NIS). Those patients were stratified according to race. Our primary outcome was in hospital mortality. Secondary outcomes were length of hospital stay (LOS),whether Esophagogastroduodenoscopy (EGD) was performed and time to EGD.
Results: After exclusion of other races, a total of 5610 hospitalizations were identified. 4935 (87.97%) patients identified as white while 675 (12.03%) identified as African American. The mean age was 33.13±0.79 for the white patients as compared to 32.39±2.15 for the African American patients (p=0.79). Patients from African American origin had increase Length of stay, 4.04 days (95% CI 3.24-4.84) as compared to 3.14 days (95% CI 2.86-3.42) for white patients, p< 0.001. The mortality rate for white patients was 0.001% as compared to 0% for African American patients (p=0.71). 2790 (95% CI 2614.96-2965.04) white patients had EGD as compared to 360 (95% CI 280.26-439.73) African American patients. The median time to EGD was 1 day (IQR=1) for white patients and 2 days (IQR=2) for African American patients. Log rank test showed $x^2(2) = 3.88$ and p=0.04
Conclusion: Patient from African American descent admitted with EoE appear to have similar mortality as compared to white patients but higher morbidity in the form of longer LOS and longer time to EGD. Further prospective studies are needed to examine these differences and identify possible causes for it.

S418

Disease Burden and Diagnosis Pathways Among Patients With EoE in the United States: Evidence From Real World Clinical Practice

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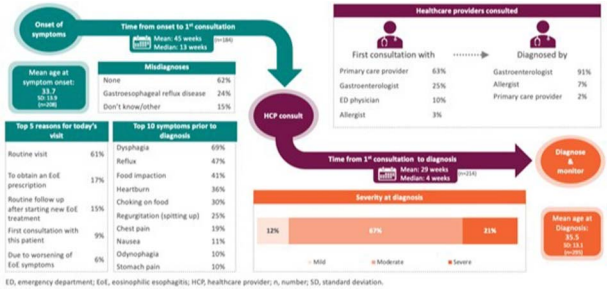
Introduction: Eosinophilic esophagitis (EoE), which is a chronic immune-mediated inflammatory disorder of the esophagus, is one of several heterogeneous inflammatory conditions, known as eosinophil-associated diseases (EADs). Common EoE symptoms are dysphagia, food impaction, abdominal pain, and nausea. EoE is associated with significant burden and upper gastrointestinal morbidity that impair health-related quality of life (HRQoL). This real-world study characterizes the patient journey to diagnosis and treatment among US patients with EoE.
Methods: Adelphi Real World Disease Specific Programmes (DSPs) are multinational, point-in-time surveys, completed by physicians for their patients, which provide data regarding the real-world clinical practice for a range of chronic health conditions. This study used the Adelphi EoE DSP, which collected information in 2020 from US patients with EoE. Eligible patients were ≥12 years with a physician-confirmed EoE diagnosis, an esophageal count of ≥15 eosinophils (EOS)/high-power field (HPF) at diagnosis, and were currently prescribed treatment for EoE.
Results: Overall, 322 patients with EoE were included in the United States. Mean patient age was 35.6 years and mean body mass index was 25.4. Most patients (63%) were male, 74% were employed full/part time, 15% were students, 3% were on leave/unemployed, and 3% needed caregiver support due to EoE. Most frequent EoE symptoms prior to diagnosis are shown in the Figure. Mean age at EoE symptom onset was 33.7 years, mean time from symptom onset to first healthcare provider (HCP) consult was 15.2 months, and from first consult to EoE diagnosis was 6.7 months; mean age at diagnosis was 35.5 years. Most patients (88%) were diagnosed with either moderate (67%) or severe (21%) EoE; among those assessed using EREFS (n=76), 57%, 91%, 67%, 80%, and 41% scored above Grade 0 in edema, rings, exudate, furrows, and stricture, respectively. Among 52 patients with a recent esophageal count, 77% (n=40) still had a count of ≥15 EOS/HPF after a mean 28 months since diagnosis and on treatment, although only 28% (n=11) of those patients were considered moderate/severe EoE cases. Allergic rhinitis (27%), asthma (22%), and anxiety (17%) were the most common comorbidities.
Conclusion: EoE presents severe symptoms and comorbidities that could substantially impact patients' HRQoL. Furthermore, patients faced 22 months of wait from symptom onset to HCP consult and receipt of an accurate diagnosis.



[0418] **Figure 1.** Most frequent EoE symptoms prior to diagnosis

S419

Discovery of Methylated DNA Biomarkers for the Potential Non-Endoscopic Detection of Barrett's Esophagus (BE)

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Introduction: Barrett's esophagus (BE) is a known precursor of esophageal adenocarcinoma (EAC), the type of esophageal cancer that accounts for over 80% of all esophageal cancer cases in the United States. The current gold standard for diagnosis of BE is endoscopic biopsy with histologic examination. Unfortunately, most individuals in the United States do not undergo endoscopy and thus BE is not diagnosed, resulting in progression toward fatal EAC in most undiagnosed BE cases. For this reason, minimally invasive sponge or balloon devices have been studied in conjunction with various types of biomarkers. However, most markers used in current BE diagnostic biomarker panels are outdated, lacking in sufficient specificity and sensitivity, and warrant substantial improvement.
Methods: Using a novel approach, we accessed and integrated 6 Infinium HumanMethylation450 BeadChip datasets from various research groups within the Gene Expression Omnibus (GEO) database, from which we selected probes that were highly methylated in Barrett's (beta ≥ 0.30) and mostly unmethylated in normal esophageal and gastric tissues (beta ≤ 0.05) yielding 30 candidate BE-specific markers. All 30 were identified from research groups who used microdissection and/or careful histopathologic review of each tissue biopsy. We then analyzed 248 BE, 184 normal esophageal, and 101 normal gastric tissue samples from our archives. After designing qMSP primers and probes, and further testing, we assayed 14 candidate markers in 21 matched normal-BE tissue pairs, 8 matched normal-BE-tumor tissue triplets, and 17 matched normal-tumor tissue pairs.
Results: All 14 biomarkers tested exhibited significantly higher methylation levels in BE DNAs vs. matched normal DNAs ($p < 0.01$ by Wilcoxon rank-sum test). 4 of the 14 markers showed significantly higher methylation levels in tumor DNAs vs. matched normal DNAs ($P < 0.01$). 3 markers were statistically significantly different across matched normal, BE, and tumor tissue triplets (Kruskal-Wallis test, $p < 0.05$), and these 3 markers were used to develop a diagnostic panel for future testing on minimally invasively obtained cytologic DNAs from sponge-capsule samples.

Conclusion: This discriminatory biomarker panel shows potential for BE diagnosis using an inexpensive, minimally invasive sampling technique and thus merits further study in case-control sponge studies. Due to our systematic and rigid method of selecting these markers, these genes are expected to be extremely important for the diagnosis of BE.

S420

In Esophagogastric Junction Outflow Obstruction, More Severe Lower Esophageal Sphincter Obstruction May Be Associated With a Greater Likelihood of Response to Botulinum Toxin Injection

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Introduction: Features of manometric esophagogastric junction outflow obstruction (EGJOO) that denote clinical relevance towards symptom generation are unclear. We aimed to test whether lower esophageal sphincter (LES) physiological properties measured on high-resolution manometry (HRM) and functional lumen imaging probe (FLIP) are different in patients with EGJOO based on symptomatic improvement after Botulinum toxin (Botox) therapy.
Methods: This was a single-center prospective study conducted over an 18-month period. Adult patients with non-obstructive dysphagia or non-cardiac chest pain who were diagnosed with EGJOO per Chicago Classification 4.0 HRM criteria received treatment with 100 units of Botox to the LES. Patients reported the % improvement in symptoms 2 weeks after Botox injection. Symptomatic response to Botox was denoted by 70% or greater improvement in symptoms. HRM metrics, FLIP indices, and esophageal symptom questionnaires were compared between Botox responders vs. non-responders.
Results: Forty-three patients (ages 32-87, 74% female) were included. Symptomatic response to Botox at 2 weeks occurred in 16 (37.2%) patients. Table shows physiologic features based on the Botox response. Although the differences in HRM and FLIP metrics were not significantly different between groups, HRM supine integrated relaxation pressure (IRP) and upright IRP, and the FLIP distensibility index (DI) show a trend towards a higher degree of LES obstruction in the Botox-responsive group.
Conclusion: EGJOO which responds to Botox therapy seems to demonstrate a more severe obstructive physiology at the LES. These findings support the CC 4.0 criteria for EGJOO. If results in a larger sample are significant, these findings could support the application of more stringent thresholds (for IRP and DI) for the diagnosis of clinically relevant EGJOO.

Table 1. Clinical Features in EGJOO based on response to LES Botox therapy. Count with % or mean with standard deviation are shown as relevant

	Botox responders (N = 16)	Botox non-responders (N = 27)	P value
Age [range]	65.3 [45-87]	55.5 [32- 76]	0.01*
No. Female (%)	12 (75%)	21 (77.8%)	0.83
BMI (kg/m^2)	28.4 (7.9)	31.5 (8.2)	0.23
Narcotic use (%)	4 (25%)	4 (14.8%)	0.41
Supine IRP (mmHg)	25.1 (8.5)	22.2 (5.8)	0.20
Upright IRP (mmHg)	23.8 (15.8)	19.3 (7.5)	0.27
Basal LES (mmHg)	53.3 (18.9)	49.8 (22.9)	0.61
DL (s)	7.3 (2.0)	7.4 (1.6)	0.85
DCI (mmHg-s-cm)	3771.6 (2863.1)	3372.3 (4036.0)	0.73
FLIP EGJ DI (mm^2/mmHg)	0.83 (0.43)	1.4 (1.3)	0.11
BEDQ	15.3 (12.0)	19.8 (18.4)	0.42
GERDQ	8.1 (2.9)	9 (3.0)	0.41
Eckardt Score	4.9 (3.0)	4.1 (2.1)	0.28

Abbreviations: BMI – body mass index, Brief Esophageal Dysphagia Questionnaire – BEDQ, DCI – distal contractile integral, DL – distal latency, DI – distensibility index, Eckardt Score – ES, EGJ – esophagogastric junction, FLIP – functional lumen imaging probe, Gastroesophageal Reflux Disease Questionnaire – GERDQ.

S421

Evaluation of ICARUS Guidelines and Recommendations Not Supported by Randomized Controlled Trials

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Introduction: The ICARUS guideline is a systematic review and Delphi process that provides recommendations in the treatment and management of patients with GERD. Many of the recommendations were supported by randomized trials; some were not. This study assesses guidelines with limited evidence and weak endorsement.
Methods: Four ICARUS guidelines were chosen: the role of fundoplication for patients with BMI >35, regurgitation, chest pain, and extra-esophageal symptoms. A multicenter database of patients undergoing fundoplication surgery for GERD between 2015-2020 was accessed. Outcomes assessed were anatomic failure and symptom recurrence. Multivariable regression was performed.
Results: Five institutions performed a fundoplication on 462 patients for GERD with a median of follow-up of 14.7 months (IQR 14.2). Most patients were white (51.1%) or Hispanic (24.7%), with a mean age of 54 ± 14.1 years. Most patients were overweight (BMI=29.7 ± 5.3). Most patients presented with symptoms of heartburn (98.9%) and regurgitation (51.7%), and many had a hiatal hernia on EGD/esophagram (85.1%). Laparoscopic fundoplication was the most common surgical approach (84.2%), with partial posterior fundoplication (63.0%) and no mesh reinforcement (58.9%). On multivariate analysis, patients with BMI >35 did not have significantly higher rates of anatomic failure (OR 1.78, 95%CI 0.90-1.04). Patients with preoperative regurgitation had similar symptom recurrence rates to those without (OR 1.06, 95%CI 0.55-2.06). Patients with non-cardiac chest pain had comparable rates of symptom recurrence (OR 1.55, 95%CI 0.92-2.62). Patients with chronic cough attribuTable to reflux had similar symptom recurrence rates postoperatively to patients without (OR 0.79, 95%CI 0.42-1.49). (Table)
Conclusion: Among the ICARUS guidelines and recommendations, a small proportion were lacking evidence at low risk for bias and strong endorsement by the Delphi committee. The results of this multicenter study evaluated outcomes of patients with various pre-operative conditions: BMI >35, regurgitation, chest pain attribuTable to reflux, and extra-esophageal symptoms attribuTable to reflux. Our findings endorse patients with these characteristics as promising candidates for antireflux surgery.

Table 1. Multivariate Regression Analysis

Hernia Recurrence, BMI >35			
Variables	Odds Ratio	95% Confidence Interval	p-value
BMI, >35	1.779	0.90-1.04	0.099
Age	1.021	0.99-1.04	0.062
Ethnicity			
Hispanic	Ref	-	-
Black	1.888	0.67-5.30	0.227
White	1.227	0.53-2.83	0.630
Asian	1.405	0.15-13.55	0.769
Other	1.900	0.70-5.19	0.211
Gender, Male	2.045	1.17-3.56	0.012
Institution			
1	Ref	-	-
2	3.54	0.41-30.67	0.251
3	3.13	0.38-25.91	0.290
4	2.68	0.33-21.55	0.355
5	3.03	0.16-58.72	0.463
Symptom Recurrence, Preoperative Regurgitation			
Variables	Odds Ratio	95% Confidence Interval	p-value
Preoperative Regurgitation	1.060	0.55-2.06	0.864
Age	1.000	0.98-1.02	0.962
Race/Ethnicity			
Hispanic	Ref	-	-
Black	0.322	0.10-1.08	0.067
White	0.588	0.27-1.27	0.176
Other	1.022	0.40-2.58	0.963
Gender, Male	0.861	0.50-1.48	0.588
Institution			
1	Ref	-	-
2	0.978	0.17-5.53	0.980
3	1.88	0.36-9.83	0.453
4	1.12	0.23-5.35	0.889
5	5.36	0.61-47.1	0.130
Symptom Recurrence, Preoperative Chest Pain attributable to reflux			
Variables	Odds Ratio	95% Confidence Interval	p-value
Preoperative chest pain	1.554	0.92-2.62	0.099
Age	1.000	0.98-1.02	0.922
Race/Ethnicity			
Hispanic	Ref	-	-
Black	0.366	0.11-1.23	0.105
White	0.649	0.30-1.41	0.276
Other	1.157	0.45-2.96	0.760
Gender, Male	0.868	0.51-1.49	0.609
Institution			
1	Ref	-	-
2	0.929	0.17-5.00	0.932
3	1.942	0.40-9.54	0.414
4	1.194	0.25-5.75	0.825
5	5.31	0.63-45.09	0.126
Symptom Recurrence, Preoperative Cough attributable to reflux			
Variables	Odds Ratio	95% Confidence Interval	p-value
Preoperative cough	0.794	0.42-1.49	0.470
Age	1.000	0.98-1.02	0.921
Race/Ethnicity			
Hispanic	Ref	-	-
Black	0.335	0.10-1.12	0.076
White	0.601	0.28-1.30	0.194
Other	1.052	0.42-2.65	0.915
Gender, Male	0.847	0.49-1.46	0.549
Institution			
1	Ref	-	-
2	0.880	0.16-4.76	0.882
3	1.711	0.35-8.41	0.509
4	1.114	0.23-5.34	0.893
5	5.158	0.61-43.36	0.131

S422

Patient Perspective and Feedback on a Dysphagia-Specific Question Prompt List (QPL) Communication Tool

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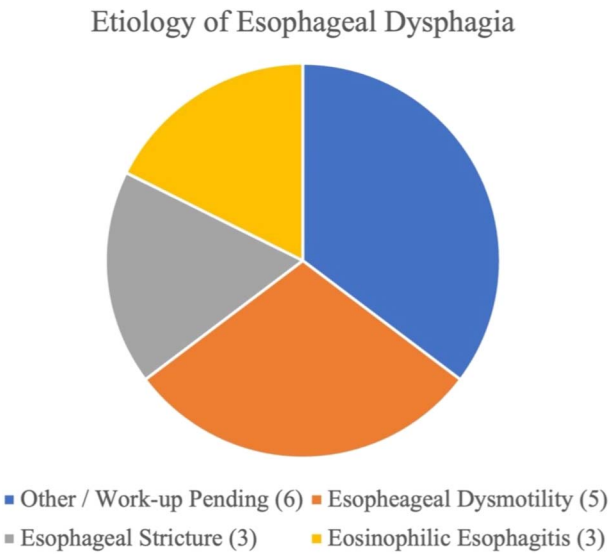
Introduction: Question prompt lists (QPLs) are structured sets of disease-specific questions intended for patient use, to encourage patients to ask questions and enhance patient-physician communication. Recently, a preliminary 44 dysphagia QPL was created by 11 esophageal experts through a modified Delphi process. Patients' perspective and feedback on each question, however, has not been accounted for in this expert version. We aim to obtain and incorporate patients' perspective and feedback on our expert-derived dysphagia QPL.
Methods: A preliminary dysphagia QPL was modified through patient perspective and feedback. Consecutive patients with esophageal dysphagia followed at Stanford University Esophageal Clinic between November 2021 and June 2022 were recruited to assess the preliminary expert QPL version. After receiving the QPL in Qualtrics (Provo, UT), patients independently rated questions on a 5-point Likert scale, where 1= "should not be included," 2= "unimportant," 3= "don't know/depends," 4= "important," and 5= "essential." Questions were accepted for inclusion in the QPL with an a priori inter-agreement of ³ 80% ranking (range 4 to 5). At the end, patients were encouraged to propose additional questions to incorporate into the QPL by an open-ended question added to the survey.
Results: Seventeen patients (13 female, age range 28-79) with a symptom presentation of esophageal dysphagia (Figure) assessed the existing QPL. Of the 44 questions experts agreed were important, only 30 questions (68.2%) were accepted for inclusion. Patients disagreed on the importance of questions such as "Do you think I have cancer?", "Why do I cough or choke when I try to eat or drink?", and "What can I do to avoid losing weight?" (Table). In contrast, patients highly agreed on the importance of the question "What are treatment options if symptoms do not go away?" Six patients suggested additional questions such as "Do cold liquids make swallowing worse?" By incorporating the suggested questions, the final dysphagia QPL totaled to 50 questions.
Conclusion: With expert input followed by patient feedback, we have developed a patient-centered dysphagia QPL aimed to enhance patient-physician communication. Our study highlights the importance of patient perspective and feedback in development of a patient-centric communication tool. Future directions will assess patient and physician usability, as well as rigorously test the efficacy of this QPL on patient outcomes.



[0422] **Figure 1.** Etiology of dysphagia for the patient panel

Table 1. Physician-Patient Discordance of Question Inclusion

Questions Recommended by Experts	Patient % Agreement
Do you think I have cancer? What is the likelihood I have cancer?	52.9
What can I do to avoid losing weight?	64.7
Why am I losing weight?	64.7
Why do I cough or choke when I try to eat or drink?	64.7
Are any of these conditions pre-cancerous?	70.6
I have food/seasonal allergies. Are those associated with dysphagia (difficulty swallowing)?	70.6
How urgently do I need to start my dysphagia (difficulty swallowing) workup?	70.6
Where in the chest do the food get stuck?	70.6
Do I need to worry?	76.5
Are my medications/habits responsible for dysphagia?	76.5
What is manometry? Will it hurt?	76.5
What diet should I follow?	76.5
How often do you evaluate and treat patients with symptoms?	76.5
Is heartburn associated with dysphagia (difficulty swallowing)?	76.5

S423

Association Between Defective Secondary Peristalsis Detected by Functional Lumen Imaging Probe Topography (FLIP) and GERD

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Introduction: Esophageal secondary peristalsis is a defense mechanism against GERD by clearance of refluxate. When absent or defective, it may lead to increased esophageal acid exposure time (AET). Functional lumen imaging probe topography (FLIP) allows assessment of secondary peristalsis induced by volumetric distension. Aim: evaluate the association between secondary peristalsis and GERD.
Methods: We included patients with esophageal symptoms who underwent FLIP topography and reflux monitoring (wireless pH or catheter-based pH-impedance) while off PPI ≥7 days, high-resolution esophageal manometry (HRM) findings (LES pressure, ineffective esophageal motility , absent contractility) were added for secondary analysis when available. Exclusion criteria: achalasia, prior gastroesophageal surgery, Botox injection within 6 months of FLIP and reflux study. Abnormal AET on reflux monitoring was defined as % time pH< 4 greater than 4%. FLIP was performed with a 16 cm balloon during propofol-sedated endoscopy; peristaltic response was assessed at 30-40-50-60 ml and classified as repetitive antegrade contractions (RACs), borderline contractile response, repetitive retrograde contractions (RRCs), impaired, absent, and spastic reactive. EGJ distensibility index (DI) was calculated at 60ml. Secondary peristalsis was considered intact if RACs seen at any volume, impaired otherwise. Those with borderline contractility but no RACs were excluded from analysis.. We assessed the association between FLIP and HRM findings and GERD by t test and chi square.
Results: 37 patients included (23, 62% female), mean age 58.45 years, mean BMI 25.7. GERD present in 15 (40.5%). Mean esophageal AET was lower in patients with versus without intact peristalsis but significance not reached (5.8% vs 3.0%, p=0.058). The proportion of patients with GERD was lower in patients with peristalsis versus without intact peristalsis but significance not reached (25% vs 40%, p=0.18). There was no association between GERD and DI or any HRM measures.
Conclusion: Our data suggests that defective secondary peristalsis is more frequent in GERD patients and is thus and important contributing factor to reflux. Lack of significance may be due to small sample size and type II error, but a larger number of patients is needed to clarify this and data collection is ongoing.

S424

Online Patient Education for Gastroesophageal Reflux Disease – Are Patients Being Misinformed?

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Introduction: Gastroesophageal Reflux Disease (GERD) is a chronic gastrointestinal disorder that affects about 20% of the US adult population. As more patients turn to the internet for educational resources, our aim was to evaluate the accuracy, comprehensiveness, and readability of online patient education tools that are readily available.
Methods: We conducted a cross-sectional analysis of online patient educational resources for GERD using Google in June 2022. We divided the US into four major regions and performed online searches from the 1) Two of the wealthiest and poorest cities and 2) Two of the largest and smallest cities in each region to determine if variation existed in the availability of online resources. The top 10 Google websites, blogs and videos for the search of "GERD" from each of the 16 cities which were included and independently reviewed. We created a list of 36 items related to GERD that we believe should be included in patient information materials. This list was used to assess for accuracy and comprehensiveness of patient's resources (Table). The readability of each website and blog was assessed using the Flesch-Kincaid readability test.
Results: There was no difference in websites, blogs or videos between the 16 cities. We identified a total of 10 websites, 10 blogs and 10 videos. Six websites were from academic sites and four were a compilation of non-academic sites, which we titled "other." No website, blog or video met 100% of the criteria. Median percentage of total GERD criteria mentioned was 82% for academic websites, 92% for other websites, 61% for blogs, and 61% for videos (Table and Figure). Of the criteria, autoimmune disease as a risk factor and sleeping on left side as a lifestyle intervention were least mentioned. All websites and blogs exceeded the average reading level of 6th grade as recommended for patient education materials by the National Institute of Health.
Conclusion: The websites, blogs and videos are consistent and accessible regardless of search location. These resources were accurate, but varied in their comprehensiveness and exceeded the average recommended reading level. It is important for clinicians to be familiar with these patient resources, especially with patients blogs as they were more geared towards lifestyle modifications and included many misconceptions about adverse drug effects.

Type	Percentage of total GRED criteria mentioned by each website, blog and video			Average Grade Level Readability
	Minimum (%)	Median (%)	Maximum (%)	
Websites				
Academic (n=6)	61.1%	81.9%	91.7%	7.8
Other (n=4)	77.8%	91.7%	97.2%	8.0
Blogs (n=10)	41.7%	61.1%	86.1%	6.8
Videos (n=10)	13.9%	61.1%	88.9%	N/A

[0424] **Figure 1.** Percentage of total Gastroesophageal reflux disease (GERD) criteria and average grade level readability for website, blog, and video.

Table 1. Percentage of each Gastroesophageal Reflux Disorder (GERD) criteria met by each category of websites, blogs and videos

Criteria (n=36)		Website		Blogs (n=10)	Videos (n=10)
		Academic (n=6)	Other (n=4)		
Background	Defines GERD	100%	100%	100%	100%
	Explains disease pathophysiology	83%	75%	80%	80%
Clinical Manifestation	Heartburn	100%	100%	100%	100%
	Chest pain	100%	100%	70%	60%
	Dysphagia	100%	100%	100%	70%
	Regurgitation or sour taste	100%	100%	100%	90%
	Cough	100%	100%	90%	70%
	Sleep disturbances	50%	75%	30%	20%
Risk Factors	Obesity	67%	100%	60%	70%
	Hiatal hernia	67%	100%	50%	50%
	Pregnancy	67%	100%	60%	40%
	Diabetes or Gastroparesis	0%	50%	0%	30%
	Autoimmune	17%	50%	0%	10%
Complications	Esophageal stricture	83%	100%	60%	40%
	Gastroesophageal ulcers or esophagitis	83%	100%	50%	30%
	Barrett's Esophagus	83%	100%	90%	40%
Diagnosis	Endoscopy	100%	100%	50%	40%
	pH monitoring	100%	75%	40%	40%
	Manometry	67%	75%	30%	20%
	Barium swallow	83%	75%	30%	30%
Management	Antacids	100%	100%	70%	80%
	Proton pump inhibitors	100%	100%	90%	80%
	Histamine 2 Receptor Antagonists	100%	100%	70%	70%
	Surgery	83%	100%	80%	70%
	Endoscopic interventions	33%	50%	20%	30%
Modifiable risks	Weight loss	100%	100%	70%	60%
	Smoking cessations	100%	100%	70%	60%
	Avoid alcohol	100%	75%	100%	60%
	Avoid coffee	100%	100%	70%	60%
	Avoid medications that can worsen symptoms (i.e. aspirin, NSAID)	50%	100%	40%	50%
	Avoid trigger foods	50%	100%	90%	50%
Lifestyle interventions	Eat small meals	83%	100%	50%	40%
	Eat food slowly/chew	100%	100%	70%	60%
	Elevate head of the bed	0%	0%	30%	10%
	Sleep on left side	100%	100%	80%	50%
	Avoid laying flat after eating or eating 2-3 hours prior to bedtime	50%	100%	90%	50%

S425

Hormone Replacement Therapy Is Associated With Reduced Risk of Squamous Cell Carcinoma of the Esophagus in Post-Menopausal Women: A Systematic Review and Meta-Analysis

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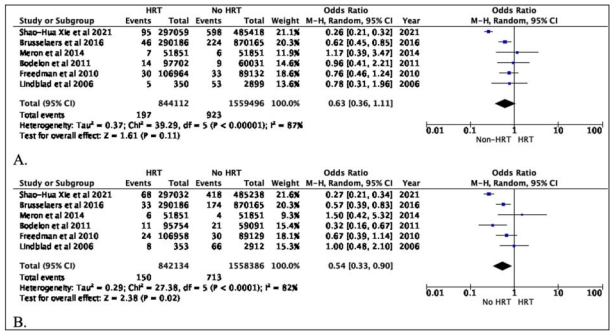
Introduction: It has been hypothesized that female sex hormones, mainly estrogen, are protective against esophageal cancer. The aim of our systematic review was to determine the association between HRT and either esophageal adenocarcinoma (AC) or squamous cell carcinoma (SCC).
Methods: We performed a review of the literature across major databases including PubMed/MEDLINE, Embase, and Google Scholar in May 2022. Retrospective cohort and case-controlled studies including post-menopausal women who either received or did not receive HRT were eligible for inclusion. The primary endpoint was the association between HRT and esophageal AC or SCC. Subgroup analyses were performed based on the type of HRT used. Results were pooled together using Reviewer Manager 5.4 software (Figure).
Results: 6 studies involving 2,403,608 post-menopausal women who either received or did not receive HRT were included in the pooled analysis. Our findings suggest that there was no statistically significant association between HRT use and esophageal AC (OR=0.63, 95% CI [0.36,1.11], P=0.11). Subgroup analysis showed that the rate of esophageal AC was similar between the estrogen only versus estrogen and progesterone group. The test for subgroup differences was not statistically significant (P=0.83, I^2=0%). On the other hand, the use of HRT was associated with a statistically significant decrease in the rate of esophageal SCC compared to controls (OR=0.54, 95% CI [0.33, 0.90], P=0.02). The use of combined estrogen and progesterone therapy was associated with a greater decreased risk of esophageal SCC compared to estrogen only therapy (P=0.03, I^2=78.9%). Stratified analysis showed that the rate of esophageal cancer in patients receiving HRT was similar between past and current users (OR=1.18, P=0.66). Shorter duration of HRT use were not associated with decreased rate of esophageal cancer as well (OR=0.65, P=0.19). The age at menarche (OR=1.46, P=0.18), menopause (OR=0.99, P=0.99), and first birth (OR=1.08, P=0.84) were not associated with any increased risk of esophageal cancer in women who received HRT (Table).
Conclusion: HRT use in post-menopausal women was associated with a reduced risk of esophageal squamous cell carcinoma but not adenocarcinoma. Combined estrogen and progesterone therapy was associated with a greater reduction in the risk of esophageal SCC compared to estrogen only therapy. The duration of HRT use and years of estrogen exposure were not associated with any increased risk of esophageal cancer.



[0425] **Figure 1.** Forest plots of the association between hormone replacement therapy use and the incidence of esophageal adenocarcinoma (A) or squamous cell carcinoma (B).

Table 1. (A) Subgroup analysis investigating the association between hormone replacement therapy use and the rates of esophageal adenocarcinoma or squamous cell carcinoma based on the type of HRT used (B) Evaluation of influencing factors affecting the rate of esophageal cancer in post-menopausal women who received hormone replacement therapy.

A.

Outcome	Subgroup	OR [95% CI]	P-value	Test for Subgroup Differences P (I^2 %)
AC	Estrogen only	0.59 [0.29, 1.21]	0.15	0.83 (00.0)
	Estrogen + Progesterone	0.54 [0.32, 0.90]	0.02	
SCC	Estrogen only	0.52 [0.31, 0.89]	0.02	0.03 (78.9)
	Estrogen + Progesterone	0.27 [0.20, 0.36]	< 0.00001	

B.

Variables		Rate of Esophageal Cancer (/1000)	OR [95% CI]	P-value
Duration of HRT Use	**< 10 years**	**0.142**	**0.65 [0.35, 1.23]**	**0.19**
	≥ 10 years	**0.270**		
Status of HRT Use	Past Users	0.212	1.18 [0.57, 2.44]	0.66
	Current Users	0.193		
Menarche Onset	Early (< 12 years)	0.529	1.46 [0.84, 2.53]	0.18
	Late (≥ 15 years)	0.235		
Menopause Onset	Early (< 45 years)	0.243	0.99 [0.23, 4.17]	0.99
	Late (≥ 55 years)	0.319		
Age at First Birth	Early (< 20 years)	0.511	1.08 [0.52, 2.23]	0.84
	Late (≥ 30 years)	0.273		

Abbreviations: HRT, hormone replacement therapy; AC, adenocarcinoma; SCC, squamous cell carcinoma; OR, odds ratio; CI, confidence interval.

S426

POEM Results in More Frequent and More Severe Reflux Than Heller Myotomy

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Introduction: Achalasia is an esophageal motility disorder that is characterized by abnormal lower esophageal sphincter (LES) relaxation due to disrupted neuromodulatory responses. Relieving this outflow obstruction simultaneously disrupts the barrier against gastroesophageal reflux (GER). There is a need for comprehensive studies describing the comparative incidence of abnormal GER accounting for both pH testing and esophagogastroduodenoscopy (EGD) findings and specifically examining the incidence of severe reflux in peroral endoscopic myotomy (POEM) compared to laparoscopic Heller myotomy with Dor fundoplication (LHM).
Methods: The charts of patients who underwent LHM or POEM between 2017 and 2019 at our institution were reviewed, and patients who had completed a 2-month post-treatment esophageal pH study off acid-lower agents were included. We also included patients who underwent EGD but did not undergo pH monitoring due to finding erosive esophagitis. Patients with a history of prior myotomy or who underwent Heller without Dor fundoplication were excluded.
Results: Of the 236 patients included, 85 (36%) had undergone POEM while 151 (64%) had undergone LHM. The prevalence of abnormal gastroesophageal reflux using pH testing (TAE >4%) is 62% for POEM and 21% for LHM. When including abnormal EGD's, the prevalence of abnormal GER (TAE >4% or reflux esophagitis or esophageal ulcer) becomes 72% and 28%, respectively. The incidence of severe reflux (defined by more than 10% time in reflux overall or Grade C/D esophagitis or esophageal ulcer) is 38.8% for POEM and 15.2% for LHM. The prevalence of gastritis was 7.9% in LHM vs 2.4% in POEM (NS), with a prevalence of gastric and duodenal ulcers of 2.6% in LHM vs 0% in POEM, but these were not statistically significant (Table).
Conclusion: POEM is associated not only with a significantly higher incidence of abnormal GER (72% vs 28%, p< 0.001), but also with a higher incidence of severe GER (38.8% vs 15.2%, p< 0.001), accounting for both esophageal pH testing and upper endoscopy findings. Gastroenterologists should be aware of this association and follow post-POEM patients carefully given the risk of developing significant pathology due to severe reflux.

Table 1. **Incidence of gastroesophageal reflux (GER) by different measures in POEM as compared to LHM**

Characteristic	POEM	LHM	p-value
TAE time >4%	62.4%	20.5%	< 0.001
TAE time >10%	35.3%	10.3%	< 0.001
Grade A/B esophagitis	17.6%	9.3%	NS
Grade C/D esophagitis	2.4%	6.6%	0.03
Esophageal Ulcer	1.2%	0.7%	NS
Gastroduodenal pathology*	2.4%	10.6%	0.022
Abnormal GER**	72%	28%	< 0.001
Severely abnormal GER***	38.8%	15.2%	< 0.001

p-value significant if p4% or esophagitis. Severely abnormal GER was defined as TAE >10% or Grade C/D esophagitis or esophageal ulcer.

S427

Risk Factors for Dysphagia and Need for Upper Endoscopy in Patients With a Hiatal Hernia Who Undergo Anti-Reflux Surgery

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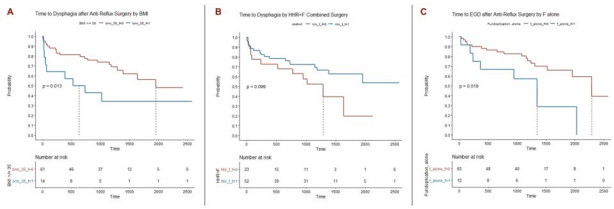
Introduction: Dysphagia is a common adverse event (AE) of anti-reflux surgery, including hiatal hernia repair (HHR) and fundoplication (F). We aimed to determine the frequency, outcomes, and factors associated with the emergence of dysphagia, and need for endoscopy after anti-reflux surgery in patients with hiatal hernia (HH) and gastroesophageal reflux disease (GERD).
Methods: We performed a retrospective study across four academic centers between January 2015 and December 2021 in patients with HH and GERD who underwent anti-reflux surgery, either HHR, F, or HHR+F. Kaplan-Meier Estimates with Cox Proportional Hazards Regression Analysis were utilized to determine features associated with the emergence of dysphagia and need for upper endoscopy (EGD) after anti-reflux surgery in patients with HH. Statistical significance was defined as $p< 0.10$ given the small sample size. Statistical analysis was performed utilizing BlueSky Statistics software v. 7.0.
Results: A total of 75 patients were included. (Table) Anti-reflux surgeries included HHR+F (69.3%), HHR (14.7%), or F alone (16.0%). 10.7% of patients had an AE within 30 days. 40.0% developed dysphagia at a median time of 270 days (IQR: 55-907). An EGD was performed in 25 patients (33.3%) with 5 patients having an intervention for dysphagia. Re-do surgery occurred in 10.7% of patients at a median time of 453.0 days (IQR: 349-577). Class II obesity, utilizing mesh for HHR, and using a proton-pump inhibitor prior to surgery were the strongest predictors for developing dysphagia. An HHR+F approached significance for being protective against dysphagia, $p=0.1043$. Having had a large HH on pre-surgical CT imaging or endoscopic evaluation were strongly associated with the need for EGD after surgery, $p=0.0023$ and $p=0.0263$, respectively. Increased blood loss during surgery, younger age, class II obesity, and F alone were also strongly associated with undergoing EGD after surgery at $p< 0.05$. (Figure) Dyspepsia (40.0%) was the most common indication for EGD.
Conclusion: We found dysphagia occurred in 40.0% of patients undergoing anti-reflux surgery. Class II obesity, type of surgery, and a large HH were the strongest predictors for dysphagia and the need for EGD. These characteristics likely have a synergistic effect to increase the risk of AEs after anti-reflux surgery. Further studies on the long-term outcomes of anti-reflux surgery in the management of patients with hiatal hernia are needed.



[0427] **Figure 1.** Kaplan-Meier Estimates of A) Time to Initial Discontinuation of PPI after Anti-Reflux Surgery in Patients with Hiatal Hernia, B) Time to Discontinuation of PPI by Pre-Surgery EGD, and C) Time to Restarting of PPI after Anti-Reflux Surgery by Class II Obesity or Higher (>/= 35.0 kg/m2). Legend A: Blue = BMI >/= 35 kg/m2, Red = BMI < 35 kg/m2; Legend B: Blue = Hiatal Hernia Repair + Fundoplication, Red = Hiatal Hernia Repair or Fundoplication, alone; Legend C: Blue = Fundoplication, alone, Red = Hiatal Hernia Repair +/- Fundoplication.

Table 1. Baseline Characteristics of All Patients and Cox Proportional Hazards Regression for Emergence of Dysphagia and Performance of Upper Endoscopy in Patients with a Hiatal Hernia after Anti-Reflux Surgery

Baseline Characteristics		Unadjusted Cox Proportional Hazards Regression			
Median (IQR) or Fraction (%)		Dysphagia After Surgery		EGD Performed After Surgery	
	All Patients (N=75)	HR (95% CI)	P value	HR (95% CI)	P value
Age at Surgery, per 10 years	68.7 (59.9-75.2)	0.94 (0.67-1.30)	0.69	0.66 (0.46-0.96)	0.0284
Male	19 (25.3%)	0.77 (0.31-1.89)	0.57	0.84 (0.33-2.14)	0.71
White race	75 (100%)	NA	NA	NA	NA
Hispanic ethnicity	1 (1.3%)	NA	NA	NA	NA
Height, per 30 cm	164.0 (158.3-172.8)	1.26 (0.43-3.72)	0.68	1.16 (0.37-3.68)	0.80
Weight, per 10 kg	83.9 (70.7-92.9)	0.94 (0.75-1.17)	0.57	0.96 (0.73-1.25)	0.96
Body Mass Index, per 5 kg/m^2	30.8 (27.2-33.6)	1.14 (0.99-1.33)	0.0752	1.22 (1.05-1.41)	0.0113
Body Mass Index ≥ 35 kg/m^2	14 (18.7%)	2.60 (1.18-5.72)	0.0172	1.78 (0.73-4.30)	0.20
Obesity	42 (56.0%)	0.78 (0.38-1.61)	0.51	0.98 (0.44-2.17)	0.96
Never Smoker	43 (57.3%)	1.45 (0.69-3.06)	0.33	1.30 (0.58-2.91)	0.53
Moderate to Severe Alcohol Use	16 (21.3%)	0.69 (0.26-1.80)	0.45	1.13 (0.42-3.02)	0.81
Type 2 Diabetes	16 (21.3%)	0.94 (0.40-2.20)	0.88	0.95 (0.37-2.43)	0.95
Interstitial Lung Disease	13 (17.3%)	0.65 (0.23-1.88)	0.43	0.81 (0.29-2.21)	0.68
History of Aspiration	4 (5.3%)	0.56 (0.08-4.10)	0.57	0.66 (0.09-4.91)	0.68
Type of Surgery					
Hiatal Hernia Repair, alone	11 (14.7%)	1.87 (0.76-4.60)	0.17	0.71 (0.21-2.39)	0.58
Mesh Utilized	17/63 (22.7%)	2.00 (0.89-4.53)	0.0953	1.08 (0.38-3.07)	0.89
Fundoplication, alone	12 (16.0%)	1.44 (0.58)	3.58)	2.78 (1.14-6.77)	0.0241
Nissen	53/64 (70.7%)	0.58 (0.21-1.57)	0.28	1.04 (0.30-3.56)	0.95
Toupet	9/64 (12.0%)	1.67 (0.56-4.95)	0.36	0.70 (0.16-3.02)	0.63
Hiatal Hernia Repair and Fundoplication	52 (69.3%)	0.38 (0.26-1.13)	0.1043	0.60 (0.27-1.34)	0.21
Laparoscopic Approach	71 (94.7%)	0.71 (0.17-2.99)	0.64	1.29 (0.17-9.68)	0.80
Estimated Blood Loss, per 20 mL	20 (10-30)	1.09 (0.97-1.21)	0.14	1.16 (1.02-1.32)	0.0211
Elapsed Time for Surgery, per 30 minutes	142.5 (110.8-174.8)	1.06 (0.78-1.45)	0.70	1.10 (0.75-1.60)	0.62
Time ≥ 180 minutes	11/36 (14.7%)	0.44 (0.09-2.08)	0.30	0.66 (0.17-2.52)	0.54
Pre-Surgical Evaluation					
EGD prior to surgery	55 (73.3%)	1.12 (0.50-2.51)	0.79	0.96 (0.40-2.31)	0.92
Esophagitis	12/55 (16.0%)	1.53 (0.62-3.76)	0.35	1.34 (0.47-3.76)	0.58
Manometry Performed	32 (42.7%)	0.89 (0.43-1.83)	0.75	0.67 (0.30-1.51)	0.33
Normal Findings	10 (37.0%)	0.66 (0.17-2.55)	0.54	1.67 (0.36-7.77)	0.52
pH Testing Performed	20 (26.7%)	1.21 (0.55-2.66)	0.63	1.34 (0.58-3.13)	0.54
Total Acid Exposure, per 3 %	9.8 (6.0-14.3)	0.96 (0.71-1.29)	0.77	0.75 (0.50-1.13)	0.16
DeMeester Score, per 5 points	32.0 (21.4-51.9)	0.96 (0.83-1.11)	0.59	0.91 (0.76-1.10)	0.33
Large Hiatal Hernia on Endoscopy	28/49 (37.3%)	0.56 (0.24-1.34)	0.19	0.30 (0.11-0.87)	0.0262
Large Hiatal Hernia on CT Imaging	34 (45.3%)	0.61 (0.28-1.30)	0.20	0.19 (0.06-0.55)	0.0023
PPI prior to surgery	62 (82.7%)	3.70 (0.88-15.60)	0.0742	6.24 (0.84-46.3)	0.58
Endpoints					
Adverse Events within 30 days	8 (10.7%)	NA	NA	NA	NA
Median Time to Adverse Event, days	21.5 (9.8-25.8)	NA	NA	NA	NA
Re-do Surgery Performed	8 (10.7%)	NA	NA	NA	NA
Median Time to Re-do Surgery, days	453.0 (348.5-577.0)	NA	NA	NA	NA
EGD Performed after Surgery	25 (33.3%)	NA	NA	NA	NA
Median Time to EGD, days	654.0 (189.0-1244.0)	NA	NA	NA	NA
Indications for EGD		NA	NA	NA	NA
Dysphagia	9 (36.0%)	NA	NA	NA	NA
Abdominal Pain	3 (12.0%)	NA	NA	NA	NA
Gastrointestinal Bleed	1 (4.0%)	NA	NA	NA	NA
Dyspepsia	12 (48.0%)	NA	NA	NA	NA
Occurrence of Dysphagia after Surgery	30 (40.0%)	NA	NA	NA	NA
Median Time to Dysphagia, days	270.0 (55.0-906.8)	NA	NA	NA	NA

Table 1. (*continued*)

Baseline Characteristics		Unadjusted Cox Proportional Hazards Regression			
Median (IQR) or Fraction (%)		Dysphagia After Surgery		EGD Performed After Surgery	
	All Patients (N=75)	HR (95% CI)	P value	HR (95% CI)	P value
Median Time to EGD for Dysphagia, days	563.5 (160.8-1228.8)	NA	NA	NA	NA
Intervention Performed for Dysphagia	5/6 (83.3%)	NA	NA	NA	NA
Balloon dilation	4 (66.7%)	NA	NA	NA	NA
Esophageal stent	1 (16.7%)	NA	NA	NA	NA

S428

Incidence of Food Impaction Based Upon Region and Season in the United States

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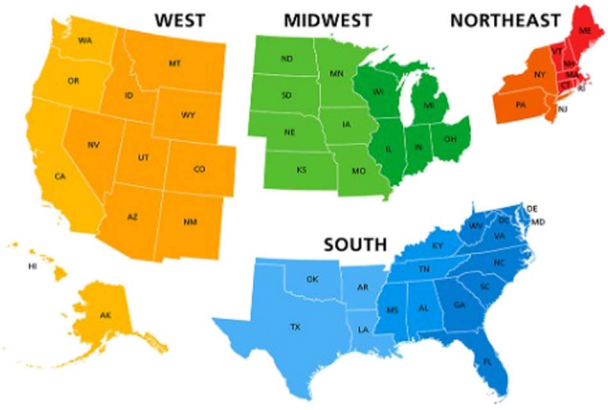
Introduction: Food impactions frequently occur as result of underling functional or mechanical pathology such as rings, strictures, webs, malignancies, eosinophilic esophagitis (EoE), or dysmotility. The primary aim of this study was to evaluate seasonal and regional variation in the incidence of esophageal food bolus impaction.
Methods: Data were collected for patients admitted for esophageal food impaction from National Hospital Discharge Survey (NHDS) between 2001 and 2010 and National Hospital Ambulatory Medical Care Survey (NHAMCS) between 2011 and 2015. Demographics, region, and month of admission were collected. SPSS was used for chi-square testing at alpha of 0.05 to compare incidence of esophageal impaction based on region and season. Seasons were defined as follows: Winter (December to February), Spring (March to May), Summer (June to August), and Fall (September to November). Four regions were identified and included Northeast, Midwest, South, and West (Figure). Data was adjusted for distribution of US population (Table).
Results: In total, 602 cases of food bolus impaction were identified. Older patients (Age > 50) had higher incidence of food bolus impaction ($p < 0.001$). Male sex was found to be an independent risk factor for food bolus impaction ($p < 0.001$). No difference was noted based on race of patients ($p = 0.07$). Northeast had the highest number of cases and west had the least number of cases of food bolus impaction ($p < 0.001$). Cases in northeast were significantly more than Midwest and South as well ($p < 0.001$). The highest number of food bolus cases were noted in summer and the least number of cases were noted in winter. The difference between summer vs winter ($p < 0.01$), and summer vs spring ($p = 0.01$) was statistically significant. The difference between summer and fall ($p = 0.28$) was not statistically significant.
Conclusion: Food impactions occur for a wide variety of reasons with EoE being one of the most common cause of food impactions. Previous studies have documented seasonal variations of EoE, but none, known to date, have evaluated this finding in the United States. Interestingly, in our study, the Northeast did have significantly more cases compared to the South, West, and Midwest. Summer months had a high propensity for food impactions as well. This difference may be due to environmental factors and should be investigated further.



[0428] **Figure 1.** Distribution of States by Region

Table 1. **Comparison of esophageal food impaction cases based on seasons and region**

Region	No. of Cases	% of Cases
Northeast	201	33.4%
Midwest	145	24.1%
South	191	31.7%
West	65	10.8%
Comparison between Regions		p-value
Northeast vs. Midwest	33.4% vs. 24.1%	< 0.001
Northeast vs. South	33.4% vs. 31.7%	< 0.001
Northeast vs. West	33.4% vs. 10.8%	< 0.001
Midwest vs. South	24.1% vs. 31.7%	0.002
Midwest vs. West	24.1% vs. 10.8%	< 0.001
South vs. West	31.7% vs. 10.8%	< 0.001
Season	No. of Cases	% of cases
Winter	131	21.8%
Spring	132	21.9%
Summer	180	29.9%

Table 1. (*continued*)

Region	No. of Cases	% of Cases
Fall	159	26.4%
Comparison between Seasons		p-value
Spring vs. Winter	21.9% vs. 21.8%	0.9
Summer vs. Winter	29.9% vs. 21.8%	< 0.01
Fall vs. Winter	26.4% vs. 21.8%	0.1
Summer vs. Spring	29.9% vs. 21.9%	0.01
Summer vs. Fall	29.9% vs. 26.4%	0.28
Fall vs. Spring	26.4% vs. 21.9%	0.13

S429

Esophageal Motility Disorders Frequency in Patients With Pulmonary Disorders: A Retrospective Study

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Introduction: The relationship between esophageal and pulmonary diseases has been extensively studied, however, despite the increasing interest in understanding this bi-directional relationship, a lot remains to be elucidated. Given the significant morbidity and mortality often associated with some pulmonary disorders, an understanding of the pathophysiological mechanisms involved in this interaction is extremely important. This study further explores the relationship among various esophageal and pulmonary disorders.
Methods: This is a retrospective study of patients who underwent high resolution esophageal manometry (HREM) and pH studies at the Yale Gastrointestinal and Motility Lab between 2016 and 2019. Data was extracted from the electronic medical record after studies were reviewed by two motility specialists using the Chicago Classification v. 4.0. A total of 1078 patients were divided into five groups according to the presence of four pulmonary diagnoses: asthma (270); obstructive sleep apnea (OSA, 160); interstitial lung disease (ILD, 59); chronic obstructive pulmonary disease (COPD, 74); control (no pulmonary diagnosis, 565).
Results: The prevalence of ineffective esophageal motility (IEM) was significantly higher in ILD, asthma, and OSA patients compared to control (22.7, 18.5, 20.0 and 12.9%, respectively). Moreover, the incidence of absent contractility was four times greater in ILD patients than control patients. No statistical difference was found in frequency of motility disorders between COPD and control patients. Demeester score was higher in both OSA (36.1) and asthma (40.9) patients than in the control group (24.7) and proton pump inhibitor (PPI) was more effective in decreasing the score in these two groups.
Conclusion: The prevalence of motility disorders is higher in patients with pulmonary diseases. Screening those populations with HREM and pH testing with impedance (when available) can promote bi-directional benefits and improve chronic cough management in this group.

S430

Opportunities for Virtual Care in Eosinophilic Esophagitis: Real-World Dietary Therapy Practice

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Introduction: Dietary therapy for eosinophilic esophagitis (EoE) is an effective first-line treatment aimed at identifying triggers by systematically removing then reintroducing food groups. Success on diet therapy can be augmented by working with a dietitian, but this is not a universal clinical resource. Virtual or telehealth approaches to nutrition care may offer opportunities to implement diet therapy for EoE. We conducted a retrospective study at a tertiary center with six GI dietitians to compare real-world standard in-person versus virtual EoE nutrition practices in terms of access, follow-up, and disease control.
Methods: We identified adults with EoE referred to GI nutrition through query of the electronic medical record by ICD-10 diagnoses and confirmed by chart review. As all nutrition visits prior to the COVID pandemic were performed in-person, standard care was defined as care established in January–December 2019 and virtual care in January–December 2021. Associations were analyzed using Chi-squared and Student's t test (Table).
Results: A total of 204 patients were included; 99 referred for standard in-person and 105 virtual nutrition care. The cohorts did not differ significantly by gender, age at the time of referral, race, and distance lived to our center. Of these, 55.6% (55) standard and 48.6% (51) virtual visits were completed with a dietitian (p=0.341) and 4-food elimination diet was the most commonly planned diet. The majority initiated the diet (80.0% standard, 78.4% virtual, p=0.842) and among them, half successfully attained histologic remission with the elimination phase (63.6% standard, 47.5% virtual, p=0.324). Ultimate treatments plans included remaining on dietary therapy (25.5% standard, 23.5% virtual, p=0.728), no treatment or lost to follow-up (34.6% standard, 25.5% virtual), and medication (25.5% standard, 41.2% virtual).
Conclusion: There is a growing demand for nutrition care in EoE and in our tertiary practice, we found no differences in the success and response rate on elimination diet or follow-up between patients receiving standard or virtual nutrition care. Virtual approaches to implementing EoE dietary therapy may serve to complement in-person care and offer opportunities for those lacking local dietitian access. However, up to one-third of patients are lost to follow-up or remain untreated, also highlighting a need to identify, understand, and overcome barriers to treatment uptake and disease control.

Table 1. **Follow-up and response on EoE dietary therapy**

		Standard in-person (n = 55)	Virtual (n = 51)	p-value
Planned diet	4FED	34 (61.8%)	25 (49.0%)	0.612
	6FED	11 (20.0%)	13 (25.5%)	
	2FED	5 (9.1%)	7 (13.7%)	
	1FED	0 (0.0%)	0 (0.0%)	
	Other	5 (9.1%)	6 (11.8%)	
Diet initiation		44 (80.0%)	40 (78.4%)	0.842
Response to elimination diet		28 (50.9%)	19 (37.7%)	0.324
Ultimate treatment	Diet	14 (25.5%)	12 (23.5%)	0.648
	None or LTFU	19 (34.6%)	13 (25.5%)	
	PPI	6 (10.9%)	10 (19.6%)	
	TCS	8 (14.6%)	11 (21.6%)	
	Diet + medication	6 (10.9%)	4 (7.8%)	
	Dilation alone	0 (0.0%)	0 (0.0%)	
	Other	2 (3.6%)	1 (2.0%)	

4FED, 4-food elimination diet; 6FED, 6-food elimination diet, 2FED, 2-food elimination diet; 1FED, milk only 1-food elimination diet; LTFU, lost to follow-up; PPI, proton pump inhibitor; TCS, topical corticosteroid.

S431

Associations of Dietary Fiber and Fat Intake with Barrett's Esophagus and Stages of Progression to Esophageal Adenocarcinoma

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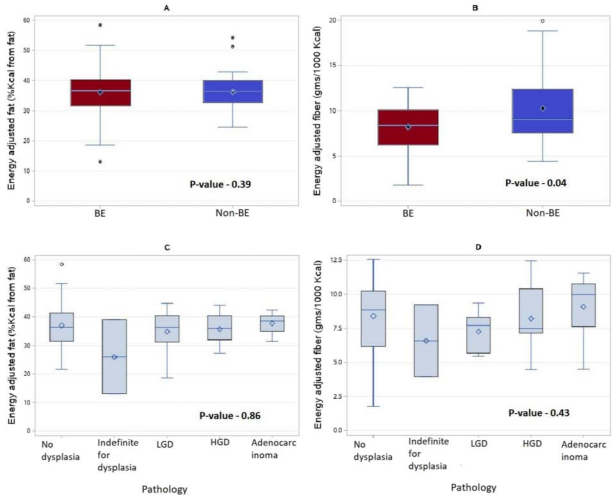
Introduction: The incidence of esophageal adenocarcinoma (EAC) has increased dramatically over the past half century. Changes in dietary patterns over this time may partially account for this trend. Prior studies have found inverse associations between fiber intake and both Barrett's esophagus (BE) and EAC, and studies of fat intake have reported increased risk or no association. However, it is unknown whether fiber or fat intake contribute to neoplastic progression in BE patients.
Methods: We performed a multi-center case-control study of patients with and without BE. We collected demographic, anthropometric, and clinical data and categorized BE by worst degree of histology ever. Subjects completed the NCI DHQII, a validated food frequency questionnaire assessing dietary intake over the preceding 12 months. We used multivariable logistic regression analyses to assess associations of energy adjusted fat and fiber intake with BE and with advanced neoplasia (high grade dysplasia or EAC vs. no dysplasia/indefinite/low grade dysplasia). Four models were developed: 1) fat and fiber intake; 2) Model 1 and EAC risk factors (age, sex, BMI, smoking history, family history); 3) Model 2 and aspirin and statin use; 4) reduced parsimonious model (final model: age, sex, family history).
Results: We enrolled 162 subjects; 108 subjects (37 non-BE, 71 BE; 21 with advanced neoplasia) completed the questionnaire and were analyzed. Compared to controls, BE patients were older and more likely ($p< 0.01$) to be male, aspirin users, statin users, and ever smokers. BE patients had significantly higher energy-adjusted fiber intake but no difference in fat intake compared to controls. (Figure A-B) Adjusted for fat intake, increased fiber intake was associated with reduced odds of BE (per g/1000 kcal, OR 0.81, 95%CI 0.70-0.93), with similar associations in all the models (Table). There was no association between fat intake and BE. There was no significant association between fat or fiber intake and stages of progression to EAC (Figure C-D), and neither fat nor fiber intake was associated with advanced neoplasia in multivariable analyses. (Table)
Conclusion: Fiber intake was inversely associated with BE but not with stages of progression to EAC. There was no association between fat intake and BE or dysplasia or EAC, but this may reflect our small sample size. Future larger studies are warranted to elucidate the mechanisms by which fiber may protect against the development of BE.



[0431] **Figure 1.** Comparisons of energy-adjusted intake of A) fat and B) fiber between BE and non-BE subjects. Comparisons of energy-adjusted intake of C) fat and D) fiber across stages of progression to EAC.

Table 1. Multivariable logistic regression models for associations between energy-adjusted fat (% kcal) and fiber (g/1000 kcal) intake with BE (vs. no BE) and with advanced neoplasia (HGD/EAC vs. ND/IND/LGD). (ORs per unit increase)

		Model 1	Model 2	Model 3	Model 4
BE	Fat	1.01 (0.95- 1.08	1.03 (0.95- 1.08)	1.03 (0.94- 1.11)	1.03 (0.95- 1.11)
	Fiber	0.81 (0.70- 0.93)	0.82 90.67- 0.99)	0.82 (0.67-1.00)	0.80 (0.66- 0.97)
Advanced neoplasia	Fat	1.00 (0.93- 1.08	1.00 (0.92- 1.09)	1.02 (0.93- 1.12)	1.01 (0.98- 1.09)
	Fiber	0.94 (0.75- 1.18)	0.85 (0.65- 1.1)	0.87 (0.65- 1.16)	0.96 (0.75- 1.24)

S432

Fifty Percent Increase in Low-Grade Dysplasia Detection Using Probe-Based Confocal Endomicroscopy in a Metropolitan Veteran Cohort Undergoing Short Segment Barrett's Esophagus Surveillance

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Introduction: Seattle protocol (SP) is the standard method to biopsy Barrett's esophagus. However, SP may miss dysplasia in all types of BE. Few studies have focused on pCLE in the diagnosis of dysplasia in short segment Barrett's esophagus (SSBE). The primary aim of our study was to determine if pCLE was more effective in diagnosing dysplastic mucosa in patients undergoing surveillance endoscopy in SSBE.
Methods: Patients undergoing surveillance endoscopy and diagnosed with SSBE between January 1, 2018 and January 1, 2021 at the VA Loma Linda Healthcare System (VALLHCS) were included. Patients who underwent pCLE were compared to those undergoing SP. Esophagogastroduodenoscopy (EGD) was performed using a high definition diagnostic upper endoscope (Olympus, Center Valley PA). All patients in both pCLE and SP group underwent high-definition white light examination (HD-WLE). All pCLE examinations were performed by two gastroenterologists (C.S.J.and N.S.) using GastroFlex UHD Confocal Miniprobe (Cellvizio, Mauna Kea Technologies). Age, sex, number of EGDs prior to a diagnosis of dysplasia, hiatal hernia length and pCLE findings were assessed. SSBE was defined using Prague criteria, circumference (C) $\leq$ 2cm and maximal length of Barrett's segment (M) $\leq$ 3cm. Two pathologists reviewed all biopsies with a diagnosis of dysplasia. Continuous variables were compared using a Fisher's exact test with $p\leq0.05$ as statistically significant. This study was approved by the institutional review board for VALLHCS.
Results: Sixty-seven patients were identified as having SSBE. Sixteen patients underwent pCLE-targeted biopsies while 51 underwent SP. The mean age of the pCLE group was 64 years and 65.9 years for those who underwent SP. There was no difference in age, BMI, smoking status, statin, H2 blocker or PPI use in patients who underwent pCLE-targeted biopsies versus those who underwent SP. Low-grade dysplasia was detected in 17 patients (25.3%). Of these 17 patients, 11 were detected with pCLE, and 6 were detected with SP. The use of pCLE was significantly associated with detection of low-grade dysplasia (11/16, 68.7%) compared to (6/51, 11.7%) with a p-value of < 0.001.
Conclusion: In a primarily male metropolitan veteran population, pCLE may be helpful in identifying low grade dysplasia in patients with SSBE. SP biopsy techniques may miss LGD during SSBE surveillance.

S433

Identification of Novel Genes and Pathways in Barret's Esophagus and Esophageal Adenocarcinoma Using Bioinformatics

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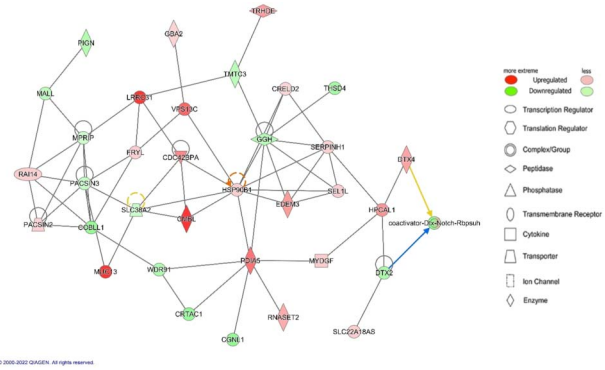
Introduction: Esophageal cancer is one of the leading causes of death in males in the United States (US). Esophageal Adenocarcinoma (EAC) is the most common histological type. EAC usually arises from Barrett's esophagus (BE). There is a paucity of data on the cellular mechanisms that leads to neoplastic progression in the esophagus.
Methods: We conducted two meta-analyses using our STARGEO platform to tag samples from Gene Expression Omnibus. One analysis compares 175 esophageal biopsies from patients with BE to 169 healthy esophageal samples as a control and the other compares 157 esophageal biopsies from patient with EAC to 127 BE biopsies. Results from the two meta-analyses were analyzed using Ingenuity Pathway Analysis.
Results: For the BE vs healthy tissue analysis, ERK/MAPK signaling and integrin signaling were found as top canonical pathways. The top upstream regulators included genes implicated in inflammation such as TNF and TGFB1. Additionally, results suggested possible causal role of Secreted Phosphoprotein 1 (SSP1) gene, which is essential in the pathway that leads to type I immunity, as well as ACP5 gene, a clinically relevant parameter of cancer progression/aggressiveness. Top upregulated genes hold implications in cell migration and invasion such as TSPAN8 and adherens junctions like LGALS4. Top downregulated genes largely held roles in epidermal differentiation complex including SERPINB13 and SPRR2C. Overall, our analysis reflected oncogenic changes seen in BE (Figure). For the BE vs EAC analysis, Xenobiotic Metabolism PXR signaling pathway was the top canonical pathway. Similarly, the top upstream regulators also included genes implicated in inflammation such as IL1B and TGFB1. Also, ERBB2, a member of the epidermal growth factor receptors, was among the top upstream regulators. IL17-TH17 was reported to have a possible causal role in EAC. Top upregulated genes were oncogenes like IGF2BP3 and genes that belong to the GO groups extracellular region /matrix such as MMP1 and INHBA.
Conclusion: Our results build off long-described players in BE/EAC pathogenesis and provide more support for more recently described genes such as TSPAN8, LGALS4, SERPINB13, SPRR2C, etc. Additionally, SSP1, involved in cancer angiogenesis and inflammation, as well as IL17-TH17 were identified as possible causal networks. Overall, this study provides more insight to BE/EAC that can suggest possible therapeutic targets or potential markers of disease progression.



[0433] **Figure 1.** Top network (Cancer, Cellular Compromise, and Cellular Function and Maintenance) identified by IPA Network analysis of Barrett's esophagus. Legend illustrates class of the gene. Red indicates upregulation and green downregulation, with shade depicting magnitude of change. Solid and dashed lines depict direct and indirect, respectively, relationship between genes.

S434

Burden of Eosinophilic Esophagitis 2016-2019: NIS-Based Retrospective Analysis

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Introduction: Eosinophilic esophagitis (EoE) is a chronic and progressive type 2 inflammatory condition causing significant dysphagia and impaired quality of life. In this review, we aim to study the contemporary prevalence of EoE with gender, racial disparities as well as other baseline characteristics over the course of four years.
Methods: We used the NIS database 2016-2019 to identify patients with eosinophilic esophagitis using the appropriate ICD-10 code (K20.0) which was analyzed using STATA 17.0 software. We evaluated the prevalence, baseline characteristics including gender and racial factors, disease distribution in accordance with regions, length of hospital stay, hospital type, healthcare cost, and associated co-morbidities.
Results: A total of 16,733 adult admissions of EoE were identified between 2016-2019 which accounted for 0.01% of total US hospitalizations. EoE displayed a white race predominance of 81.8% with a mean age of presentation being 47.4 years averaged over the study period. A higher prevalence was seen in males compared to females except in 2016. The average length of hospital stay was 4.5 days which remained stable between 2016-2019 corresponding to an average cost of stay of 55,026 USD with females requiring a slightly longer length of stay. Majority of cases presented to urban teaching hospitals in the southern regions of the United States and required large-sized beds. Rural hospitals also demonstrated a modest increase of 2% EoE cases. Among the EoE patients, 37% were found to be hypertensive, 14.7% were obese and 26.5% were smokers. (Table)
Conclusion: The prevalence of eosinophilic esophagitis has been increasing for the past two decades which is thought to be due to increased disease recognition by physicians, higher endoscopy volume with biopsies, or both. Our study reported a stable prevalence with a 0.01% proportion of total US hospitalizations with the majority of cases reported in urban teaching hospitals. Interestingly, the cost and length of hospital stay remained relatively stable over the course of four years. It was also observed that the disease is more prevalent in white middle-aged males and in the southern region of the United States which is similar to previous studies. In patients with EoE, nearly 37% were hypertensive and 26% were reported as smokers. Another important observation was the prevalence of obesity in 14.7% of the patient population. Further studies are needed to explore the rise in prevalence of the disease as well as associated co-morbidities.

Table 1. Eosinophilic esophagitis (EoE) with associated variables

Variables	2019	2018	2017	2016
Total EoE in Adults	4670	4444	3879	3740
Proportion of EoE in adults	0.01%	0.01%	0.01%	0.01%
Mean Age	47.98	48.0	46.92	46.67
Overall LOS	4.31	4.48	4.6	4.57
Female LOS	+0.2	-0.23	+0.42	+0.73
Hypertension	37.37%	37.91%	34.02%	38.77%
Smoking	27.73%	29.25%	25.9%	23.26%

Table 1. (*continued*)

Variables	2019	2018	2017	2016
Obesity	15.59%	14.29%	15.08%	14.04%
Diabetes	12.74%	13.61%	12.63%	12.97%
Total charges	$55,590	$57,114	$55,137	$52,265

S435

Baseline Impedance Derived From Esophageal Manometry Fails to Distinguish GERD Phenotypes

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Introduction: Baseline impedance (BI) measured during a multichannel intraluminal impedance -pH (MII-pH) study is able to distinguish patients with gastro-esophageal reflux disease (GERD). Limited data suggest BI measured during high resolution esophageal impedance manometry (HRIM) could be helpful in detecting patients with GERD or Barrett's esophagus. Nevertheless, measurement of BI with HRIM is not done routinely. We aim to assess whether BI measured during HRIM (HRIM-BI) could serve to detect patients with GERD, thus eliminating the need for further evaluation.
Methods: We retrospectively collected consecutive patients who underwent HRIM and MII-pH study off acid suppression, from May 2021 through May 2022. HRIM-BI measurement was done manually during the landmark period in the beginning of the study, where we measured impedance values at different levels above the LES (0, 5, 10 and 15 cm above LES). Mean nocturnal BI (MNBI) was measured in the MII-pH in the distal sensor (5 cm above the LES) over three 10 minute intervals around 1, 2, and 3 am (Reflux reader 6.1.1 Medronic Inc.). GERD was defined as acid exposure time (AET) >6%, whereas non GERD group included patients without or borderline GERD.
Results: We have included 60 patients (31 females) with a mean age 38 ± 5.5 years. Of the total cohort, 42 patients had AET< 6% and 18 patients (30%) had MNBI under 1500 Ohm. MNBI and HRIM-BI at the 5 cm proximal to the LES were moderately correlated (Spearman Rho=0.439 p< 0.001). This level showed the best correlation to MNBI. A cut-off of MNBI< 1500 ohm had good discriminating properties in detecting GERD with area under the receiver operating characteristics curve AUROC of 0.884 (95% CI0.774-0.995, p< 0.0001). However, HRIM-BI could not discriminate between GERD and non-GERD AUROC of HRIM-BI 5 cm proximal to LES was 0.659 (0.5-0.818, p=0.053). None of the levels had adequate discriminating properties.
Conclusion: Our results support previously published reports of the usefulness of MII-ph MNBI in detecting GERD. Unfortunately, our data do not support the use of HRIM BI in detecting GERD and obviating the need of 24 hour MII-pH, contrary to prior reports. The HRIM-pH does not correlate well to MNBI and has inadequate discriminatory properties. In conclusion, landmark impedance measurements of HRIM do not discriminate well between GERD and non-GERD patients.

S436

Role of 24 Hours Ambulatory pH Impedance Study and High Resolution Manometry in Patients With PPI Refractory Non-Erosive Reflux Disease

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Introduction: Refractory GERD is a common problem faced by a gastroenterologist. Understanding the cause of treatment refractory GERD helps in guiding the further course of treatment. We aim to study the physiological basis of patients with refractory non-erosive reflux disease and classify these patients based on findings of 24 hour ambulatory pH Impedance monitoring and high resolution manometry (HRM).
Methods: This is a single centre prospective study from March, 2019 to August, 2020 in which clinical profile and data of pH impedance studies and HRM was analysed in patients on PPI with refractory non-erosive GERD. Refractory GERD was defined as persistence of heartburn or regurgitation atleast once a week after receiving standard dose of PPI for atleast 8 weeks. Patients on NSAIDs, pregnant females, patients with organic disease of the upper digestive tract or previous upper digestive tract surgery, significant comorbidities like decompensated chronic liver disease, chronic kidney disease, poorly controlled diabetes mellitus or any malignancy were excluded.
Results: 151 patients with refractory GERD were analysed of which, 48 had abnormal esophagogastroduodenoscopy and 103 were non-erosive GERD. Amongst, non-erosive disease, acid reflux disease was found in 29.1%, non-acidic reflux disease in 21.4%, 30.1% patients had reflux hypersensitivity whereas, 19.4% patients had functional heartburn. On HRM, 8.74% had esophageal motility disorders, most commonly being IEM in 5.82% patients followed by EGJ obstruction in 1.94% and absent contractility in 0.97%. 25.2% had hiatus hernia; 20.4% patients had type II EGJ morphology, 2.9% had type IIIa and 1.9% had type IIIb EGJ morphology.
Conclusion: True acid reflux disease was found in less than 1/3rd refractory non-erosive GERD patients only and around 50% patients had functional esophageal disorder as found on pH impedance studies. Majority patients have normal esophageal motility but 1/4th have abnormal EGJ morphology.

S437

Lower Socioeconomic Status Is Associated With Higher Mortality in T1a Esophageal Cancer

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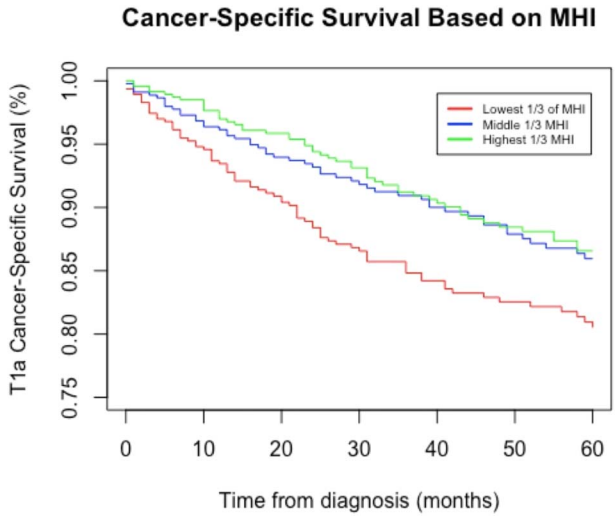
Introduction: Esophageal cancer is the 6th leading cause of cancer mortality worldwide. While esophagectomy remains the conventional treatment for early-stage esophageal cancer, minimally invasive endoscopic therapies have become an increasingly widespread alternative with comparable outcomes to surgery. Socioeconomic status (SES) has been linked to significant disparities in esophageal cancer. To date, the impact of SES on outcomes in early-stage esophageal cancer has not been evaluated. Our aim was to assess if socioeconomic status influences cancer-related outcomes in T1a disease.
Methods: Patients diagnosed with a primary T1a esophageal cancer from 2004-2015 via the November 2018 submission of Surveillance, Epidemiology, and End Results (SEER) Program were included. Demographic, tumor, treatment, and survival data were collected. Three tertiles of socioeconomic status were created based on patients' median household income (MHI) from county-level data derived from 2010-2014 US Census. We compared all-cause, cancer-specific, and non-cancer related mortality at 2 and 5 years. Stratified survival distributions were assessed using the Kaplan–Meier method and clinical significance between survival curves was determined via the log-rank (Mantel–Cox) test. Statistical analysis was performed using R studio (R version 3.6.1, Boston, Massachusetts). (Figure)
Results: A total of 1788 patients with primary T1a esophageal cancer from 2004-2015 were included. The three MHI groups were: lowest ($20,000 - $54,390), middle ($54,390 - $65,500), and highest ($65,500 - $106,520). 402 of these patients did not have complete follow up data, leaving 1386 patients for survival analysis. Patients with lowest income bracket had significantly lower overall survival at 2 (83% vs 91.5%, p=0.001) and 5 years (72.2% vs 81.1%, p=0.006), higher cancer-specific mortality at 2 (10.9% vs 5.3%, p=0.003) and 5 years (16.2% vs 10.9%, p=0.025), with similar levels of non-cancer related deaths at both 2 (p=0.102) and 5 years (p=0.147). (Table)
Conclusion: In this population-level observational study, we demonstrate that lower median household income is associated with poorer cancer-specific and overall survival in esophageal cancer limited to the muscularis mucosa. Population-based strategies aimed at enhancing access to screening and identifying other possible etiologies for these socioeconomic disparities are paramount to improving patient outcomes in early esophageal cancer.



[0437] **Figure 1.** Kaplan-Meier plot for cancer-specific survival stratified by median household income bracket. Log-Rank test value <0.001.

Table 1. Survival based on median household income (MHI). Caption: Lowest MHI ($20,000 - $54,390), Middle MHI ($54,390 - $65,500), Highest MHI ($65,500 - $106,520)

	Overall	Lowest MHI	Middle MHI	Highest MHI	p-value
Number of patients	1386	468	448	470	
Overall Survival					
2-year (%)	1213 (87.5%)	389 (83.1%)	394 (87.9%)	430 (91.5%)	**0.001**
5-year (%)	1065 (76.8%)	338 (72.2%)	346 (77.2%)	381 (81.1%)	**0.006**
Cancer-Specific Mortality					
2-year (%)	105 (7.6%)	51 (10.9%)	29 (6.5%)	25 (5.3%)	**0.003**
5-year (%)	178 (12.8%)	76 (16.2%)	51 (11.4%)	51 (10.9%)	**0.025**
Non-Cancer Mortality					
2-year (%)	68 (4.9%)	28 (6.0%)	25 (5.6%)	15 (3.2%)	0.102
5-year (%)	143 (10.3%)	54 (11.5%)	51 (11.4%)	38 (8.1%)	0.147

S438

Relationship Between Upper Esophageal Sphincter (UES) and Distal Acid Exposure in Patients With GERD: Evaluation of pH Impedance and High Resolution Manometry (HRM)

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Introduction: Gastroesophageal reflux disease (GERD) is the most common disorder of the gastrointestinal tract in the United States. The UES is essential by sustaining basal pressure (normal = 34-104mmHg) to prevent laryngopharyngeal reflux (LGR) and also relaxation pressure (normal = < 15mmHg) for the passage of food boluses during ingestion. Unlike the lower esophageal sphincter (LES), the physiology of the UES in GERD is not well established. The aim of this large retrospective study is to evaluate both pH Impedance and HRM to assess whether GERD is associated with a high pressure UES.
Methods: This cohort consists of patients that underwent both pH Impedance and HRM at an esophageal motility laboratory between 09/2018 and 01/2022. Patients less than 18 years old, on PPI therapy at time of testing, or with exams further than one month apart were excluded from the study. Patients with uninterpretable or inconclusive exams were also omitted. All data from pH Impedance and HRM reports were recorded for each subject. Primary variable of interest was total acid exposure time (AET) which was further categorized into GERD or normal according to both Demeester (AET >4.2%) and Lyons criteria (AET >6%). All variables were compared to corresponding basal and residual pressure on HRM.
Results: There were 727 adults with both pH Impedance and HRM performed over the 40-month span with our sample including 318 patients after implementation of exclusion criteria (mean age = 53.5, 76.1% female). The diagnosis of GERD was found in 191 subjects (60%) per Demeester Criteria and 146 patients (46%) per Lyons criteria. Subjects diagnosed with GERD per Demeester criteria were found to have a higher mean UES basal pressure (72.8 mmHg) compared to those without GERD (64.3 mmHg) (p=0.04). This was also true in Lyons criteria (69.3 mmHg vs 65.0 mmHg) (p=0.33). Further comparative analysis between pH impedance variables and UES pressure are summarized in Table.
Conclusion: Our results suggest that patients with elevated total AET secondary to GERD may have elevated basal UES pressures. This is likely due to a chronic compensatory mechanism to prevent micro aspirations and damage to the larynx. These results are further supported by a recent smaller retrospective study demonstrating an association of elevated residual UES pressure in patients with more episodes of proximal reflux. The findings of this study propose that UES pressure may be a novel measurement to assist with classifying and diagnosing GERD.

Table 1. Basal and Residual Upper Esphageal Pressures for PH Impedance Variables

UES Pressure	pH Impedance Variable		*p*
	Total AET ≤ 4.2%	Total AET > 4.2%	
Basal	64.26	72.83	0.04*
Residual	17.98	19.93	0.45
	Total AET < 4%	Total AET > 6%	
Basal	64.98	69.31	0.33
Residual	17.95	20.67	0.37

Table 1. (*continued*)

UES Pressure	pH Impedance Variable		p
	Total AET ≤ 4.2%	**Total AET > 4.2%**	
	Upright AET < 6.3	Upright AET ≥ 6.3	
Basal	70.12	68.63	0.73
Residual	18.44	19.24	0.57
	Recumbent AET < 1.2%	Recumbent AET ≥1.2	
Basal	69.46	69.38	0.99
Residual	20.43	18.41	0.45
	Number of Refluxes < 40	Number of Refluxes > 80	
Basal	67.82	69.89	0.88
Residual	17.92	18.69	0.44
	Longest Reflux Episode < 9.2 min	Longest Reflux Episode ≥ 9.2 min	
Basal	67.11	70.67	0.43
Residual	19.03	19.22	0.94
	Demeester Score ≤ 14.2	Demeester Score > 14.2	
Basal	65.13	71.64	0.13
Residual	18.41	19.54	0.68
	Absent Extra-Esophageal Sx	Present Extra-Esophageal Sx	
Basal	70.65	67.09	0.43
Residual	19.46	18.59	0.75
	MNBI >2292	MNBI ≤ 2292	
Basal	67.29	71.02	0.48
Residual	24.61	23.32	0.53

Statistical analysis was performed via two-sample t-test assuming unequal variance. UES, Upper Esophageal Sphincter; AET, Acid Exposure Time; Sx, Symptoms; MNBI, Mean Nocturnal Baseline Impedance.
*Signifies statistical significance (p<0.05).

S439

Markedly Increased Prevalence of Eosinophilic Esophagitis in Patients With Atopic Diseases in a U.S. Veteran Population

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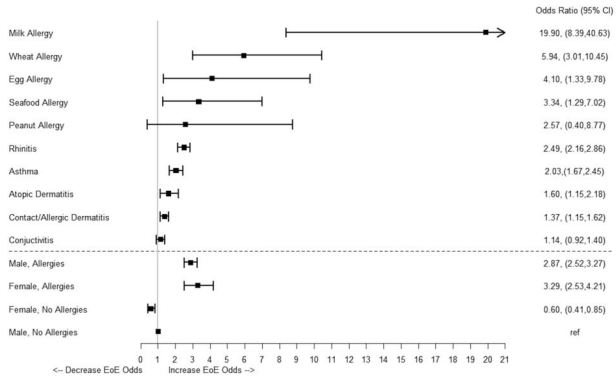
Introduction: Eosinophilic Esophagitis (EoE) is a chronic esophageal disorder associated with atopy. However, there is lack of data on prevalence of EoE in atopic patients. We aimed to study the relationship between EoE and atopy to determine prevalence-associated demographics, risk factors, and symptoms.
Methods: A case-control study was conducted with data from the VA population, 2009-2021, using a 9.7% random sample from a nationwide VHA database. Demographic data, symptoms, and risk factors were collected on patients with EoE and at least one atopic disease diagnosis, identified using ICD9/10 codes. Logistic regression models for EoE, allergy, and symptoms were developed.
Results: Of 1,110,189 VA patients, 26% (288,193) had at least one atopic condition and 0.092% (1,022) had an EoE diagnosis. Atopy was more common in patients with EoE (51.6%) than without (25.9%; p< 0.0001). In atopic patients, EoE was common in patients with milk (4.10%), egg (1.06%), and wheat (0.81%) allergy. Frequency of EoE was lower in patients with asthma (0.26%), rhinitis (0.22%), and conjunctivitis (0.16%). In patients with EoE, rhinitis (32.5%), dermatitis (18.4%), and asthma (12.7%) were most common. Few patients with EoE had wheat (1.04%), milk (0.78%) or egg (0.49%) allergy. Atopic patients had increased odds of EoE (Figure). Compared to male VA patients without allergy, odds ratio for EoE was 2.87 for a male and 3.29 for a female, each with at least one allergic condition. In a separate model, VA patients with at least one atopic condition, milk allergy had 19.9 times increased odds of EoE, wheat allergy had 5.94 times increased odds, and egg allergy had 4.10 times increased odds. Of patients with more than one allergic condition, rhinitis and asthma were most likely to increase odds of EoE. VA patients presenting with upper GI symptoms had higher odds of EoE (24.41), or EoE and allergy comorbidity (45.98) compared to patients without symptoms.
Conclusion: While these data confirm that atopy is commonly associated with EoE, they newly show increased prevalence of EoE in atopic patients. Patients with food allergy, especially to milk, wheat, and egg, are most likely to have EoE. Upper GI symptoms are more likely to indicate EoE and allergy comorbidity, or EoE alone, than at least one atopic disease. Thus, high clinical suspicion for EoE should be considered if a patient has GI symptoms with history of atopic disease and especially milk, wheat, or egg allergy.



[0439] **Figure 1.** Odds ratios of developing EoE for sex and atopic disease conditions.

S440

Clinical Utility of an AI-driven Precision Medicine Test for Barrett's Esophagus: Results From a Randomized Controlled Trial

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Introduction: Barrett's esophagus (BE) is a treaTable precursor to esophageal adenocarcinoma (EAC). Physician adherence to BE management guidelines is poor, leading to reduced dysplasia detection and inappropriate treatment. We conducted a randomized controlled study to determine the clinical utility of a precision medicine test that predicts risk of progression to high grade dysplasia (HGD) or EAC.
Methods: 259 practicing general and interventional gastroenterologists and gastrointestinal surgeons participated in this IRB-approved study. We measured the clinical care for three simulated BE patient types: non-dysplastic BE, indefinite for dysplasia, and low-grade dysplasia that each had three variants: high-risk clinical profile and high-risk test score [variant A], low-risk clinical profile and high-risk test score [variant B], and high-risk profile and low-risk test score [variant C]. After collecting baseline data on clinical care for the cases, the precision medicine test was introduced to two intervention groups who viewed its educational materials. In a second round, intervention 1 was given the test results while intervention 2 optionally ordered the results. Their care was compared to controls. Quality of care scores were calculated based on the number of physician responses that matched evidence-based criteria for the management of BE.
Results: Intervention 1's quality of care scores showed improvement compared to control for all case variants (difference-in-difference scores A: +1.8, p=0.600; B: +6.7%, p=0.013; C: +4.3%, p=0.129, see Table). After controlling for physician and practice characteristics, intervention 1 outperformed controls in correctly determining risk of progression to HGD/EAC among all three case variants ($p < 0.01$ for all) and ordering the correct primary treatment (p=0.02, see Table). Intervention 2 participants ordered the test results in 21.9% of cases, and those who did performed similarly to, or even outperformed, intervention 1. Those who did not order the test performed similarly to controls ($p > 0.10$).
Conclusion: This precision medicine test for BE optimized appropriate care for both patients at high-risk and low-risk for disease progression to HGD/EAC, particularly for patients with low-risk clinical profiles but high-risk test results. With increased test use, physicians may treat early disease stages more efficiently and accurately and prevent progression to EAC.

Table 1. Quality of Care (Diagnosis and Management) Difference-in-Difference Results Across Study Arms

	Difference-in-difference*		
	Intervention 1 (received risk prediction test results)	Intervention 2 (given option to order risk prediction test)	
	Intervention 1	Test Orderers	Test Non-Orderers
Diagnosis+Management Quality of Care Scores			
Variant A	+1.8%	-5.5%	-1.5%
Variant B	+6.7%**	+6.8%	+3.2%
Variant C	+4.3%	+5.7%	+3.5%
Correctly Assessing Risk of Progression to HGD/EAC			
Variant A	+60.3%**	+73.0%**	-1.2%
Variant B	+65.7%**	+66.6%**	+10.4%
Variant C	+32.6%**	+59.9%**	-1.9%
Correct Primary BE Management			
Eradication therapy	+14.6%	+30.8%***	-1.0%
Endoscopic surveillance	+18.5%**	+5.9%	+2.5%

Variant A: high-risk clinical profile and high-risk test result
Variant B: low-risk clinical profile and high-risk test result
Variant C: high-risk clinical profile and low-risk test result

*Compared to controls; **p-value < 0.05; ***p-value < 0.10

S441

Prevalence of Barrett's Esophagus in Patients With Autoimmune Disease

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Introduction: Systemic lupus erythematosus (SLE), Rheumatoid arthritis (RA) and Sjögren's syndrome (SS) are multi-system rheumatologic diseases with known esophageal manifestations such as gastroesophageal reflux disease (GERD) from impaired peristalsis, decreased lower esophageal sphincter tone, and increased visceral hypersensitivity. However, there are no data on the prevalence of Barrett's esophagus (BE).
Methods: The aim of this study was to investigate the prevalence of Barrett's esophagus in patients with SLE, RA and SS. Data were collected from a commercial database (Explorys Inc, Cleveland, OH), an aggregate of electronic health records data from 27 integrated healthcare systems in the US between 4/2017-4/2022. We identified patients with SLE based on Systematized Nomenclature of Medicine – Clinical Terms (SNOMED-CT). We compared the prevalence of BE at least 30 days after a diagnosis of each autoimmune condition to a control cohort without the autoimmune disease. We sub-categorized using demographics including gender, race, age, and BMI. We also included data on tobacco use, alcohol use, and proton pump inhibitor (PPI) therapy.
Results: Of the 31,502,430 patients in the database, we identified 120,040 cases of SLE, 371,640 cases of RA, and 77,010 cases of SS. There was a greater female to male ratio for all three autoimmune diseases (Table). Prevalence of BE in SLE was 1.3% (OR 2.33, CI 2.21-2.45), in RA was 1.5% (OR 2.88, CI 2.80-2.96), and in SS was 1.7% (3.24, CI 3.07-3.42). History of tobacco use was reported in 11.2%, 14.1%, and 11.9% of patients with SLE, RA, and SS, respectively, compared to 3.4% of patients without the autoimmune disease. Among patients with tobacco use, the risk of BE was comparable between those with SLE, RA and SS and those without SLE, RA, or SS (SLE OR 0.95, RA OR 1.11, SS OR 1.20). However, among those without tobacco use, the risk of BE was higher among the patients with SLE, RA, and SS compared to patients without SLE, RA or SS (SLE OR 2.33, RA OR 2.77, SS OR 3.28) (Figure). PPI use for BE was reported in 91.3%, 91.4%, and 90.3% of patients with SLE, RA, and SS, respectively, compared to 81.1%, 83.6%, and 83.9%, without the autoimmune disease.
Conclusion: In a large population-based study using a commercial database, patients with SLE, RA, and SS had a significant association with BE after a diagnosis of the autoimmune disease. This association was stronger in patients with each autoimmune disease without tobacco use.

Barrett's Esophagus			
	SLE (%)	No SLE (%)	Odds Ratio (95% CI)
Overall	1500 (1.25)	169660 (0.54)	2.33 (2.21-2.45)
Male	290 (1.93)	92850 (0.66)	2.95 (2.62-3.31)
Female	1210 (1.15)	76170 (0.44)	2.62 (2.47-2.78)
Tobacco use	370 (2.8)	31190 (2.9)	0.95 (0.85-1.05)
No tobacco use	1130 (1.1)	138470 (0.5)	2.33 (2.20-2.48)
	RA (%)	No RA (%)	Odds ratio (95% CI)
Overall	5590 (1.5)	164360 (0.5)	2.88 (2.80-2.96)
Male	2020 (2.2)	90690 (0.7)	3.38 (3.23-3.53)
Female	3560 (1.3)	73020 (0.4)	3.00 (2.91-3.11)
Tobacco use	1660 (3.2)	29530 (2.9)	1.11 (1.06-1.17)
No tobacco use	3930 (1.2)	124830 (0.4)	2.77 (2.68-2.86)
	SS (%)	No SS (%)	Odds ratio (95% CI)
Overall	1340 (1.7)	170630 (0.5)	3.24 (3.07-3.42)
Male	220 (2.6)	93410 (0.7)	3.99 (3.49-4.57)
Female	1110 (1.6)	76610 (0.4)	3.73 (3.52-3.96)
Tobacco use	320 (3.5)	31450 (2.9)	1.20 (1.07-1.34)
No tobacco use	1020 (1.5)	139180 (0.5)	3.28 (3.09-3.49)

[0441] **Figure 1.** Table 2. Prevalence and odds ratios (OR) for BE in patients with and without SLE, RA, and SS (all p<0.001)

Table 1. Baseline characteristics for Barrett's esophagus in patients with and without SLE, RA, and SS

Barrett's Esophagus	With SLE (%)	Without SLE (%)	With RA (%)	Without RA (%)	With SS (%)	Without SS (%)
Total	1500	169660	5590	164360	1340	170630
Adult (18-65)	680 (45.3)	65350 (38.5)	1570 (28.1)	64290 (39.1)	420 (31.3)	66010 (38.7)
Elderly (>65)	830 (55.3)	105780 (62.3)	4050 (72.5)	101530 (61.8)	930 (69.4)	106090 (62.2)
Female	1210 (80.7)	76170 (44.9)	3560 (63.7)	73020 (44.4)	1110 (87.3)	76610 (62.2)
Male	290 (19.3)	92850 (54.7)	2020 (36.1)	90690 (55.2)	220 (16.4)	93410 (54.7)
F:M ratio	4.2	0.8	1.8	0.8	5.0	0.8
Caucasian	1280 (85.3)	144440 (85.1)	4940 (88.4)	139680 (85.0)	1170 (87.3)	145240 (85.1)
African American	130 (8.7)	6120 (3.6)	280 (5.0)	5900 (3.6)	50 (3.7)	6250 (8.4)
Tobacco use	370 (24.7)	31190 (18.4)	1660 (29.7)	29530 (18.0)	320 (23.9)	31450 (18.4)
Alcohol use	170 (11.3)	14160 (8.3)	520 (9.3)	13670 (8.3)	80 (6.0)	14360 (8.4)
Obese (BMI >30)	380 (25.3)	29880 (17.6)	1400 (25.0)	28470 (17.3)	320 (23.9)	30060 (17.6)
Severely obese (BMI >40)	180 (12.0)	11680 (6.9)	580 (10.4)	11110 (6.8)	100 (7.5)	11820 (6.9)
PPI use	1370 (91.3)	137520 (81.1)	5110 (91.4)	137380 (83.6)	1210 (90.3)	143110 (83.9)

S442

Utilization of Diagnostic Testing and Indications for Long-Term Twice-Daily Proton Pump Inhibitor (PPI) Therapy for Gastroesophageal Reflux Disease (GERD) in a Large Healthcare System

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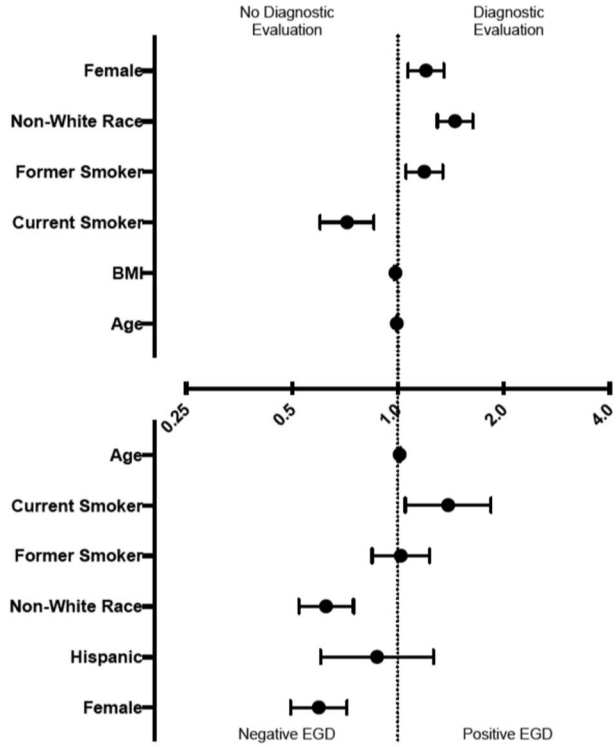
Introduction: For symptoms potentially associated with GERD, guidance recommends de-prescribing long-term PPI therapy based on symptoms if possible, particularly in the absence of objective diagnostic findings. We assessed the utilization and yield of diagnostic evaluation (upper endoscopy (EGD) and/or reflux monitoring) among patients with GERD diagnoses receiving long-term twice-daily PPI therapy.
Methods: From a healthcare system database, adults with GERD diagnoses (per ICD coding) who received prescriptions for twice-daily PPI for at least 90 days from 2018-2021 were identified. CPT analyses were performed to identify the proportions who underwent EGD and reflux monitoring. Characteristics of patients who underwent diagnostic testing were compared to those who did not. Further, those with objective EGD findings potentially warranting long-term PPI (such as erosive or eosinophilic esophagitis, peptic stricture, Barrett's esophagus, ulcer) were compared to those without such findings on EGD. Factors significant on univariate analysis were included in multivariate models to identify predictors of A) undergoing diagnostic evaluation, and B) having positive EGD findings.

Results: 5565 patients (57.7±0.2 yrs; 67.4% female; BMI 31.3±0.1) met inclusion criteria. 2696 (47.7%) had upper endoscopy, 491 (8.7%) had reflux monitoring, and 2735 (48.4%) had either upper endoscopy or reflux monitoring performed. Factors associated with diagnostic testing included younger age, female gender, and non-white race (Table, Figure A). Among those who underwent EGD, 42.2% had endoscopic findings potentially warranting long-term PPI (37.7% for females vs 52.2% for males; 34.7% for non-white patients vs 47.3% for white patients). Factors associated with the presence of EGD findings included older age, male gender, and white race (Figure B).

Conclusion: Among patients receiving prescriptions for long-term, twice-daily PPI for GERD diagnoses, over half did not have procedural diagnostic evaluation documented per CPT analysis, suggesting providers may rely on patient symptom reporting to guide long-term PPI prescriptions. Of those with documented EGD, less than half had objective findings to potentially corroborate the need for long-term, twice-daily PPI. These findings warrant further investigation into potential disparities in care around long-term PPI prescribing patterns based on symptoms and symptom response versus diagnostic evidence.



[0442] **Figure 1.** Forest Plots for Multivariate Analysis of Factors Associated with A) Diagnostic Evaluation (Upper Endoscopy and/or Ambulatory Reflux Monitoring) among Patients with GERD Diagnoses Prescribed Twice-Daily Long-Term PPI Therapy; and B) Objective Endoscopic Findings Potentially Warranting Twice-Daily Long-Term PPI Therapy. Odds Ratios are Depicted with Bars Representing Associated 95% Confidence Intervals; Values Not Crossing the Dashed Line at 1 are Significant. Odds ratios for smoking status variables are in reference to no smoking history.

Table 1. Comparisons Between Patients who Underwent Diagnostic Evaluation (with Upper Endoscopy and/or Ambulatory Reflux Monitoring) and Those Patients Who did Not Undergo Diagnostic Evaluation

	Evaluated *(n=2735)*	Not Evaluated *(n=2920)*	*p* Values
Age (years)	57.1±0.3	58.3±0.3	0.005*
Body Mass Index	31.0±0.1	31.6±0.2	0.006*
Gender (female)	1898 (69.4%)	1916 (65.6%)	0.002*
Race (data missing = 97)			
White	1681 (62.4%)	1998 (69.8%)	< 0.001*
Black	838 (31.1%)	672 (23.5%)	
Asian	62 (2.3%)	77 (2.7%)	
Other	115 (4.3%)	115 (4.0%)	
Ethnicity (data missing =109)			
Non-Hispanic	2505 (93.1%)	2663 (93.3%)	0.71
Hispanic or Latino	187 (7.0%)	191 (6.7%)	
Married (data missing =58)			
Married	1526 (56.2%)	1658 (57.5%)	0.32
Not Married	1189 (43.8%)	1224 (42.5%)	
Smoking Status (data missing = 5)			
Current	279 (10.2%)	390 (13.4%)	< 0.001*
Former	974 (35.6%)	945 (32.4%)	
Never	1481 (54.2%)	1581 (54.2%)	

S443

Hypogonadism and Testosterone Replacement Therapy Are Associated with a Higher Risk of GERD in Males: A National Cohort Study

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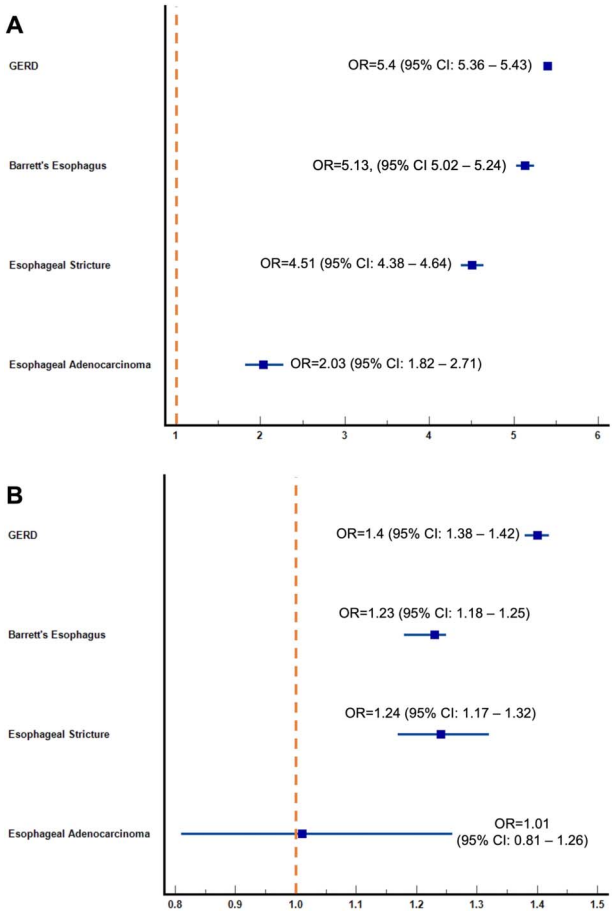
Introduction: The risk of GERD among males with hypogonadism is relatively unknown. Furthermore, the association between gastroesophageal reflux disease (GERD) and testosterone replacement therapy (TRT) has not been well documented in literature. Precisely, the reported effect of exogenous testosterone on GERD has been conflicting in literature. The aim of our study is to determine the risk of GERD and its complications among males with hypogonadism and the risk of GERD and its complications with TRT versus those who did not receive TRT among males with hypogonadism.

Methods: We used a commercial database (Explorys Inc, Cleveland, OH) which includes electronic health record data from 26 major integrated US healthcare systems. Based on Systematized Nomenclature of Medicine – Clinical Terms (SNOMED-CT), we identified all patients (age >18 years). Inclusion criteria for individuals included: males, age >18 with a diagnosis of "hypogonadism". The effect of FDA approved testosterone preparations on GERD and Barrett's esophagus (BE) was assessed. Odds ratios (OR) with 95% confidence intervals (CI) were calculated to compare the risk of GERD and its complications between males on TRT versus those not on TRT.

Results: Of the 70,398,640 individuals in the database from 1999 to May 2022, we identified 408,810 (0.58%) male patients with hypogonadism of whom 135,000 (33%) patients were diagnosed with GERD and 9,430 (2.3%) patients were diagnosed with BE. A total of 183,760 (44.9%) male patients with hypogonadism received TRT. Males with hypogonadism had a significantly higher risk of GERD (5.40, CI 5.36 – 5.43) and BE (5.13, CI 5.02 – 5.24). Furthermore, treatment with TRT was associated with a significantly higher risk of GERD (1.40, CI 1.38 – 1.42) and BE (1.23, CI 1.18 – 1.28) among males with hypogonadism compared to untreated males. (Figure) (Table)

Conclusion: In this large retrospective study, we found that males with hypogonadism had a significantly higher risk for GERD and its complications compared to men without hypogonadism. Unfortunately, treatment with TRT may further exacerbate that risk. Accordingly, males with hypogonadism should be closely monitored for GERD and its complications.



[0443] **Figure 1.** Risk of GERD and its complications in A: Males with Hypogonadism B: Hypogonadal males on testosterone replacement therapy

Table 1. Patient Demographics

Variable	Patients with Hypogonadism		Patients without Hypogonadism N=31,019,340 (%)
	TRT N=183,770 (%)	No TRT N=225,100 (%)	
Age >65	75,740 (41.2%)	97,390 (43.3%)	9,435,750 (30.4%)
Caucasian	157,350 (85.6%)	128,170 (56.9%)	9,631,910 (31.1%)
Obesity	67,180 (36.6%)	62,050 (27.6%)	1,944,090 (6.3%)
Smoker	30,060 (16.4%)	29,000 (12.9%)	1,887,270 (6.1%)
Alcohol Abuse	7,470 (4.1%)	8,230 (3.7%)	711,830 (2.3%)
Hiatal Hernia	540 (0.3%)	450 (0.2%)	2,597,410 (8.4%)
GERD	68,270 (37.1%)	66,750 (29.7%)	2,597,410 (8.4%)
Barrett's Esophagus	4,720 (2.6%)	4,710 (2.1%)	142,030 (0.46%)
Esophageal Stricture	2,410 (1.3%)	2,380 (1.1%)	81,390 (0.26%)
Esophageal Adenocarcinoma	140 (0.1%)	170 (0.1%)	36,020 (0.12%)

GERD; gastro-esophageal reflux disease

S444

Short-Term Outcomes After Pneumatic Dilation in Non-Achalasia Obstructive Disorders of the Esophagogastric Junction

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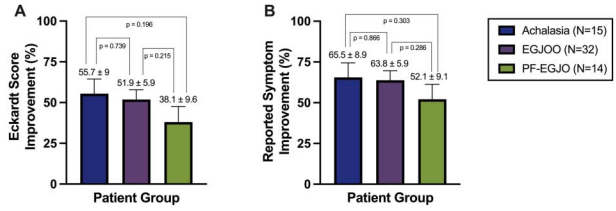
Introduction: Treatment options for non-achalasia obstructive disorders of esophagogastric junction (EGJ) are limited. The aim of this study was to assess the treatment efficacy of pneumatic dilation (PD) for the disorders of the esophagogastric junction outflow obstruction (EGJOO) and post fundoplication esophagogastric junction obstruction (PF-EGJO) and to assess attitudes regarding training in PD.
Methods: This was a two-part study. The main study was a prospective single-center study comparing treatment outcome after PD in patients with EGJOO and PF-EGJO, defined using manometry criteria, vs achalasia. Treatment success was defined as a post-PD Eckardt score (ES) of ≤ 2 at the longest duration of follow-up available. In a survey sub-study, a 2-question survey was sent to advanced endoscopy fellowship sites in the US (n=78) regarding training in PD. (Figure)
Results: Of the 58% of respondents to the advanced endoscopy program director survey, 2/3 reported no training in PD at their program. The primary rationale cited was lack of a clinical need for PD. Sixty-one patients (15 Achalasia, 32 EGJOO, and 14 PF-EGJO) were included in the main study with outcomes available at a mean follow-up of 8.8 months. Overall, mean ES decreased from 6.30 to 2.89 ($p < 0.0001$); and mean % improvement in symptoms reported by patients was 55.3%. ES of ≤ 2 was achieved by 33/61 patients (54.1%). (Table)
Conclusion: PD is an effective treatment for the non-achalasia obstructive disorders of the EGJ. It has limited complications and the potential ability to resolve suffering from untreated obstruction. Despite this, there is a current gap in training and technical expertise in PD.



[0444] **Figure 1.** Outcome of pneumatic dilation protocol is shown for each esophageal diagnosis. Panel A shows the magnitude of improvement in Eckardt score. Panel B shows the patient-reported % symptom improvement. Means with SEM are shown. Abbreviations - EGJOO: esophagogastric junction outflow obstruction, PF EGJO: post-fundoplication esophagogastric junction obstruction.

Table 1. Baseline Clinical Data by Subgroup (61 patients). Means with SEM are shown

	Achalasia (N = 15)	EGJOO (N = 32)	PF-EJGO (N = 14)	*p* value
Age (Years)	64.4 ± 3.9	61 ± 2.2	62.8 ± 1.9	$p = 0.659$
% Male	60	34.4	28.6	$p = 0.158$
BMI (kg/m2)	23.4 ± 1.2	29.4 ± 1.3	28.7 ± 1.8	$p = 0.015$
Supine IRP (mmHg)	28.1 ± 3.3	21.5 ± 1.0	23.1 ± 1.7	$p = 0.043$
BLESP (mmHg)	42.4 ± 4.2	44.1 ± 2.3	33.8 ± 1.6	$p = 0.046$
Distensibility Index (mm2/mmHg)	1.6 ± 0.3	1.1 ± 0.11	2.2 ± 0.28	$p = 0.0012$
Barium Tablet retention (%)	66.7	28.1	42.9	$p = 0.043$
Eckardt Score	7.3 ± 0.7	5.9 ± 0.5	6 ± 2.4	$p = 0.255$
BEDQ Score	31.7 ± 3.9	29.1 ± 2.4	26.9 ± 4.4	$p = 0.667$

Abbreviations: BEDQ – Brief esophageal dysphagia questionnaire, BLESP – basal lower esophageal sphincter pressure, BMI – body mass index, IRP – integrated relaxation pressure.

S445

Severity of Reflux Predicts Number of Days Abnormal on Ambulatory Reflux Testing: Discovery and External Validation Cohort Study

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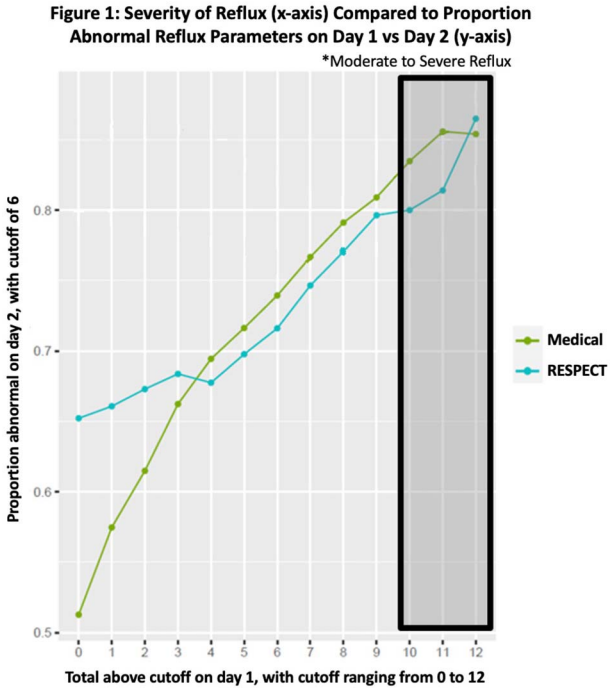
Introduction: Ambulatory reflux monitoring off PPI has become a leading option for the diagnosis of GERD. Even with adoption of the Lyon Consensus, there remains controversy on ambulatory reflux parameters for the prediction of abnormal reflux. The aim of our study was to evaluate if severity of reflux alone predicted the number of days of abnormal acid exposure.
Methods: Our discovery cohort included single center data from patients with GERD symptoms despite PPI evaluated by pH testing ("Medical"). The Medical group was compared to an external validation cohort from the clinical RCT trial of TIF 2.0 ("RESPECT") during parallel time-periods over 10 years. RESPECT patients had symptoms and were being evaluated to undergo TIF 2.0. 48 Hour wireless pH testing was performed at least 7 days off PPI therapy in all subjects. Percent total time pH< 4 was considered abnormal if greater than 6% (Lyon Classification). The probability of having abnormal reflux was measured based on severity and frequency of reflux events. Wilcoxon and Pearson X2 tests were used for comparison of continuous and categorical variables, respectively.
Results: Our cohorts included the RESPECT group (n=129, 49% male) compared to Medical group (n=119, 30% male). Frequency of abnormal days on pH monitoring was highly dependent on severity of reflux events with a 91-93% likelihood of both days being abnormal if reflux AET was 12% or greater (Figure). Using 6.0% AET on the worst day, the prediction for the 2nd day to also be abnormal was driven by severity of reflux event (Medical= 78% at a pH of 6.0, 88% at pH of 10, and 91% at pH of 12). This was similar for the validation cohort (RESPECT = 72% at a pH of 6.0, 80% at pH of 10, and 93% at pH of 12) (p-value for non-linear effects < .0001) (Figure). This finding was consistent between the discovery and validation cohorts irrespective of esophagitis status.
Conclusion: Severity of reflux (defined by abnormal acid exposure time) is highly predictive of number of days abnormal. Utilizing the severity of reflux on ambulatory testing potentially obviates the need for extended ambulatory monitoring beyond 48 hours. As severity of reflux worsens, the predictive power for number of abnormal days is strengthened (from current Lyon of 6.0% to moderate-severe ranges of 10-12). When using ambulatory reflux testing, increased focus on the severity of reflux has higher predictive power in guiding patient diagnosis.



[0445] **Figure 1.** Severity of Reflux (x-axis) Compared to Proportion Abnormal Reflux Parameters on Day 1 vs Day 2 (y-axis) in Our Cohorts

S446

Results from KRYPTOS, a Phase 2/3 Study of Lirentelimab (AK002) in Adults and Adolescents With EoE

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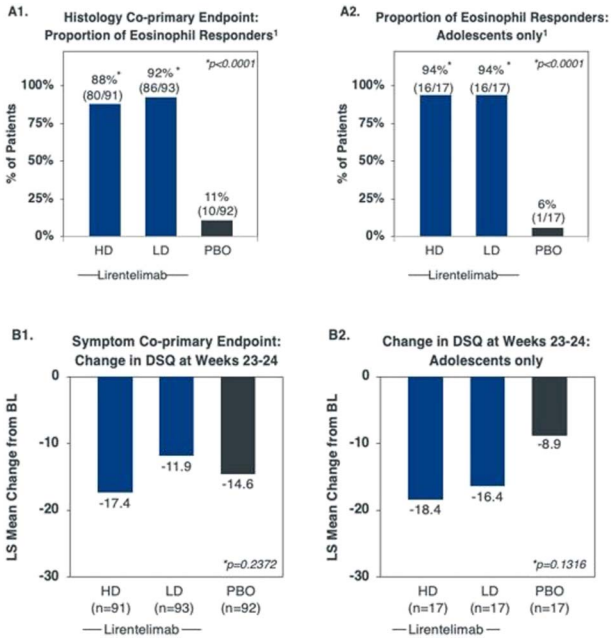
Introduction: Eosinophilic esophagitis (EoE) is a chronic disorder characterized by an inflammatory infiltrate of eosinophils (eos) and mast cells and associated esophageal dysfunction, structural tissue damage, and remodeling. Lirentelimab (LIR, AK002) is a humanized IgG1 mAb directed against Siglec-8, which is expressed selectively on the surface of mature eos and mast cells. The aim of this randomized, double-blind, placebo-controlled phase 2/3 clinical trial was to evaluate the safety and efficacy of LIR in adults and adolescents with active EoE (KRYPTOS, NCT04322708).
Methods: Patients ≥12 years old with symptoms of dysphagia and ≥15 eos/hpf on esophageal biopsy were randomized 1:1:1 to high dose LIR (1 mg/kg x 1 dose then 3 mg/kg x 5 doses [HD]), low dose LIR (1 mg/kg, [LD]) or placebo (PBO) for 6 monthly infusions. Co-primary endpoints were histologic response (defined as the proportion of patients who achieved a peak eos count of ≤6 eos/hpf) at week 24 (W24) and mean absolute change in the daily Dysphagia Symptom Questionnaire (DSQ) score from baseline to weeks 23-24. EGD with esophageal biopsies was performed at screening and at W24.
Results: Of the 276 patients who completed the study, 51 were adolescents (12-17 ys) who had a higher proportion of atopic diseases, peripheral blood eos, serum IgE levels, and prior EoE treatment (Table). In the overall cohort, the histologic co-primary endpoint was met by 88% HD and 92% LD vs. 11% PBO ($P < 0.0001$; Figure A1). For adolescents, 94% HD and 94% LD met this compared to 6% PBO (Figure A2). The change in DSQ co-primary endpoint for the overall cohort showed a reduction from baseline of -17.4 HD and -11.9 LD vs. -14.6 for PBO ($P=0.2372$; Figure B1), whereas the change in adolescents was -18.4 HD and -16.4 LD vs. -8.9 PBO ($P=0.1316$; Figure B2). The most common adverse events (AEs) were infusion related reactions (38.5% HD, 25.8% LD, 12% PBO) and headache (6.6% HD, 8.6% LD, 6.5% PBO); there were 3 serious AEs (2 HD, 1 PBO).
Conclusion: This phase 2/3 trial of lirentelimab met the histologic co-primary endpoint but did not meet the DSQ symptom co-primary endpoint, although in adolescents there was a trend in DSQ response over PBO. Lirentelimab was generally well-tolerated. This study included a broad range of patients with EoE, and identification of factors associated with symptoms and histologic response will improve our understanding of disease activity and help identify patients who may respond to biologic therapy.



[0446] **Figure 1.** Co-Primary Endpoints: Topline and Adolescent Subpopulation A. Histology co-primary endpoint is proportion of histologic responders defined as esophageal intraepithelial eosinophil count of ≤6 eosinophils/hpf at week 24; A1. Overall population, A2. Adolescent subpopulation. missing data were treated as non-responders. With observed data, the histology response rate is 100% (80/80), 99% (86/87), and 11% (10/88) for the overall population, and 100% (16/16), 100% (16/16), and 6% (1/6) for the adolescent subpopulation. B. Change in DSQ co-primary endpoint at weeks 23-24; B1. Overall population; B2. Adolescent subpopulation. LS Means and HD lirentelimab from placebo p-values derived from ANCOVA model

Table 1. Baseline Characteristics a. Asthma, allergic rhinitis, atopic dermatitis and/or food allergy b. Adolescent prior treatment data were collected from chart reviews

Patient Characteristic	Overall N=276	Adults n=225	Adolescents n=51
Age, years, mean±SD	33±15	38±13	15±2
Female sex, n (%)	103 (37)	92 (41)	11 (22)
Duration of EoE, years, mean±SD	6.2±6.5	6.3±6.9	6.0±4.2
History of atopy[a], n (%)	208 (75)	163 (72)	45 (88)
History of esophageal dilatations, n (%)	17 (6)	17 (8)	0 (0)
Food elimination diet at screening, n (%)	30 (11)	18 (8)	12 (24)
Prior Treatments[b], n (%) PPI use Steroid use	 191 (69) 71 (26)	 143 (64) 45 (20)	 48 (94) 26 (51)
Peak esophageal eosinophil counts/hpf, mean±SD	60±34	58±34	68±32
Peripheral blood eos cells/μL, median (IQR) mean±SD	300 (210-460) 357±227	290 (200-430) 333±205	395 (252.5-635) 467±285
Serum IgE, kU/L, median (IQR) mean±SD	96 (39-275) 260±462	83 (32-241) 203±315	213 (98-535) 513±807
Baseline DSQ [0-84], mean±SD	35±12	35±12	35±13

S447

A Retrospective Study on the Geographic Trends of Eosinophilic Esophagitis (EoE) in the United States

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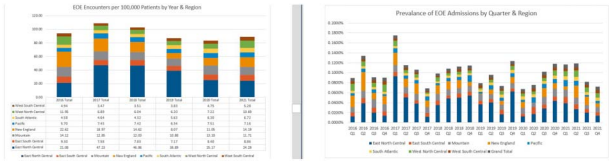
Introduction: Up until a couple of decades ago, eosinophilic esophagitis in adults (EoE) was considered uncommon, but its incidence has increased dramatically in recent decades (de Rooj WE 2021). In this retrospective study, we compare the number of cases of EoE across various regions in the United states and aim to identify regional trends.
Methods: We performed a retrospective cross-sectional study of adults presenting to the ED and/or admitted to the hospital with eosinophilic esophagitis from 2016 through 2021 at 185 HCA hospitals across the United States. A total of 5,283 unique patients were included in the study. The inclusion criteria were all patients ages 18 years and older with a diagnosis of eosinophilic esophagitis. Patients with visit problems suggestive of other known cause of dysphagia such esophageal cancer, candida esophagitis, immunocompromised, were excluded.
Results: The mean age of patients was 46 years. 17.8% of EOE encounters involved food impaction, and 14.9% of patients had a diagnosis of asthma. Our data revealed a statistically significant difference in EoE encounters based on year. There was an increase in the percent of patients seen for EOE each year from 2016-2021 (p=0.025). East North Central (ENC) region had the greatest number of EoE cases per 100,000 patients for each given year (Figure A). ENC, had a dramatic increase in encounters from 2016 (21.08/100,000 patients) to reaching its peak in 2017 (47.23/100,000 patients). The West South-Central region had the least amount of EoE encounters for each given year (Figure A). There was no statistically significant seasonal difference in encounter frequency (Figure B).
Conclusion: The geographical data of EoE cases, reveal an overwhelming rate of EoE cases in the East North Central region of the United States. Our study demonstrated significant regional variations within the United States for hospitalizations and ED visits for EoE patients. Given the association of EoE and allergic diseases, further investigation could include comparing our findings with regional rates of encounters for asthma and allergies.

REFERENCE: de Rooij WE, Barendsen ME, Warners MJ, et al. Emerging incidence trends of eosinophilic esophagitis over 25 years: Results of a nationwide register-based pathology cohort. *Neurogastroenterol Motil.* 2021;33(7):e14072. doi:10.1111/nmo.14072



[0447] **Figure 1.** A) EoE Encounters per 100,000 patients by year and region B) Prevalence of EoE by quarter and region

S448

Using the Matrix: Efficacy of Extracellular Matrix in Treatment Algorithm for Recurrent Benign Esophageal Stricture Therapy

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Introduction: Recurrent benign esophageal stricture (RBES) is caused by chronic inflammation from GERD, radiation, or surgery. Despite various therapeutic options including dilation, incision, steroid injection, and self-expandable metal stents, efficacy of these interventions remains suboptimal ranging between 20% to 63.6%.
Methods: We designed a proof-of-concept endoscopic technique that utilizes a biodegradable scaffold membrane composed of extracellular matrix (ECM) as part of our stricture management algorithm to stimulate site specific tissue repair.
Results: Ten patients, mean age 61 years (38-80) with 6 females:4 males, presented with four types of RBES (40% peptic, 30% anastomotic, 20% post Zenker's septotomy and 10% fistula-related) were recruited to undergo ECM placement as part of their stricture management algorithm (Table). Mean follow up duration was 811 days (42-1726). In patients with post Zenker's septotomy strictures, there was 100% complete resolution of symptoms at two months with no further interventions required. In peptic strictures, the average therapy interval was extended from 6.5 weeks to 9.3 weeks after ECM therapy, leading to 17% reduction in treatment frequency following ECM. There was no change in therapy frequency in patients with post-surgical anastomotic esophageal strictures or fistula-related stenosis. The mean number of procedures required was reduced by 30% for peptic strictures and by 38% for anastomotic strictures.
Conclusion: Our novel technique demonstrates that the utilization of ECM membrane as part of the treatment algorithm of RBES reduces both the frequency and the number of repeat interventions in select patients. Post septotomy and peptic strictures responded the best to ECM therapy in conjunction with other modalities compared to anastomotic strictures. Further larger prospective studies are required for increased understanding of ECM therapy response in various disease states.

Table 1.

	Average Pre-ECM Treatment Frequency (Weeks)	Average Post-ECM treatment Frequency (Weeks)	Average Percent Reduction in Treatment Frequency	Average Percent Reduction in Mean number of Procedures	Other Modalities used
Post Zenker's Septotomy (n=2)	14.00	N/A	N/A	N/A	Flexible endoscopic incisional therapy
Peptic Stricture (n=4)	6.50	9.33	17%	30%	Incision, balloon dilation, steroid Injection, Fully covered metal esophageal stent
Anastomotic Stricture (n=3)	4.67	5.00	0%	38%	Incision, Ballon dilation, steroid Injection
Fistula (n=1)	4.00	4.00	0%	N/A	Sealant and fully covered metal esophageal stent

S449

Lirentelimab (AK002) Safety and Efficacy in Patients With Higher Eosinophil Thresholds: Supplementary Analysis of Phase 2/3 EoE KRYPTOS Trial

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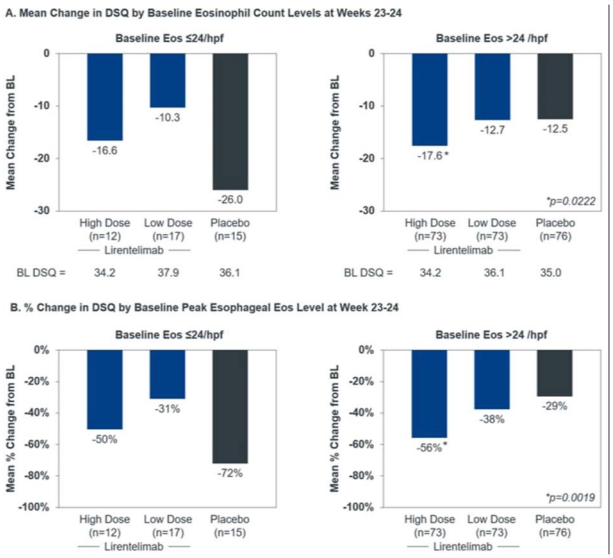
Introduction: In the KRYPTOS phase 2/3 randomized, double-blind, placebo controlled clinical trial of lirentelimab (LIR), an IgG1 Ab against siglec-8, in EoE patients (NCT04322708), a significant histologic response was observed but the co-primary symptom endpoint was not met. However, LIR may be more effective among those with greater active inflammation. This supplementary analysis explores the effect of LIR in a subpopulation of patients with EoE and baseline esophageal eos >24/hpf, a threshold previously suggested to differentiate EoE from a cofounding condition like GERD.
Methods: Patients were randomized 1:1:1 to high dose LIR (1 mg/kg x 1 dose then 3 mg/kg x 5 doses [HD]), low dose LIR (1 mg/kg, [LD]) or placebo (PBO) for 6 monthly infusions. Co-primary endpoints were the proportion of patients who achieved an esophageal intraepithelial eos count of ≤6 eos/hpf at week 24 and the mean absolute change in daily Dysphagia Symptom Questionnaire (DSQ) score from baseline to weeks 23-24.
Results: There were 48 patients with baseline peak esophageal eos ≤24/hpf (n=14 HD, n=18 LD, and n=16 PBO) and 228 patients with eos >24/hpf (n=77 HD, n=75 LD, n=76 PBO; Table) which was related to other markers of severity including higher median levels of serum IgE (≤24/hpf: 83kU/L HD, 64kU/L LD, 65 kU/L PBO vs. >24/hpf: 105 kU/L HD, 117 kU/L LD, 98 kU/L PBO) and median levels of peripheral blood eosinophils (≤24/hpf: 310 cells/μL HD, 175 cells/μL LD, 220 cells/μL vs >24/hpf: 300 cells/μL HD and LD, 380 cells/μL PBO). Significantly more patients with eos >24/hpf met the histologic co-primary endpoint vs placebo (91% [HD], 92% [LD], 8% [PBO]; $P< 0.0001$). Patients with baseline eos >24/hpf also demonstrated a significant mean change and percent change in DSQ co-primary endpoint (mean change DSQ: -17.6 HD, -12.7 LD, -12.5 PBO, $P=0.0222$, Figure A; Percent change DSQ: -56% HD, -38% LD, -29% PBO, $P=0.0019$, Figure B). Safety profile was no different among patients with eos >24/hpf compared to patients with eos ≤24/hpf.
Conclusion: Supplementary analysis of the KRYPTOS phase 2/3 EoE trial revealed that patients with eos >24/hpf had a significant decrease in symptoms of dysphagia with lirentelimab compared to placebo showing a difference in response when separated from other cofounding conditions like GERD. The safety profile of lirentelimab was consistent with previous reports. Further study is warranted to identify patients with EoE who may be most likely to respond to treatment with lirentelimab.



[0449] **Figure 1.** DSQ Response in Patients by Baseline Peak Eosinophil Count. Co-primary endpoint, change in DSQ at weeks 23-24 stratified by patients with EoE baseline eos ≤24/hpf and >24/hpf; A. Mean change in DSQ. B. Percent change in DSQ. LS Means and HD lirentelimab from placebo p-values derived from MMRM model

Table 1. Baseline Characteristics by Peak Esophageal Eosinophils

Patient Characteristic	Peak Esophageal Eosinophils ≤24/hpf			Peak Esophageal Eosinophils >24/hpf		
	HD n=14	LD n=18	PBO n=16	HD n=77	LD n=75	PBO n=76
Age, median years (range)	35.5 (15-67)	33.5 (15-67)	43.5 (20-68)	29 (12-69)	34 (12-67)	30 (12-70)
Female sex, n (%)	6 (43)	8 (44)	6 (38)	20 (26)	32 (43)	31 (41)
History of EoE, n (%)	11 (79)	15 (83)	15 (94)	70 (91)	69 (92)	71 (93)
Duration of EoE, median years (range) [mean]	4 (1-19) [6.5]	4 (0-11) [5.0]	4 (0-12) [4.9]	4 (0-38) [6.3]	5 (0-56) [7.7]	5 (0-18) [5.2]
History of atopy, n (%)	11 (79)	12 (67)	9 (56)	58 (75)	54 (72)	64 (84)
Peak esophageal eosinophil/hpf mean±SD in distal location, mean±SD in proximal/mid location, mean±SD	 20±3 15±7 13±9	 19±3 17±4 7±9	 20±3 17±7 10±9	 66±31 54±32 48±29	 71±32 59±31 54±37	 67±30 55±29 46±35
Peripheral blood eosinophils cells/μL, median (IQR)	310 (213-430)	175 (143-245)	220 (98-400)	300 (240-470)	300 (210-500)	380 (240-455)
Serum IgE, kU/L, median (IQR)	83 (33-348)	64 (21-168)	65 (24-140)	105 (54-349)	117 (46-314)	98 (33-255)
Baseline DSQ [0-84], mean±SD	34±10	38±11	36±10	34±12	36±12	35±13

HD, high dose lirentelimab; LD, low dose lirentelimab; PBO, placebo

S450

Assessment of the Accuracy of a Clinical Risk Prediction (Kunzmann) Score 5 Years Prior to Barrett's Esophagus and Esophageal Adenocarcinoma Diagnosis: Results From a Large Population-Based Database

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Introduction: Barrett's esophagus (BE) is the only known precursor lesion of esophageal adenocarcinoma (EAC), a malignancy with poor 5-year survival. Screening for BE is endorsed in those with risk factors. Assessing BE/EAC risk remains challenging. The Kunzmann score is a tool to identify patients at risk of BE/EAC. We assessed the ability of this tool to predict BE/EAC risk 5 years prior to BE/EAC diagnosis in a large population-based database.
Methods: The Rochester Epidemiology Project contains medical records of over 90% of SE Minnesota residents since 1977. Utilizing appropriate ICD-9 and 10 codes, we identified all BE/EAC patients from 1977-2020. Endoscopic evidence of at least 1 cm of salmon colored mucosa in the tubular esophagus and presence of intestinal metaplasia on endoscopic biopsies were assessed to confirm BE diagnosis. We also identified non-BE/EAC controls, and endoscopic reports were reviewed to exclude BE/EAC in these patients. The Kunzmann score is a composite score based on age, gender, smoking history, presence of esophageal conditions (such as heartburn), and BMI. It has previously been reported to have a sensitivity and specificity for EAC of 77.5% and 70.5%, respectively, utilizing a cut off score of 8. We compared risk prediction scores between BE patients and non-BE controls at datapoints obtained 5 (±1) years prior to BE diagnosis. (Table)
Results: Data to calculate the Kunzmann score were abstracted from 916 cases (684 BE,232 EAC) 5 years prior to diagnosis and from 100 endoscopy negative controls. The mean Kunzmann score 5 years prior to diagnosis was significantly higher in the EAC group (10.6; SD: 2.0) compared to those with baseline BE (9.7; SD: 2.5) and controls (10.2; SD: 2.5; $p < 0.01$). Furthermore, the percentage of patients with a Kunzmann score greater than 8 at 5 years prior to diagnosis was highest in the EAC group (90.9%) compared to the baseline BE (78.8%) and control (83.0%; $p< 0.01$) groups. Utilizing a cut-off score of 8, the Kunzmann score at 5-years prior to diagnosis demonstrated a sensitivity of 84.0% and specificity of 18.1% for the diagnosis of BE/EAC, and demonstrated a sensitivity of 79.5% and specificity of 9.1% for the diagnosis of EAC alone.
Conclusion: In this large population-based database, the Kunzmann score demonstrated reasonable sensitivity but low specificity to predict BE/EAC at 5 years prior to diagnosis. Its utility for predicting BE/EAC risk needs to be further evaluated.

Table 1. Baseline characteristics and Distributions of Kunzmann Score in BE cases, EAC cases and Endoscopy Negative Controls in a Population Based Cohort

	BE (N=684)	EAC (N=232)	Endoscopy Negative Controls (N=100)	
Mean (SD) age	61.8 (13.7)	65.6 (11.7)*	65.9 (13.8)	< **0.01**
Male, N (%)	490 (71.6%)	201 (86.6%)	66 (66.0%)	< **0.01**
White, N (%)	620 (90.6%)	211 (90.9%)	96 (96.0%)	0.5
Mean (SD) BMI	30.3 (6.0)	30.3 (6.2)	30.3 (6.1)	1.0
Never smokers, N (%)	248 (36.5%)	61 (26.3%)*	40 (40.0%)	**0.04**
Baseline BE grade, N (%)				
NDBE	570 (83.3%)	-	-	-
LGD	37 (5.4%)	-	-	-
IND	52 (7.6%)	-	-	-
HGD	25 (3.7%)	-	-	-
EAC	-	232 (100.0%)	-	-
Baseline mean (SD) BE length, cm	4.0 (3.3)	5.4 (3.1)*	-	
Presence of Hiatal hernia, N (%)	459 (67.1%)	68 (29.3%)	55 (55.0%)	< **0.01**
History of GERD, N (%)	304 (44.4%)	85 (50.3%)	100 (100.0%)	-
Mean (SD) Kunzmann Score	9.7 (2.5)	10.6 (2.0)*	10.0 (2.4)	< **0.01**
Kunzmann score greater than 8	539 (78.8%)	211 (90.9%)	84 (84.0%)	< **0.01**

S451

Utilization of the Seattle Protocol for Incidental Salmon Mucosa

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Introduction: Barrett's esophagus (BE) is diagnosed when endoscopically visible salmon-colored mucosa (SCM) is biopsied to reveal intestinal metaplasia (IM) with or without dysplasia replacing the stratified squamous epithelium above the level of gastroesophageal junction (GEJ). The Seattle Protocol (SP), defined as targeted biopsies of visible lesions and random four-quadrant biopsies every 2 cm, is the gold standard to minimize sampling error in the detection of Barrett's esophagus and dysplasia. We aimed to assess the utilization rate of the Seattle protocol when salmon mucosa is incidentally found in EGDs performed for reasons other than known Barrett's esophagus, and to determine which factors may affect SP utilization.
Methods: Patients undergoing EGD from Jan 2018 to March 2019 with findings of salmon colored mucosa were selected for the study from one tertiary and two community hospitals. Patients were excluded if they had a previous diagnosis of Barrett's esophagus or esophageal adenocarcinoma (EAC), if the procedure was aborted, or if the indication was for urgent bleeding. Patient and procedure characteristics were recorded. Outcomes included the performance of biopsies according to the Seattle protocol and current or future detection of Barrett's esophagus and dysplasia. Data was analyzed for descriptive statistics; categorical variables were compared using Chi-square or Fisher's exact test as appropriate.
Results: Three hundred ninety-five patients were identified with "salmon colored mucosa" (SCM) on index EGD. Twenty-nine patients with known diagnosis of BE and/or undergoing the EGD for acute GI bleed were removed. Out of 366 patients, SP was properly followed in 34 patients (9.2%). SP was more likely to be performed when EGD indication was dysphagia (32%) or diarrhea (41.7%), or when SCM length was >1cm (17%), but less likely to be performed when the indication was abdominal pain or GERD (1.7%). The utilization of SP showed a higher rate of eventual Barrett's diagnosis (53% vs 31%, p=0.01) (Table).
Conclusion: This study shows that the Seattle Protocol is not consistently applied when salmon mucosa is incidentally found and therefore BE diagnosis may be delayed or missed. Procedure indication and endoscopic findings are likely contributing factors to whether SP is utilized or not.

Table 1. Endoscopy Characteristics Associated with and without the Use of the Seattle Protocol in Addition to Clinical Outcomes

Characteristic	Total N = 366	SP followed (n=34, 9.2%)	SP not followed (n=332, 90.7%)	p-value
Patient Demographics				
Age	Mean 59.2	62.4yr	59yrs	0.127
Male Gender	208	22, 10.5%,	186, 89.4%	0.36
Female Gender	158	12, 7.5%	146, 92.4%	0.36
Inpatient	9	2, 22.2%	7, 77.8%	0.199
Outpatient	357	32, 9%	325, 91%	0.2
Indication				
Suspected Barrett's	28	3, 10.7%	25, 89.2%	0.73
Abdominal Pain or GERD	174	3, 1.72%	171, 98.3%	**0.0001**
Dysphagia	50	16, 32 %	34, 68%	**0.0001**
Anemia work up	34	2, 5.8%	32, 94.2%	0.75
Diarrhea	12	5, 41.7%	7, 58.3%	**0.002**
Others	37	3, 8%	34, 92%	1.00
Patient Factors				
GERD	217	19, 8.7%	198, 91.2%	0.71
Obesity	126	14, 11.1%	112, 88.9%	0.44
Smoking	166	14, 8.4%	152, 91.5%	0.71
Family history of celiac	5	1, 20%	4, 80%	0.39
Endoscopy Findings				

Table 1. (*continued*)

Characteristic	Total N = 366	SP followed (n=34, 9.2%)	SP not followed (n=332, 90.7%)	p-value
vSCM Length < 1CM	190	12, 6.3%	178, 93.7%	**0.04**
SCM Length >1CM	100	17, 17%	83, 83%	**0.003**
Presence of esophageal ulcer	6	0	6	1.000
Presence of Esophagitis	138	12, 8.7%	126, 91.3%	0.85
NBI used	178	16, 9%	162, 91%	0.85
Clinical Outcomes Associated with SP performance		SP followed n = 34	SP not followed n = 332	p-value
Barrett's Diagnosis in index or future EGDs		18, 52.9%	104, 31.3%	**0.013**
Dysplasia		1, 2.9%	1, 0.3%	0.177

S452

Safety and Efficacy of Liquid Nitrogen Spray Cryotherapy in Barrett's Neoplasia: A Comprehensive Review and Meta-Analysis

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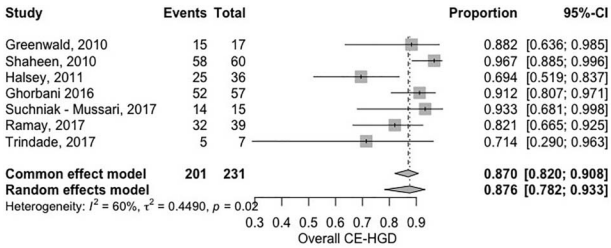
Introduction: Barrett's esophagus (BE) is a precursor condition to esophageal adenocarcinoma (EAC), resulting in transformation of the squamous epithelium of distal esophagus to columnar-lined epithelium with intestinal metaplasia (IM). Liquid nitrogen spray cryotherapy (LNSC) is a non-contact method of BE eradication and has been used both as primary and salvage therapy. We conducted a systematic review and meta-analysis to assess the safety and efficacy of LNSC.
Methods: We searched multiple databases from inception through December 2021 to identify studies on use of LNSC for Barrett's neoplasia. Pooled estimates were calculated using random-effects model and results were expressed in terms of pooled proportions with relevant 95% confidence intervals (CIs) of complete eradication (CE) of dysplasia(D), high grade dysplasia (HGD) and IM. We also assessed pooled rates of therapeutic failures as well as post procedure complications including strictures, pain and perforation events.
Results: Fourteen studies with 666 patients were included in our final analysis. (Figure) Overall pooled rates of CE-D, CE-HGD and CE-IM were 80.8% (CI 77.4-83.8; I2 62), 87% (CI 82-90.8; I2 60) and 55.8% (CI 51.7-59.8; I2 73) with follow up ranging from 4.25 months to 69.7 months. Among LNSC naïve patients with prior history of endoscopic resection, the rates were 83% (CI 73.6-89.5; I2 46), 76% (CI 65.1-84.3; I2 38) and 71.8% (CI 60.9-80.7; I2 0). In patients with follow up beyond 24 months, the rates were 78.8% (CI 72.4-84.1; I2 84), 85.2% (CI 73.1-92.4; I2 1) and 54.7% (CI 47.6-61.6; I2 81). Pooled rate of therapeutic failures, defined as lack of response to LNSC therapy, was 22.1% (CI 18.3-36.6; I2 74). Post LNSC strictures and perforation pooled rates were 4% and 0.8%, respectively, which are lower than previously reported for RFA. Pooled rate of post procedure abdominal and/or chest pain was 13.6% (CI 11.3-16.3; I2 67). (Table)
Conclusion: Our analysis suggests that liquid nitrogen spray cryotherapy is a durable and safe therapeutic modality for BE, in both ablation naïve and experienced patients.



[0452] **Figure 1.** Study analysis

Table 1.

Study	Outcomes		Recurrence		Adverse Events				Failure	F/u Time
	CE-D (CE-HGD, CE-LGD)	CE-IM	Dysplasia	IM	Pain	Stricture	Perforation	Dysphagia		
Dumot 2009	CE-D 15/ 31	CE-IM 6/ 31	16/25 (LGD 6, HGD/ IMCA/ACA, esophagectomy, or death 10)	–	10/31 Mild pain 7/31, severe pain 3/31	3/31	1/31	–	9/31	12m (6-24)
Greenwald 2010	CE-D 22/24 - 15/17 (HGD), 4/ 4 (ImCA), 3/3 (Barrett's Carcinoma); CE-HGD - 23/24	CE-IM 13/24 - 9/17 (HGD), 3/4 (ImCA), 1/3 (Barrett's Carcinoma)	–	–	CP 57/323, Abdominal pain 14/323 (procedures)	3/77	1/77	43/323 (procedures)	–	9.3 (3,13) - 13.8 (10,18)
Shaheen 2010	CE-D 52/60, CE-HGD 58/60	CE-IM 34/60	–	–	2/98	3/98	0/98	-	–	10.5m (8.3) [Mean]
Halsey 2011	CE-D and CE-HGD 25/36	–	6/36	5/36	–	–	–	–	3/36	24m
Sengupta 2015	CE-D 12/ 16	CE-IM 5/ 16	after CE-D 0/12	–	–	3/21	1/21	3/21	–	7.5m (2-25m)
Ghorbani 2016	CE-D 67/80 [HGD: CE-HGD 52/57, CE-D 46/57; LGD: CE-D 21/23]	CE-IM 51/80 [HGD: CE-IM 37/57; LGD: CE-IM 14/23]	–	–	28/96. Abdo pain 6/96, CP 22/96	1/96	0/96	11/96	–	21 m (12–24 m)

Table 1. (*continued*)

Study	Outcomes		Recurrence		Adverse Events				Failure	F/u Time
	CE-D (CE-HGD, CE-LGD)	CE-IM	Dysplasia	IM	Pain	Stricture	Perforation	Dysphagia		
Suchniak - Mussari 2017	CE-D 17/20 (CE-HGD 14/15, CE-LGD 3/5); CE-ImCA+D - 6/8	CE-IM 16/33	–	–	–	5/45	0/45	–	1/15 (with HGD), 2/8 (with ImCA)	27.6m (13.2) [Mean/SD]
Ramay 2017	CE-D: 27/36 (CE-HGD 32/39)	CE-IM 17/26	after CE-D: 7/39 (HGD)	–	–	–	–	–	13/40 (LGD 3, IM 10)	69.7 (13.8) [53.8-106.0] {Mean/SD}
Trindade 2017	CE-D 13/18 (CE-LGD 3/4, CE-HGD 5/7)	CE-IM 9/ 18	after CE-D 0/18	after CE-IM 0/18	0/18	0/18	–	–	–	4.25m (3–11) [Median]
Trindade 2018	CE-D 22/27	CE-IM 19/27	–	after CE-IM 9/ 27	0	0	0	0	8/27 (2 LGD, 3 IM, 3 cancer)	2 y [1-5.5] [Median]
Thota 2018	CE-D 63/81	CE-IM 33/81	–	after CE-IM 9/63	–	–	–	–	10/81	31.8m [12.6, 50.7] {Median}
Spiceland 2019	CE-D 38/46	CE-IM 21/46	–	–	–	3/46	–	–	8/46 (1 cancer, 2 lost f/u, 5 undergoing rx)	NR
Kaul 2020	CE-D -51/52	CE-IM - 39/52; LGD 6/ 7; HGD 13/17; T1a 13/ 17; inv EAC 7/11	4/34	after CE-IM 3/34	0/57	0/57	1/57	0/57	20/39	4.8 yr
Fasullo 2021	CE-D 44/62	CE-IM 41/62	6/44	after CE-IM 6/41	0/62	0/62	0/62	–	11/62	NR

S453 WITHDRAWN

S454

Hybrid Argon Plasma Coagulation and Argon Plasma Coagulation in Barrett's Esophagus: A Systematic Review and Meta-Analysis

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Introduction: Due to the increasing incidence of Esophageal adenocarcinoma, detection and treatment of Barrett's esophagus (BE) is critical. Radio-frequency ablation is the current standard of care, however, it is expensive with high recurrence rates. Argon Plasma Coagulation (APC) is an alternative method but is associated with perforation, stricture formation, and buried glands. Hybrid APC (hAPC) is a novel technique that combines APC with submucosal injection for eradication of BE. This is the first systematic review and meta-analysis to evaluate the efficacy and safety of hAPC in the management of BE.
Methods: We performed a comprehensive literature search of major databases from inception to Nov 2021. The primary outcomes assessed were the clinical remission of intestinal metaplasia (CRIM) and clinical remission of dysplasia (CRD) of hAPC, high power APC (90W), and standard APC (30-75W). The secondary outcomes assessed were the overall adverse events, individual adverse events, and recurrence rates. Pooled estimates were calculated using random-effects models with 95% confidence interval (C.I.). The statistical analysis was done using STATA v 17.0 software (StataCorp, LLC College Station, TX).
Results: The analysis included 37 studies (9 studies for hAPC, 4 studies for high power APC, 24 studies for standard APC) with a total of 1314 (265 for hAPC, 164 for high power APC, 885 for standard APC) patients. The calculated pooled rate of CRIM for hAPC was slightly higher at 92.11% than high power APC and standard APC groups. The calculated pooled rate of CRD for hAPC was higher than standard APC group as well. The calculated pooled rate of adverse events for hAPC was lower than other modalities. Stricture formation was the most common adverse event in all 3 groups. Stricture rates were lower in hAPC than in other groups. The calculated pooled rate of recurrence rate of BE for hAPC was higher than high power APC group but lower than standard APC group. Low to substantial heterogeneity was noted in our meta-analysis. (Figure) (Table)
Conclusion: hAPC appears to be a safe and effective treatment modality for patients with Barrett's esophagus with high clinical success rates and a low rate of adverse events. Further, prospective or randomized controlled trials are needed to validate our findings.

	hAPC	APC high power	Standard APC
CRIM	92.11% (95% CI: 84.76%, 97.54%; p=0.07; I^2=46.26%)	87.97% (95% CI: 63.42%, 100%; p=0.00; I^2=92.31%)	80.67% (95% CI: 71.99%, 88.2%; p=0.00; I^2=87.6%)
CRD	99.5% (95% CI: 93.18%, 100%; p=0.81; I^2=0%)	--	94.83% (95% CI: 77.85%, 100%; p=0.00; I^2=63.03%)
Total Adverse events	3.35% (95% CI: 0.76%, 7.09%; p=0.32; I^2=14.59%)	6.3% (95% CI: 2.77%, 10.88%; p=0.64; I^2=0%)	5.3% (95% CI: 1.86%, 9.89%; p=0.00; I^2=67.26%)
Stricture	1.92% (95% CI: 0.24%, 4.57%; p=0.62; I^2=0.0%)	3.15% (95% CI: 0.67%, 6.82%; p=0.68; I^2=0.0%)	2.44% (95% CI: 0.56%, 5.16%; p=0.03; I^2=43.62%)
Bleeding	0.62% (95% CI: 0.0%, 2.64%; p=0.93; I^2=0.0%)	1.54% (95% CI: 0.0%, 6.46%; p=0.70; I^2=0.0%)	0.01% (95% CI: 0.0%, 0.68%; p=0.35; I^2=8.83%)
Perforation	0.0% (95% CI: 0.0%, 0.90%; p=1.00; I^2=0.00%)	0.15% (95% CI: 0.0%, 2.06%; p=0.10; I^2=51.86%)	0.0% (95% CI: 0.0%, 0.17%; p=1.00; I^2=0.00%)
Recurrence	8.83% (95% CI: 4.13%, 14.68%; p=0.46; I^2=0%)	6.49 (95% CI: 0.05%, 19.18%; p=0.0; I^2=79.58%)	14.71% (95% CI: 4.87%, 27.99%; p=0.00; I^2=92.27%)

[0454] **Figure 1.** Outcomes of hAPC, high power APC and Standard APC in Barrett's esophagus

Table 1. Outcomes of hAPC, APC high power and standard APC in Barrett's esophagus

	hAPC	APC high power	Standard APC
CRIM	92.11% (95% CI: 84.76%, 97.54%; p=0.07; I^2=46.26%)	87.97% (95% CI: 63.42%, 100%; p=0.00; I^2=92.31%)	80.67% (95% CI: 71.99%, 88.2%; p=0.00; I^2=87.6%)
CRD	99.5% (95% CI: 93.18%, 100%; p=0.81; I^2=0%)	–	94.83% (95% CI: 77.85%, 100%; p=0.00; I^2=63.03%)
Adverse event	3.35% (95% CI: 0.76%, 7.09%; p=0.32; I^2=14.59%)	6.3% (95% CI: 2.77%, 10.88%; p=0.64; I^2=0%)	5.3% (95% CI: 1.86%, 9.89%; p=0.00; I^2=67.26%)
Recurrence	8.83% (95% CI: 4.13%, 14.68%; p=0.46; I^2=0%)	6.49 (95% CI: 0.05%, 19.18%; p=0.0; I^2=79.58%)	14.71% (95% CI: 4.87%, 27.99%; p=0.00; I^2=92.27%)

S455

Factors Associated With Higher Complication Rates Amongst Patients Requiring Endoscopic Intervention for Esophageal Food Impaction

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Introduction: The American Society for Gastrointestinal Endoscopy recommends that endoscopic intervention should occur within 24 hours to minimize complications in patients presenting with food impaction. The aim of our study was to ascertain whether complication rates were higher in patients undergoing endoscopy more than 6 hours after presentation compared to those undergoing intervention within 6 hours and to identify factors associated with patients that develop complications.
Methods: The electronic medical record at a single tertiary care center was queried for esophagogastroduodenoscopies (EGD) with food impaction over a ten-year period. Information on patient demographics, medical history, timing of presentation, timing of EGD, procedural and post-procedure complications was obtained. Rates of complications were compared between encounters in which a patient had an EGD within 6 hours from initial presentation versus greater than 6 hours. Data was compared using Fishers Exact test for categorical variables and a two-tailed t-test for continuous variables. (Table)
Results: This study received IRB approval. 127 records met the inclusion criteria, with 86 undergoing an EGD within 6 hours. Those undergoing EGD within 6 hours were younger (48.6 vs 60.4, p< .001), and less likely to have heart disease (5.8% vs 17.1%, p=.055). Patients that underwent an EGD within 6 hours had statistically significant fewer post-procedural complications (0% vs 12.2%, p=.0029) and fewer complications overall (3.5% vs 14.6%, p=.057). Amongst the 5 cases where post-procedural complications occurred, average age was 78.4 (range of 68 to 89) and average time from presentation to EGD was 30.7 hours (range 7.5 to 60). Two of the 5 were transferred from an outside facility, 3 of the 5 had heart or lung disease. The only post-procedural complication was aspiration pneumonia in all five patients.
Conclusion: The rate of procedural complication was not affected by duration to endoscopy. There is a higher risk of post-procedural complications in elderly patients that received an EGD more than 6 hours after initial presentation. Those patients were more likely to have cardiopulmonary comorbidities and 40% of them were transferred from outside facilities. There should be an effort to reduce delays to endoscopy and to reduce inter-facility transfer time, especially amongst elderly patients with cardiopulmonary comorbidities. Endotracheal intubation for patients undergoing EGD more than 6 hours after presentation may reduce complications.

Table 1. Patient characteristics and outcomes

	EGD within 6 hours	EGD after 6 hours	P value
Total number of patients	86	41	
Average age	48.6 (18.2)	60.4 (17.1)	< 0.001
Male gender	64 (74.4)	27 (65.9)	.40
On Anticoagulation	0 (0)	4 (9.8)	.0098
History of cardiac disease	5 (5.8)	7 (17.1)	.055
History of pulmonary disease	8 (9.3)	6 (14.6)	.38
Prior food impaction	33 (38.4)	11 (26.8)	.24
Procedural complication	3 (3.5)	1 (2.4)	1
Post-procedural complication	0 (0)	5 (12.2)	.0029
Any complication	3 (3.5)	6 (14.6)	.057

S456

Physician-Documented Symptoms and Treatment Among Patients With Eosinophilic Esophagitis in the United States: Evidence From Real World Clinical Practice

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Introduction: Eosinophilic esophagitis (EoE) is a chronic immune-mediated inflammatory disorder of the esophagus that is associated with significant patient burden and upper gastrointestinal morbidity. Typical EoE symptoms include dysphagia, food impaction, abdominal pain, and nausea, and symptoms may persist regardless of current standard of care treatments, ultimately affecting health-related quality of life (HRQoL). This real-world study characterizes physician-documented symptoms and treatments among US patients with EoE.
Methods: Adelphi Real World Disease Specific Programmes (DSPs) are multinational, point-in-time surveys providing data regarding real-world clinical practice. The present study is an analysis of surveys completed by gastroenterologists and allergists managing patients with EoE that were collected as part of the Adelphi EoE DSP in 2020 in the United States. Patients were included if they were age ≥12 years with a physician-confirmed diagnosis of EoE (esophageal count of ≥15 eosinophils/high power field) and currently receiving prescribed treatment for EoE; a subset of patients currently experiencing dysphagia was also evaluated.
Results: A total of 322 US patients with EoE were assessed; among these, 113 (35%) currently had dysphagia. Overall, the mean age was 35.6 years and 63% were male. The average time since diagnosis was 28 months, and 20% switched their treatments. The main reasons for current treatment were for symptomatic relief and to improve HRQoL. Treatments are summarized in the **Table.** Despite 83% of patients being mostly/completely adherent to treatment, patients were still burdened with symptoms such as reflux (38%), dysphagia (35%), and heartburn (26%). Almost half of patients were either currently on an elimination (27%) or elemental diet (3%; for an average of 61 weeks), or previously had attempted an elimination (21%) or elemental diet (4%). Further, 30% of patients had undergone esophageal dilation (23% after admission to the hospital or emergency room), with a mean of 1.5 dilations since diagnosis. Patients with dysphagia (n=113) had similar treatment (**Table**) and adherence (77% mostly/completely adherent) patterns but more often had undergone dilation (36%).
Conclusion: Despite good adherence with current PPIs and/or corticosteroids, many patients with EoE are still experiencing symptoms, implementing dietary interventions, and undergoing dilations, highlighting a need for new targeted therapies.

Table 1. Treatments for eosinophilic esophagitis in the United States

	All patients Previous[a] (n=63)	All patients Current (n=322)	All patients Duration[b] (months)	Patients with dysphagia Previous[a] (n=30)	Patients with dysphagia Current (n=113)	Patients with dysphagia Duration[b] (months)
PPI	60%	87%	21.6	60%	86%	15.9
Corticosteroids						
TCS	35%	37%	20.3	27%	45%	12.9
OCS	6%	5%	30.6	7%	4%	25.2
Other	29%	19%	19.0	37%	20%	12.0
Antihistamines	13%	17%	28.8	13%	12%	19.1
Antileukotrienes	5%	6%	33.0	0%	2%	4.3
Biologics	0%	1%	29.6	0%	1%	48.0

[a]Previous patients were those who switched treatments.
[b]Durations are for current use only.
OCS, oral corticosteroids; PPI, proton pump inhibitor; TCS, topical corticosteroids.

S457

Comparison of the Prevalence of Psychiatric Disorders Among Refractory GERD, Functional Heartburn and Reflux Hypersensitivity

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Introduction: Psychiatric disorders were previously reported to be associated with GERD, including anxiety and depression. Functional heartburn (FH) and reflux hypersensitivity (RH) are functional esophageal disorders which involve dysfunction of the gut-brain axis and information about association with neuropsychiatric disorders remains scarce. The aim of our study was to compare the distribution of psychiatric diseases among FH, RH and refractory GERD populations.
Methods: Patients were identified through Epic SlicerDicer with selection criteria of GERD, on proton pump inhibitor (PPI) who received esophageal pH monitoring from 2000-2021. FH cohort consisted of patients who had a negative pH test off PPI before the study and lacked endoscopic abnormalities. Similarly, RH cohort was created by selecting patients with a negative pH test off PPI with no endoscopic abnormalities, but with positive symptom association with gastroesophageal reflux events. The refractory GERD group consisted of patients with a positive pH test while on twice daily PPI. Demographic

information and psychiatric history including anxiety, depression, schizophrenia, PTSD, and bipolar disorder as well as psychiatric medications were collected. Data were analyzed using ANOVA, Fisher's exact test, Chi-square test and odds ratio (OR) with a confidence interval of 95%.

Results: FH, RH and refractory GERD cohorts consisted of 61, 22 and 38 patients respectively. There was a significant difference in the prevalence of psychiatric conditions overall and anxiety among FH, RH and refractory GERD group (psych conditions: p=0.024; anxiety: p=0.003) (Table). Specifically, both FH and RH had an overall lower prevalence of psychiatric conditions overall when compared with refractory GERD group (FH vs refractory GERD: OR 0.139-0.843, p=0.018; RH vs refractory GERD: OR 0.084-0.796, p=0.016). There was a lower frequency of anxiety and use of benzodiazepines (Benzo) in FH as compared with the refractory GERD group (Anxiety in FH vs refractory GERD: OR 0.098-0.551, p< 0.001; Benzo in FH vs refractory GERD: OR 0.033-0.493, p< 0.001).

Conclusion: Our study found a lower frequency of psychiatric disorders and anxiety in the functional esophageal groups as compared with refractory GERD group. However, further studies are warranted to determine the neuropsychiatric differences across different phenotypes of GERD.

Table 1. Comparison of Psychiatric Disorders and Psychotropic Medications Among Refractory GERD, Functional Heartburn and Reflux Hypersensitivity

		FH (n=61)	RH (n=22)	Refractory GERD (n=38)	p
Age		56.0±1.9	53.3±2.7	57.2±2.3	0.583
BMI		29.1±1.0	30.2±1.5	31.7±1.1	0.269
Gender	Male	12 (19.7%)	3 (13.6%)	8 (21.1%)	0.770
	Female	49 (80.3%)	19 (86.4%)	30 (78.9%)	
Psych	Overall psychiatric conditions	32 (52.5%)	10 (45.5%)	29 (76.3%)	0.024
	Anxiety	16 (26.2%)	8 (36.4%)	23 (60.5%)	0.003
	Depression	25 (41.0%)	8 (36.4%)	22 (57.9%)	0.166
	Schizophrenia	3 (4.9%)	0	1 (2.6%)	0.521
	PTSD	3 (4.9%)	2 (36.4%)	4 (10.5%)	0.555
	Bipolar	3 (4.9%)	0	2 (5.3%)	0.558
Medications	SSRI	13 (21.3%)	4 (18.2%)	14 (36.8%)	0.150
	SNRI	3 (4.9%)	2 (9.1%)	6 (15.8%)	0.190
	TCA	6 (10.0%)	2 (9.1%)	3 (7.9%)	0.940
	Benzodiazepine	3 (4.9%)	0	11 (28.9%)	< 0.001

S458

Site of Luminal Narrowing Affects Likelihood of Successful Dilation When Ultra-Thin Endoscopes Are Required

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Introduction: Esophagogastroduodenosopy (EGD) is used in the evaluation of esophageal disease to assess the lumen and mucosa, sample tissue, and perform therapeutic maneuvers. Standard upper endoscopes, with a diameter of approximately 9-10 mm, may not be able to traverse the entire organ when luminal narrowing exists. An ultra-thin endoscope (UTE), with a diameter closer to 6 mm, allows endoscopists to complete the evaluation and optimize a treatment plan in many of these patients. The aim of this study was to explore UTE patterns of use and evaluate for connections between UTE findings and successful resolution of luminal narrowing with intervention.

Methods: All patients undergoing EGD with UTE at a single high-volume teaching hospital between 9/2018 and 5/2022 were included. Successful dilation was defined as either balloon or Savary dilation to a luminal diameter of at least 13 mm. Stricture locations were defined as upper third (< 24 cm from incisors), middle third (24-32 cm) and lower third (>32 cm). Demographic and endoscopic data were aggregated and deidentified prior to analysis.

Results: A total of 205 EGDs with UTE were performed, with 103 of those procedures including dilation. Within this cohort, there were 31 patients with luminal narrowing not due to malignancy who underwent a 47 total dilations. Successful dilation was achieved in 14 patients, with an average of 2.35 dilations (vs. 1.19 in the unsuccessful group). There was no significant difference with respect to age or gender when comparing these two group. An ANOVA model showed a statistically significant difference between success rates for dilation of upper, middle, and lower third narrowings (p = 0.01027), with the best results for proximal lesions. (Table)

Conclusion: The use of UTE to traverse luminal narrowings has been studied, but rarely have therapeutic outcomes been examined with regards to location of narrowings. This study shows that proximal esophageal locations are associated with a greater likelihood of successful dilation. One potential explanation is that the etiologies of more proximal narrowings include congenital webs and radiation-induced strictures, where the causative insult is not active during dilation. This contrasts with reflux-induced distal lesions, where ongoing inflammation and scarring may impede successful dilation. This cohort also has a relatively small number of dilations per patient, leaving open the possibility that more attempts at distal dilation could even out the success rate between groups.

Table 1. Summary statistics for study population

	Patients Successfully Dilated (>= 13 mm)	Patients Unsuccessfully Dilated (< 13 mm)	Total	P
No.	14 (26 dilations)	17 (21 dilations)	31 (47 dilations)	
Average # of dilations	2.35	1.19		0.0854
Mean age	63.8	59.7	61.5	
Gender				
Male	10 (71.4%)	8 (47.1%)	18 (58.1%)	0.179
Female	4 (28.6%)	9 (52.9%)	13 (41.9%)	
Location of Stenosis				
Upper third (< 24 cm)	12 (85.7%)	5 (29.4%)	17 (54.8%)	0.01027
Middle third (24-32 cm)	1 (7.1%)	5 (29.4%)	6 (19.4%)	
Lower third (>32 cm)	1 (7.1%)	7 (46.7%)	8 (24.8%)	

S459

Safety and Efficacy of Esoflip for Achalasia: A Systematic Review and Meta-Analysis

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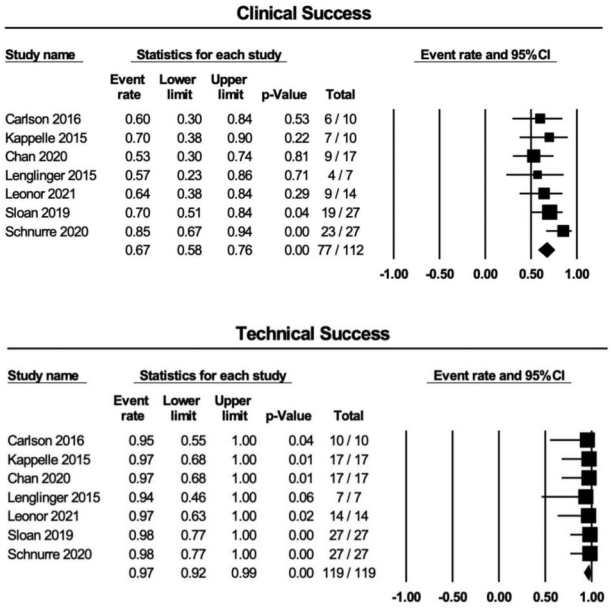
Introduction: Achalasia is a rare esophageal motility disorder due to degeneration of ganglion cells in the myenteric plexus leading to failure of relaxation of the distal esophageal sphincter. Current treatment options include pneumatic dilation, laparoscopic heller myotomy, and peroral endoscopic myotomy. Esophageal functional luminal imaging probe (EsoFLIP, Medtronic, Minneapolis, MN) is an emerging therapeutic modality for management of achalasia, however, data is limited. This device utilizes high resolution impedance planimetry that provides a real-time graphical depiction of the esophageal lumen without the need for fluoroscopy followed by hydraulic dilation. This is the first systematic review and meta-analysis to evaluate safety and efficacy of EsoFLIP for the management of achalasia.
Methods: Several electronic databases and conference proceedings such as PubMed, Google Scholar, Web of Science, EMBASE, CINAHL (from inception through May 2021) were reviewed to identify studies reporting the use of EsoFLIP for achalasia. The primary outcomes assessed were technical and clinical success of EsoFLIP in management for achalasia. Technical success was defined as the ability to successfully dilate the esophagus up to 30 mm with the EsoFLIP balloon. Clinical success was defined as the ability to achieve a post-dilation Eckardt score (ES) < 4. The secondary outcomes assessed were total and individual adverse event (AE) rates secondary to the procedure and recurrence of dysphagia post procedure.
Results: 7 studies reporting on 112 patients with a median age of 49.5 years were included in our final analysis. About half the patients were treatment naive. Mean pre-dilation ES was 7. Technical and clinical success rate was 97% (95% CI 92%,99%; I2=0) and 67% (95% CI 58%, 76%; I2=0), respectively. AE rate was 6% (95% CI 2.6%, 13%; I2=0) with perforation being the most common AE. Recurrence rate was 13% (95% CI 6%, 26%; I2=2). Post-dilation reflux was reported in 4 studies in 22 patients. Mean follow up was 2.1 months. Meta-analysis was conducted with Der Simonian and Laird random effects model using CMA software version 3. (Figure)
Conclusion: Our study demonstrated high technical success but lower clinical success as compared to other modalities. However, EsoFLIP has the advantage of having a diagnositic procedure (EndoFLIP) performed at the same time. While further studies are needed to validate our findings, this technology is a promising addition to the armamentarium for management of achalasia.



[0459] **Figure 1.** (Top) Forest plots displaying the clinical success rates for ESOFLIP (Bottom) Forest plots displaying the technical success rates for ESOFLIP.

S460

Safety of Powered Non-Thermal Endoscopic Ablation Device for Barrett's Esophagus: A Systematic Review and Meta-Analysis

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Introduction: Endoscopic mucosal resection (EMR) is utilized for removing preneoplastic or neoplastic lesions from the gastrointestinal tract. EMR is recommended for patients with a high risk of mucosal cancer, but the use of various thermal ablation techniques is associated with post-therapeutic stenosis. EndoRotor is a non-thermal device that suctions target epithelium into a small catheter where a spinning knife resects the mucosa, which reduces the risk of scarring and stenosis. Therefore, we performed a systematic review and meta-analysis to evaluate the safety of EndoRotor for non-thermal ablation of Barrett's esophagus.
Methods: A systematic review of the literature was performed using Medline, Embase, Web of Science, and the Cochrane library database until June 2022 to identify all studies that evaluated the safety of non-thermal endoscopic resection devices for the ablation of Barrett's esophagus. Other outcomes of interest included rates of intraoperative bleeding, post-procedural bleeding, perforation, post-procedural stenosis, and post-procedural pain or discomfort. All analyses were conducted using comprehensive meta-analysis software.
Results: Five studies, including 70 patients, were included in the final analysis. There were four observational studies and one randomized controlled trial. The pooled rate of intraoperative bleeding was 39% (95% CI: 25.4-54.5%, I2=0) and post-procedural bleeding was 7.5% (95% CI: 2.6%-19.6%, I2=0). The pooled rate of perforation was 4.1% (1.3%-11.9%, I2=0), post-procedural follow-up stenosis was 11.2% (4.7%-24.2%, I2=0), and post-procedural pain or discomfort was 54.2% (95% CI: 41.5%-66.4%, I2=9.2%). The efficacy of EndoRotor was not evaluated given the lack of data reported in the included studies.
Conclusion: The new EndoRotor resection device could be a viable alternative to existing ablative therapies for Barrett's esophagus. However, our study revealed significant adverse events, and therefore, larger randomized control trials are warranted to evaluate the risks and benefits of this novel device.

S461

Short Term Outcomes of Per Oral Endoscopic Myotomy for Patients With Refractory Atypical Chest Pain: A New Indication for POEM?

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Introduction: Numerous studies have shown that per oral endoscopic myotomy (POEM) is a very effective treatment for patients with achalasia. Limited data has also indicated that POEM is effective in treatment for some non-achalasia esophageal motility disorders, such as esophageal-gastric outlet obstruction and diffuse esophageal spasm. We report for the first time the outcome of POEM for patients with atypical chest pain.
Methods: Three patients were enrolled: a 72yo female, 87yo male and 73yo female. All patients had a long history of chest pain for at least 5 years. They ranked the pain from 2 to 8 on a 1 to 10 pain scale. The pain was not associated with physical activity, but it was occasionally associated with eating. Only one patient had some dysphagia and no patients reported regurgitation symptoms. All patients were evaluated by multiple doctors over the years, including primary care providers, cardiologists, and gastroenterologists. Cardiac chest pain was ruled out by their cardiologists. They all tried maximal anti-acid therapy, including proton pump inhibitors twice a day for a prolonged period, without any significant improvement. They also tried anti-spasmodic medications, such as hyoscyamine, with limited effect. All patients had esophageal manometry without conclusion. Barium swallow studies showed tertiary contraction and therefore suggested esophageal dysmotility. POEM was discussed with the patients who then provided consent to undergo the procedure (Table).
Results: All three POEMs were successful; the average procedure time was 20 minutes. Only circular muscle myotomy was performed and longitudinal muscle was left intact. Each myotomy was 10 cm in length. There were no postprocedural complications. Postop day 1, all patients were chest pain free and were discharged in the afternoon. Follow up times were 93, 42, and 5 days; pts continued to remain chest pain free. One out of 3 patients described a burning type of chest pain consistent with heartburn and was promptly relieved with anti-acid therapy.
Conclusion: From this pilot study, POEM may be a therapeutic modality for patients with refractory atypical chest pain. Further studies with increased sample size and long-term outcome assessments are needed to determine the efficacy of POEM in the treatment of atypical chest pain.

Table 1.

	Patient 1	Patient 2	Patient 3
Age (yrs)	72	87	73
Gender	F	M	F
pain level before POEM	2 to 8	2 to 8	2 to 8
pain level after POEM	0	0	0
follow up (days)	93	42	5

S462

Impact of Esophageal Biopsies During Index Endoscopy for Food Bolus Impaction on Rates of Patient Outpatient Follow-Up and Recurrence of Food Bolus Impaction: A Retrospective Study

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Introduction: Food bolus impaction (FBI) is a gastroenterological emergency requiring urgent upper endoscopy, of which up to half of cases may be due to eosinophilic esophagitis (EoE). EoE is defined by eosinophilic infiltration in the esophageal mucosa without secondary causes, which can lead to inflammatory and structural complications. Patients with EoE should have outpatient follow up as it can be effectively managed with proton pump inhibitors, swallowed topical steroids, and food elimination diets. This study aims to determine baseline rate of esophageal biopsy during index endoscopy for FBI, as recommended by American College of Gastroenterology clinical guidelines, and evaluate the impact of biopsies on rate of outpatient follow-up and repeat FBI presentations.
Methods: This retrospective cohort chart review study evaluated patients over age 18 who presented with acute FBI at Dartmouth-Hitchcock Medical Center from 2015 to 2020. Patients with incidentally found food boluses and with non-food foreign body impactions were excluded. Simple count and chi-squared analyses were performed, with a p-value < 0.05 indicating significance.
Results: 122 patients met inclusion criteria, with a mean age of 64 years old and 65% being male. Approximately half had a prior FBI though only 20% had a previous outpatient gastroenterology appointment. Baseline rate of esophageal biopsy during index endoscopy was 16%, of which 10% revealed a new diagnosis of EoE. After index endoscopy, 55% presented for outpatient follow-up and 51% underwent repeat endoscopy. 11% presented again to the emergency department for a recurrent FBI, with 31% of those patients having previously declined an outpatient visit. A greater percentage (65%) of patients with index biopsy completed an outpatient follow-up compared to those without a biopsy (53%) ($p=0.32$). There was minimal difference between those who had a biopsy and presented again with emergent FBI (15%) compared to those without a biopsy who re-presented (10%) ($p=0.49$).
Conclusion: The baseline rate of esophageal biopsy during initial endoscopy was low, suggesting missed opportunities to diagnose EoE early. A greater number of index biopsy cases followed up in outpatient clinic, though was not statistically significant. Findings could be affected by low volume of index biopsies. Further research is needed to identify barriers to outpatient follow-up and treatment adherence for patients diagnosed with EoE on index biopsy.

S463

Determination of the Association Between Motility Disorders and the Development of Pharyngeal and Esophageal Diverticulum: A Prospective Chart Review

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Introduction: Manometry is a diagnostic study that is commonly utilized to evaluate the motility of the gastrointestinal tract through measurements of pressure in patients who complain of dysphagia, reflux, or chest pain. Pharyngeal and esophageal diverticula are rare anatomical findings that have been theorized to occur as a result of various esophageal motility disorders; however, there is limited data available to formulate a strong association between the two diagnoses. In this study, we aim to look at patients with confirmed pharyngeal or esophageal diverticulum who have completed manometry testing to determine a potential association between these two anatomical and mechanical findings.
Methods: We conducted a prospective chart review of patients within our hospital network who were found to have diagnosed pharyngeal or esophageal diverticulum in all esophageal locations including the proximal, mid, and distal esophagus. Those patients who had completed esophageal manometry were then included in the study. Manometry findings were recorded including median integrated relaxation pressure (IRP) and distal contractile integral (DCI). Additionally, patient demographics including age, gender, and race were considered along with various risk factors such as history of narcotic use or autoimmune disease.
Results: 16 total patients met inclusion criteria (proximal esophagus, n = 4 (25%), mid esophagus, n=1 (6%); and distal esophagus, n = 11 (69%). Majority of the patients were female (69%) and Caucasian (81%) with a mean age of 68 years old $\pm$ 13 years. No patients were on narcotics during the manometry study or had a diagnosed autoimmune disorder. A large majority (n = 11 (69%) of diverticula were identified in the distal esophagus. 13 out of the 16 patients had abnormal esophageal motility studies demonstrating ineffective esophageal motility (n = 5, 38%), esophagogastric junction outflow obstruction (n = 3, 23%) jackhammer esophagus (n = 4, 31%), or achalasia (n = 1, 8%). The average of the median IRP (normal 20 mmHg) was 15.7 mmHg $\pm$ 8.17 and the mean DCI was 3861.1 mmHg-s-cm $\pm$ 4750.5.
Conclusion: Overall, our results show that patients found to have esophageal diverticulum have a very high prevalence of co-existing motility disorders, proven by manometry. Therefore, due to this high association, we recommend motility screening in all patients with diverticulum especially prior to determining the need for surgical intervention.

S464

Black Esophagus in the Setting of Diabetic Ketoacidosis: A Systematic Review of Clinical Presentation and Outcome

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Introduction: Black esophagus (BE) also known as the acute black esophagus or necrotizing esophagitis is a rare condition (0.2% in autopsy series). It is defined as a circumferential black appearing esophageal mucosa. It arises in a setting of tissue hypoperfusion due to hemodynamic instability, insults to the esophagus with gastric acid reflux further damaging the vulnerable mucosa. Patients are often critically ill or with significant comorbidities. Septic shock or acutely decompensated heart failure can lead to hypoperfusion states that predispose patients to necrotizing esophagitis. Diabetes mellitus (DM) leads to significant microvascular disease that can be a substrate for the development of esophageal necrosis. In this systematic review, we looked at the clinical presentation, radiological, endoscopic findings, and the outcome of the BE occurring in the setting of diabetic ketoacidosis (DKA).
Methods: A database search was conducted (PubMed, Embase, and Cochrane) for all case reports and case series of BE with DKA published in the English language. All the available reported cases were analyzed.
Results: A total of 29 patients were identified and 26 published cases were included in the analysis. The mean age of presentation was 51 years, and 74% of cases were male. DM type II 61%, DM type I in 30%, all cases included had DKA at presentation. The most common gastrointestinal symptoms prior to endoscopic evaluation were hematemesis (60%), nausea and vomiting (15.3%), dysphagia (15.3%), and melena (3.8%) (Table). 34% of cases had pre-endoscopic CT chest and abdomen, 90% (8 cases) revealed esophageal thickening, and one patient CT had no findings. On upper endoscopy, (46.1%) had pan-esophageal involvement, (34.5.62%) mid to lower esophageal involvement, (15.38%) had lower esophageal involvement, and upper esophageal involvement in 1 patient (3.85%) (Table). 42 % (11 patients) had esophageal biopsies of which (54.5%) showed acute esophageal necrosis (AEN), (and 45.4%) reported AEN with candida. Regarding outcomes, 57% (15 patients) had repeat endoscopy which showed complete healing in 46.67%, improvement in 26.67%, No changes seen in 6.67%, and stricture as a complication was seen in 20% of the cases on repeat endoscopy Case Mortality was only 1 patient (3.7%).
Conclusion: BE in the setting of DKA is rare. Clinicians should be familiar with this condition as treatment depends on addressing underlying medical problems to avoid complications and mortality.

Table 1. **Epidemiology**

Epidemiology	
Mean Age	51.1
Male	19 males (73.08%)
Female	7 females (26.9%)
Type of Diabetes	
Type 2	16 patients (61.54%)
Type 1	8 patients (30.77%)
Unknown	2 patients (7.69%)
GI presentation	
Hematemesis	15 patients (60%)
Nausea and Vomiting	4 patients (15.3%).
Dysphagia	4 patients (15.3%).
Melena	1 patient (3.8%)
No GI symptoms	1 patient (3.8%)

S465

Nationwide Seasonal Variation in Food Impaction in Patients with Eosinophilic Esophagitis

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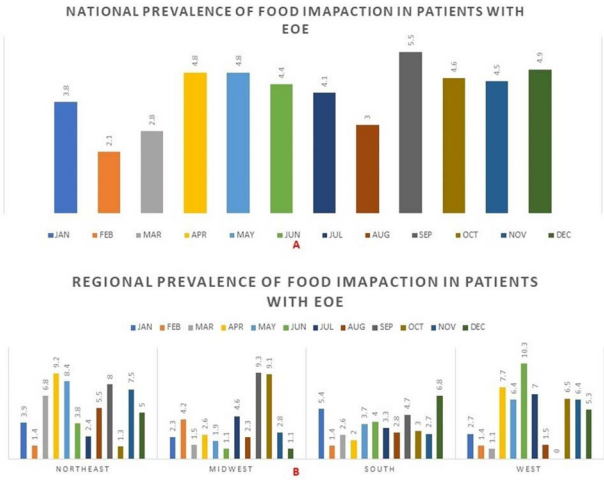
Introduction: Eosinophilic esophagitis (EOE) is associated with dysphagia, food impaction. Studies have shown a seasonal variation with increased incidence in summer months. This study was conducted to assess potential seasonal variation in US in the incidence of esophageal food impaction amongst patients with EOE
Methods: Retrospective cohort study using the HCUP's Nationwide Inpatient Sample (NIS) database from Jan 2017 to Dec 2019 was conducted. All adults hospitalized with food impaction due to EOE were included in this cohort. A comparison of monthly variation in food impaction amongst EOE patients was assessed at a national level and regional level. Statistical analysis was performed using SPSS version 25 software.
Results: During the study period, a total of 4,744 patients (unweighted) >18 years were admitted with impaction, of which 197 (4.2%) had a diagnosis of EOE. The mean age of the cohort was 44.2 years and 23.9% patients were female. Temporal trends of prevalence at national and regional level for food impaction in EOE patients are shown in Figure A and B respectively. No statistically significant seasonal association of food impaction amongst EOE patients was noted at a national level (Table). Similarly, no statistically significant temporal association of food impaction was noted at a regional level, except in the Midwest region during the months of September-October (Table) where a higher incidence of food impaction was noted.
Conclusion: A relation between seasonal variation and the diagnosis of EOE has been shown with peak months varying across regions. Such a seasonal variation is primarily proposed due to role of aeroallergens in adults and foods in children. Data regarding a similar seasonal variation in food bolus impaction in EOE is scarce, with few studies being done in regions outside of US, in Sweden, showing a marked seasonal variation with peak incidence in summer months. The present study was aimed to assess such a seasonal variation across different regions in US. We found no such statistically significant variation at a regional level, except in the Midwest region in months of September-October. Our study was limited due to regional distribution available inNIS data not accounting for intra-regional climatic variation, reliance on ICD coding and not taking into account EOE chronicity and treatment. Further studies exploring the association within a climate region would be needed to prove this association and serve to identify a potential therapeutic strategy.



[0465] **Figure 1.** (A) Nationwide seasonal trends of prevalence of food impaction in those with EOE (B) Regional seasonal trends in prevalence of food impaction in those with EOE

Table 1. National and Regional seasonal association of Food Impaction in EOE

	OR	95% C.I.for OR		p value
		Lower	Upper	
National				
Jan-Feb	0.214	0.025	1.814	0.157
Mar-Apr	0.276	0.033	2.316	0.235
May-Jun	0.339	0.041	2.824	0.317
Jul-Aug	0.26	0.031	2.188	0.215
Sep-Oct	0.368	0.044	3.063	0.355
Nov-Dec	0.348	0.042	2.897	0.329
Regional				
Northeast				
Jan-Feb	0.196	0.019	1.99	0.168
Mar-Apr	0.615	0.07	5.389	0.661
May-Jun	0.475	0.054	4.215	0.504
Jul-Aug	0.278	0.029	2.635	0.265
Sep-Oct	0.336	0.036	3.116	0.337
Nov-Dec	0.453	0.051	4.016	0.477
Midwest				
Jan-Feb	1.784	0.439	7.253	0.419
Mar-Apr	1.113	0.221	5.606	0.896
May-Jun	0.831	0.165	4.173	0.822
Jul-Aug	1.858	0.457	7.556	0.387
Sep-Oct	5.304	1.505	18.695	0.009
Nov-Dec	-	-	-	-
South				
Jan-Feb	0.686	0.295	1.593	0.38
Mar-Apr	0.471	0.189	1.173	0.106
May-Jun	0.789	0.363	1.715	0.55
Jul-Aug	0.617	0.266	1.432	0.261
Sep-Oct	0.776	0.357	1.687	0.523
Nov-Dec	-	-	-	-
West				
Jan-Feb	0.342	0.092	1.268	0.109
Mar-Apr	0.631	0.224	1.778	0.384
May-Jun	1.451	0.608	3.462	0.402
Jul-Aug	0.782	0.29	2.108	0.627
Sep-Oct	0.6	0.213	1.69	0.334
Nov-Dec	-	-	-	-

S466

The Clinical Value of Complementary Approaches in Foregut Disorders of Gut-Brain Interaction

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Introduction: Complementary therapy is often utilized as an adjunct to pharmaco-therapeutics and cognitive/behavioral therapy (CBT) in symptomatic disorders of gut-brain interaction (DGBI), but specific value of each approach remains unclear. We evaluated the clinical value of complementary approaches in foregut DGBI that persisted despite standard management.
Methods: Study subjects were identified from a cohort of patients with established DGBI managed at a tertiary clinic. Use of complementary therapy (ginger, peppermint oil, turmeric, acupuncture, dietary modifications, exercise, and probiotics) was identified from review of electronic medical records. Concurrent neuromodulator therapy and/or CBT was not an exclusion. Symptom frequency and severity was quantified using a 100 mm visual analog scale (VAS) and averaged, while health related quality of life was evaluated using the BEST questionnaire; both were administered at initial presentation and upon follow up. Data were analyzed to determine 30% improvement in symptom burden collectively and within each symptomatic cohort.
Results: Over a 26-month period, 163 DGBI patients (median age 59.0 years, 66.9% F, BMI 26.1 kg/m^2) were included, and 68 (41.7%) had foregut symptoms (heartburn, regurgitation, chest pain, bloating, belching, cough, nausea). Neuromodulators (151, 92.6%) and CBT 35 (21.5%) were standard therapy. Among complementary therapy, peppermint oil was utilized most often (41, 25.2%), followed by dietary modifications (35, 21.5%), probiotics (30, 18.4%) and exercise (25, 15.3%). BEST scores improved in 60 (36.8%), and VAS in 57 (35.0%). Overall symptom change was similar with and without complementary approaches; CBT provided an overall trend toward improvement (p=0.06). Within foregut symptom groups, overall symptoms on VAS trended toward improvement with exercise (75.0% vs. 38.6%, p=0.067). BEST score improved with ginger extract in patients with nausea (100% vs. 42.7%, p=0.037), and with peppermint oil in patients with esophageal symptoms (heartburn, regurgitation, chest pain, belching) (100.0% v. 18.2%, p=0.027). VAS improved more often with anxiety (53.2%) and depression (50.0%) compared to multiple (20.9%) or no (31.6%) psychiatric comorbidities (p=0.009). BEST score improvement was higher in patients with anxiety (54.8%) and depression (50.0%) compared to multiple psychiatric abnormalities (26.3%, p=0.057) (Table).
Conclusion: In foregut DGBI, complementary therapeutic approaches are most beneficial when tailored to presenting symptoms.

Table 1. Symptom response compared between complementary therapy and standard therapy

	Response to Complementary Therapy	Response to Standard Therapy	P value
≥30% improvement in BEST score			
Probiotics	12/25 (48.0%)	48/62 (43.6%)	0.824
Dietary modifications	12/29 (41.4%)	48/106 (45.3%)	0.834
Exercise	10/18 (55.6%)	50/117 (42.7%)	0.322
Peppermint oil	16/38 (42.1%)	44/97 (45.4%)	0.848
Turmeric	3/4 (75.0%)	57/131 (43.5%)	0.323
Ginger	4/4 (100.0%)	56/131 (42.7%)	0.037
Acupuncture	1/4 (25.0%)	59/131 (45.0%)	0.629
≥30% improvement in VAS			
Probiotics	10/29 (34.5%)	47/129 (36.4%)	1.000
Dietary modifications	14/34 (41.2%)	43/124 (34.7%)	0.547
Exercise	10/23 (43.5%)	47/135 (34.8%)	0.484
Peppermint oil	14/41 (34.1%)	43/117 (36.8%)	0.851
Turmeric	3/5 (60.0%)	54/153 (35.3%)	0.352
Ginger	2/4 (50.0%)	55/154 (35.7%)	0.620
Acupuncture	1/5 (20.0%)	56/153 (36.6%)	0.654

S467

CDX2 Immunohistochemical Positivity Confirms Barrett Esophagus in the Absence of Goblet Cells and Confers Significant Risk for High Grade Dysplasia and Esophageal Adenocarcinoma: A Pilot Study

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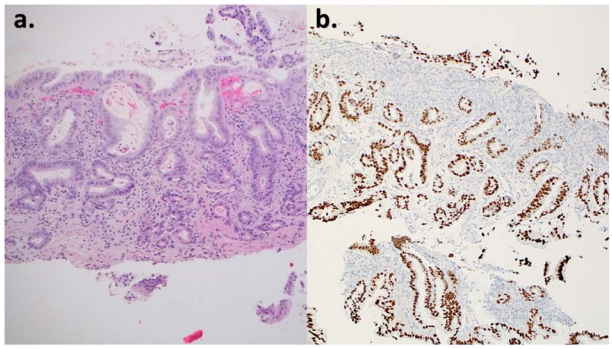
Introduction: Barrett's esophagus (BE) is a premalignant condition defined by intestinal metaplasia (IM) and can develop into esophageal adenocarcinoma (EAC). The standard tool for diagnosing BE is esophagogastroduodenoscopy (EGD). Based on American College of Gastroenterology (ACG) guidelines, patients that do not have goblet cells GCs on the initial or subsequent biopsies do not qualify for surveillance EGDs. The absence of GCs on subsequent biopsy could be due to tissue sampling error, medication effects, or true goblet cells loss over time. The caudal-related homeobox transcription factor 2 (CDX2) is a well-established marker for intestinal mucosa and is present in BE mucosa, consistent with IM. In this paper, we examine the role of CDX2 staining as a marker for BE IM when patients do not have GCs on subsequent biopsies and determine the risk for high-grade dysplasia (HGD) or EAC.
Methods: Serial biopsies of the esophagus were obtained during surveillance EGDs, with the initial biopsy set confirming BE with GCs and a second set that did not show GC. The CDX2 stains were prepared from paraffin blocks (Figure a,b).
Results: 35 patients met all inclusion criteria and had initial biopsies that were positive for CDX2. Of those 35 patients, 34 were positive for CDX2 on subsequent slides. Of these 34 patients, one had HGD, and one had HGD and EAC. One patient was negative for GCs and CDX2 on the subsequent slides; this patient had HGD. In total, 3 of 35 patients (9%) had HGD or EAC on subsequent slides.
Conclusion: This study, while small, shows that CDX2 may be an important adjunctive test for the surveillance of BE. Our results demonstrate that BE patients with proven GCs IM on initial biopsy, but not subsequent biopsies, are overwhelmingly positive for CDX2 and still have a significant risk of HGD or EAC. Our study has important limitations, including the small sample size due to strict inclusion criteria required by the IRB. Despite this, our study provides valuable information concerning CDX2 and the development of HGD and EAC in BE patients, especially those without GCs on subsequent biopsies. Our study supports the use of CDX2 as an adjunctive test for the initial diagnosis of BE. More importantly, the patients with previously diagnosed BE who no longer have GCs on subsequent biopsies but are CDX2 positive continue to have a significant risk for HGD or EAC and warrant continued surveillance. We believe that CDX2 can help identify this at-risk group.



[0467] **Figure 1.** a. H&E stain with HGD and adenocarcinoma (102x80mm; 220 x 220 DPI) b. CDX2 Immunohistochemical stain with HGD and adenocarcinoma (101x79mm, 220 x 220 DPI).

S468

Increased Risk of Hypercontractile Esophageal Motility Post Lung Transplant: A 10-Year Retrospective Review

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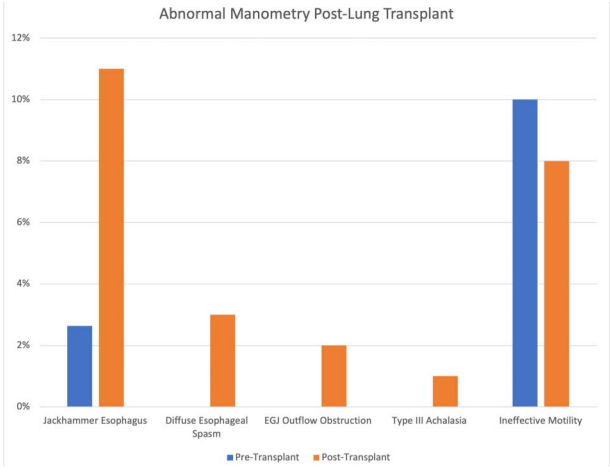
Introduction: There is evidence of an association between abnormal esophageal motility, GERD, and poor lung transplant outcomes. Our group has previously showed pre-operative manometric evaluation is critical for lung-transplant selection. A similar focus on post-lung transplant manometric evaluation to help prevent rejection and its common mediator chronic lung allograft dysfunction (CLAD). We **hypothesized** that *there is increase esophageal dysmotility post-lung transplant associated with worsened CLAD*.
Methods: In this retrospective 10-year cohort study, we analyzed all patients who underwent lung transplantation from 2009-2019. Time-to-event analysis using Cox proportional hazards model was utilized for mortality, acute rejection by biopsy, and the development of CLAD, testing pre- and post-transplant motility as a predictor for the above adjusted for age, gender, BMI, and transplant status (single vs. double lung). Manometric diagnosis was done using Chicago Classification 4.0. Pre-transplant GERD was defined based on $>$ 6% time pH $<$ 4, abnormal DeMeester score, evidence of Barrett's esophagus, peptic strictures, and/or esophagitis.
Results: 227 patients who underwent lung transplantation were analyzed in this study. 79 patients underwent pre-operative manometry (as per guidelines at the time of their pre-transplant evaluation) with the most common diagnosis being normal (87%, n=66), Ineffective Motility (11%, n=8), and Jackhammer (3%, n=2). Post-lung transplant manometry (n=166) demonstrated an increases risk of hypercontractile esophagus (Jackhammer esophagus 11% ($p< 0.01$), Diffuse Esophageal Spasm 3% ($p< 0.01$, Type III achalasia 1%, EGJ Outflow obstruction 2%) (Table). This was associated with an increase rate of CLAD (37% vs 25%, $p< 0.01$). There was no difference with Type I or Type II Achalasia nor absent contractility. There were similar covariates including BMI, acid exposure time, and rates of Nissen fundoplication. Patients who had pre and post-lung transplant manometry (n=60), there is a similar increase in hypercontractile esophageal motility (Jackhammer 11%, DES 4%).
Conclusion: We found increasing rates of hypercontractile esophageal motility independent of underlying demographics, pulmonary pathology, or surgical intervention. In this cohort, there was an associated increase risk of CLAD who have esophageal dysmotility. Effective post-transplant esophageal dysfunction management can potentially decrease CLAD which would improve overall post-transplant survivorship. (Figure)



[0468] **Figure 1.** Abnormal Manometry Post-Lung Transplant

Table 1. Manometry Pre- and Post- Lung Transplant

		Pre-Transplant	Post-Transplant	P-value
N		79	166	
Age (mean +/-SE)		66	64	
Ethnicity (Caucasian)		94%	94%	
Gender (Male)		62%	53%	
Total % Time pH < 4 (median IQR)		3.5%	3.8%	
Type of Transplant				
	Single	58%	24%	
	Double	42%	76%	
PPI Use		43%	50%	
Manometry				
	Normal	87%	75%	
	Jackhammer Esophagus	3%	11%	< **0.01**
	Diffuse Esophageal Spasm	0%	3%	< **0.01**
	EGJ Outflow Obstruction	0%	2%	
	Type III Achalasia	0%	1%	
	Ineffective Motility	10%	8%	

S469

A Low Acid Diet Rarely Normalizes Pathologic Gastroesophageal Reflux Disease

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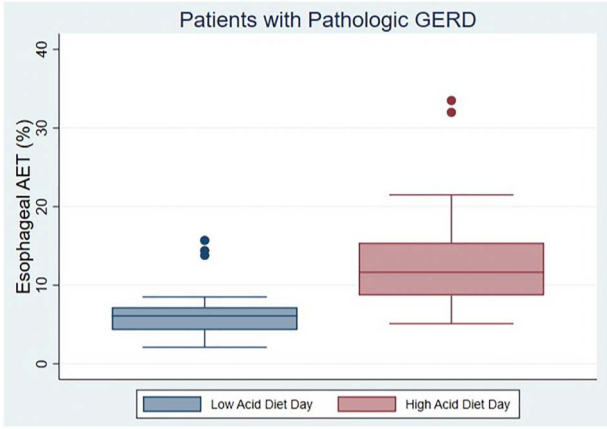
Introduction: Prolonged esophageal 96-hour wireless pH monitoring can reliably diagnose pathologic gastroesophageal reflux disease (GERD), with each study providing ample time to assess dietary influences on esophageal acid exposure time (AET). There is a paucity of literature detailing the influence of acidity in the diet on esophageal AET during ambulatory pH testing. This study aimed to evaluate differences in the quantity of acid reflux during days of high acid and low acid diets during prolonged wireless pH studies.
Methods: 96 patients who underwent esophageal 96-hour wireless pH monitoring for evaluation of potential GERD were included in the study. The patients were educated on foods of high and low acidity and instructed to consume a primarily high acid diet on one day and a primarily low acid diet on a separate day during the recording period while detailing all consumed meals in a diary. Each food diary was physician confirmed for accuracy. Demographics, BMI, and comorbidities were also assessed. Patients were considered to have pathologic GERD if the average esophageal AET was >6% for the entire pH study and considered normal on an individual day if esophageal AET was < 4%. Statistical relationships between proportions were evaluated by Fisher's exact test and continuous variables were compared using t-tests. Box plots were used to graphically represent the spread of data.
Results: Pathologic GERD was found in 30 patients (31.3%) of which the majority (64.7%) recorded their lowest AET on their low acid diet day (Table). Despite this, only 13.3% of patients with pathologic GERD achieved normal acid reflux on their low acid diet day. The highest AET occurred on the high acid diet day for all 30 patients (100%) with pathologic GERD and 36 (54.55%) of the 66 patients without pathologic GERD. In comparison to the high acid diet day, the low acid diet day reduced mean AET from 13% to 6.9% in those with pathologic GERD (Figure) and from 4.2% to 1.8% in patients negative for pathologic GERD. Average body mass index (BMI) was higher in patients with pathologic GERD, while age, sex, and number of the most common reflux symptom did not differ between each group.
Conclusion: Acid reflux is reduced overall with a low acid diet in patients with and without pathologic GERD. The majority of patients with pathologic GERD experience their lowest amount of acid reflux during a day of a low acid diet, but only a small minority normalize their acid reflux on that day.



[0469] **Figure 1.** Influence of Acidity in Diet on Esophageal AET in Patients with Pathologic GERD

Table 1. Metrics in Patients with and without Pathologic GERD

	Total	Pathologic GERD (n=30)	Negative for Pathologic GERD (n=66)	P
Male Sex, n (%)	47 (48.96)	19 (63.33)	28 (59.57)	0.078
Age, mean (SD)	48.21 (14.37)	47.27 (14.60)	48.63 (14.35)	0.67
BMI, mean (SD)	25.51 (5.61)	28.49 (5.49)	24.16 (5.15)	< 0.01
Presence of laryngopharyngeal reflux symptoms, (%)	33 (39.290)	11 (39.29)	22(39.29)	1.0
Mean number of most common symptom, (SD)	45.77 (56.41)	52.79 (12.37)	42.27 (51.59)	0.42
AET on high acid diet day highest, n (%)	66 (68.75)	30 (100)	36 (54.55)	< 0.001
Normal pH on low acid diet day, n (%)	33 (34.38)	4 (13.33)	29 (43.94)	0.005
AET on low acid diet day lowest, (%)	21 (41.18)	11 (64.71)	10 (29.41)	0.03
Mean AET on high acid, (SD)	6.99 (6.39)	13.03 (6.89)	4.24 (3.66)	< 0.01
Mean AET on low acid, (SD)	3.53 (3.54)	6.93 (1.05)	1.83 (1.47)	< 0.01

S470

Development and Utilization of a Pharmacokinetic/Pharmacodynamic Model for Vonoprazan to Assess the Relationship Between Dose, Exposure, and pH Holding Time Ratio

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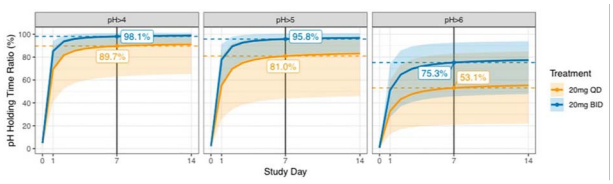
Introduction: Vonoprazan, a potassium-competitive acid blocker, suppresses gastric acid secretion rapidly and potently over prolonged periods. Gastric acid suppression is key to the healing and maintenance of erosive esophagitis (EE) and the eradication of *Helicobacter pylori* infection. The daily fraction of time that gastric pH is >4 (the pH >4 holding time ratio [HTR]) is critical for healing of EE; pH >6 HTR is important for eradication of *H. pylori* infection. Here, we develop and utilize a pharmacokinetic (PK)/pharmacodynamic (PD) model to investigate the relationship between vonoprazan treatment and intragastric pH HTR.
Methods: Data from prior Phase 1 single and multiple dose studies with pH measurements were pooled. An existing population PK model was used to estimate individual model parameters and predict PK profiles for study participants on each day with pH measurements. The area under the concentration-time curve between 0 and 24 hours post-dose (AUC_{0-24h}) was merged with pH HTR PD study data. Three direct link PK/PD models characterizing the relationship between AUC_{0-24h} and HTRs for pH >4, >5, and >6 were then derived. The models were used to simulate pH HTRs with between-subject variability; results were summarized as mean and 80% prediction intervals.
Results: Data from 245 participants in five different Phase 1 studies were used to derive the PK/PD model. Demographics: 95.1% male; 50.6% Japanese; 49.4% Western. The estimates and 95% confidence intervals for all model parameters are shown in Table. Simulations showed that vonoprazan 20 mg once-daily (QD) and 20 mg twice-daily (BID) are predicted to give pH >4 HTRs of 89.7% and 98.1%, respectively, by Day 7 (Figure). HTRs for pH >6 were 53.1% for vonoprazan 20 mg QD and 75.3% for BID.
Conclusion: These results indicate that vonoprazan provides high, dose-dependent pH HTRs and, therefore, consistent, dose-dependent control of 24-hour intragastric acidity. These pH HTRs may explain the high EE healing rates and, when combined with antimicrobials, *H. pylori* eradication rates seen with vonoprazan in clinical trials.



[0470] **Figure 1.** Predicted Mean and 80% Prediction Interval pH Holding Time Ratio at Days 0 (pre-treatment), 1, 7 and 14. BID, twice daily; QD, once daily.

Table 1. Estimates and 95% CIs for Model Parameters

Parameter	Role	pH >4 Estimate (95% CI)	pH >5 Estimate (95% CI)	pH >6 Estimate (95% CI)
E_0	TV (logit)	-2.74 (3.77%) (-2.84 to -2.64)	-3.18 (1.56%) (-3.27 to -3.09)	-3.48 (0.514%) (-3.54 to -3.42)
	Asian-effect (%)	-12.8 (-17.3 to -8.41)	-9.23 (-12.7 to -5.74)	-5.63 (-8.11 to -3.15)
	BSV	0.388 (0.310 to 0.465)	0.276 (0.192 to 0.361)	3.16e-05 (-0.286 to 0.286)
EC_{50}	TV (ng/mL)	48.2 (43.9 to 52.4)	58.8 (53.1 to 64.5)	99.5 (86.2 to 113)
	gamma	1.39 (1.20 to 1.58)	1.34 (1.17 to 1.52)	1.62 (1.30 to 1.94)
	Weight effect (1/kg)	1.50 (0.803 to 2.19)	1.81 (1.19 to 2.44)	-
	BSV	0.319 (0.259 to 0.379)	0.310 (0.252 to 0.368)	0.235 (0.102 to 0.368)
E_{max}	TV (logit)	4.80 (102%) (4.53 to 5.07)	4.83 (102%) (4.44 to 5.23)	2.17 (91.9%) (1.65 to 2.70)
	Weight effect (1/kg)	-	-	-0.0187 (-0.0265 to -0.0108)
	BSV	1e-04 (6.80e-05 to 0.000132)	1e-04 (5.42e-05 to 0.000146)	0.781 (0.505 to 1.06)
ET_{50}	TV (days)	0.432 (0.384 to 0.481)	0.427 (0.369 to 0.485)	0.348 (0.274 to 0.422)
	delta	1 (fixed)	1 (fixed)	1 (fixed)
RUV	add.err. (logit)	0.528 (0.475 to 0.580)	0.545 (0.493 to 0.596)	0.498 (0.457 to 0.539)

E0 and Emax were estimated on the logit-scale as the pH holding time ratios were logit-transformed; back-transformed estimates on the original percent scale are given for these parameters in round brackets. add.err., additive error; BSV, between subject variability; CI, confidence interval; E0, baseline effect; Emax, theoretical maximum effect achieved at infinite exposure and time; EC50, exposure (AUC) required to achieve 50% of maximum effect (Emax); ET50, time required to achieve 50% of maximum effect; RUV, residual unexplained variability; TV, typical value.

S471

Does Lower Esophageal Sphincter Distensibility Measured by the Functional Lumen Imaging Probe Relate to Total Esophageal Acid Exposure Time?

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Introduction: Proper evaluation of lower esophageal sphincter (LES) physiology is imperative in assessing esophageal motility. LES function is directly assessed through Functional Lumen Impedance Planimetry (FLIP) distensibility index (DI) measurement, which can be utilized to support complementary tests of LES physiology. 24-hour pH impedance monitoring, primarily utilized in the diagnosis of GERD, also indirectly examines LES function. The aim of this study is to characterize the relationship between LES distensibility measured by FLIP and esophageal acid exposure time measured by 24-hour pH impedance monitoring to determine how FLIP contributes to the diagnosis of GERD.
Methods: A retrospective review of 146 patients was performed. Patients were classified as unmedicated or medicated during their pH monitoring. The unmedicated group was subclassified by normal (< 4%), indeterminate (4-6%), or abnormal (>6%) acid exposure time. The medicated group was subclassified by normal (< 1.2%) or abnormal (>1.2%) acid exposure time. Mean DI at 60mL (16cm FLIP) was calculated for the each of the 6 groups. An ANOVA and a t-test was utilized to determine if mean DI varied by acid exposure classification within the unmedicated and medicated groups, respectively. Within each medicated or unmedicated population, patients were additionally grouped by normal or abnormal DI using two thresholds for normality (>2.8 mm2/mmHg and >2.0 mm2/mmHg). Average acid exposure time was calculated for each of the groups and compared via t-testing.
Results: In unmedicated patients, the average DIs were not significantly different at 3.4, 3.1 and 3.5 in patients with acid exposure time < 4%, 4-6%, and >6%, respectively (p = 0.94). In medicated patients, the average DIs were not significantly different at 4.17 and 3.81 in patients with acid exposure time < 1.2% and >1.2%, respectively (p = 0.541). There was no significant difference in mean acid exposure times between patients with normal and abnormal DIs within both the unmedicated and medicated groups (Table).
Conclusion: In both medicated and unmedicated patient groups, DI and acid exposure time were unrelated. These results suggest that while both DI and acid exposure time are valid indicators of LES dysfunction, an increased DI as measured by FLIP did not correlate to increased acid exposure time from 24-hour pH impedance monitoring. LES distensibility, which plays a major role in disorders of the esophagogastric junction, may not be as useful in characterizing GERD.

Table 1. Average Acid Exposure Time in Patients with Normal and Abnormal DI at 60mL inflation (DI - Distensibility Index)

Unmedicated Patients, DI cutoff 2.8 mm2/mmHg					Medicated Patients, DI cutoff 2.8 mm2/mmHg				
	N	Mean Acid Exposure Time (%)	Std Dev	p		N	Mean Acid Exposure Time (%)	Std Dev	p
DI < 2.8 mm2/mmHg	28	9.36	13.57	0.592	DI < 2.8 mm2/mmHg	11	9.00	9.99	0.956
DI ≥ 2.8 mm2/mmHg	41	7.79	8.70		DI ≥ 2.8 mm2/mmHg	37	8.81	9.97	
Unmedicated Patients, DI cutoff 2.0 mm2/mmHg					Medicated Patients, DI cutoff 2.0 mm2/mmHg				
DI < 2.0 mm2/mmHg	25	7.28	7.44	0.454	DI < 2.0 mm2/mmHg	8	7.36	10.66	0.645
DI ≥ 2.0 mm2/mmHg	44	9.08	12.45		DI ≥ 2.0 mm2/mmHg	40	9.15	9.82	

S472

Clinical Adverse Events Associated With Esophageal Stents: A MAUDE Database Analysis

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Introduction: Esophageal stents are widely utilized for the treatment of benign and malignant obstructions. However, associated procedural complications are not well described. We aim to investigate post Food and Drug Administration (FDA) approval outcomes associated with esophageal stents.
Methods: We analyzed post-marketing surveillance data on esophageal stents from the FDA Manufacturer and User Facility Device Experience (MAUDE) database from January 2015 to December 2021 to report device-related injuries and modes of failure. This database is an open-access platform that receives device reports from mandatory sources, including manufacturers and facilities, as well as, voluntary sources such as healthcare professionals, patients and consumers. These reports allow the FDA to monitor device performance and device-related safety concerns.
Results: During the study period, approximately 899 reported cases with 1312 device issues and 303 patient complications were examined. Reported cases included Ultraflex stent (n= 275, 30.6%), Wallflex stent (n= 210, 23.4%), Covered NITI-S stent (n= 144, 16.0%), and Evolution Partially Covered stent (n= 98, 10.9%). The most reported device issues were due to activation, position, or separation failure (n= 597, 45.5%), followed by migration or expulsion of device (n= 120, 9.1%), break (n= 96, 7.3%), difficulty to remove (n= 43, 3.3%), and material deformation (n= 41, 3.1%). A number of reports described an unclassified adverse event without specifying device or operator problem (n= 100, 7.6 %). The most reported patient adverse events were dysphagia or odynophagia (n= 29, 9,6%), followed by death (n= 24, 7.9%), hemorrhage (n= 22, 7.3%), obstruction or occlusion (n= 22, 7.3%), and perforation (n= 17, 5.6%).
Conclusion: Our analysis of the FDA MAUDE database revealed a predominance of reported device complications related to activation, positioning, and separation difficulties. Dysphagia or odynophagia represented the most commonly reported patient complication. This database has notable limitations, including limited information on patient comorbidities, detailed endoscopy reports, an absence of operator experience and total volume of procedures performed in the United States. This study provides insight into the most commonly reported complications of esophageal stents that will help inform the risk/benefit conversation with patients and may lead to a more detailed approach on how to mitigate and manage complications.

S473

Changes in Tumor Micro-Environment With Liquid Nitrogen Spray Cryotherapy and Chemoradiation in Locally Advanced Esophageal Cancer

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Introduction: In a pilot clinical trial, 44% of patients who underwent a single session of Liquid Nitrogen Spray Cryotherapy (LNSC) prior to neoadjuvant chemoradiation (CRT) had a long-term clinical response (compared to 25% - 30% in published studies of CRT alone). LNSC is hypothesized to enhance immune-mediated cell death of esophageal tumor cells and work synergistically with chemoradiation (CRT), but published studies are lacking. The aim of our study was to assess changes in tumor immune micro-environment (TIME) with LNSC and CRT.
Methods: Matched retrospective case-control study that included locally advanced EC patients who underwent a single session of LNSC plus concurrent chemoradiation (CRYOCHEMOXRT) vs. concurrent chemoradiation alone (CHEMOXRT). Groups were matched for age, histology, and pre-treatment stage. A tissue microarray was generated from the blocks and subjected to multiplex immunofluorescence staining for pancytokeratin (tumor cells), CD3 (overall T cell) and CD8 (Cytotoxic T cells), FOXP3 (regulatory T cells). The images were analyzed with Vectra Polaris Automated Quantitative Pathology Imaging System and data was analyzed using R Studio
Results: Paired pre- and post-treatment tissue was available for 5 patients in the CRYOCHEMOXRT group and 4 patients in the CHEMOXRT group. Intra-tumor total T lymphocytes (IT-TILs) increased at least five-fold pre- and post-treatment in 40% of patients in the CRYOCHEMOXRT group vs. 25% of patients in the CHEMOXRT group. IT-TILs increased at least five-fold pre- and post-treatment in 60% of patients in the CRYOCHEMOXRT vs. 50% in the CHEMOXRT group. However, regulatory T cells also increased more frequently with CRYOCHEMOXRT (40% vs. 25%). In the CRYOCHEMOXRT group, mean survival in patients who had a five-fold increase in IT-TILs vs. patients with less than five-fold response was 1402 days vs. 686 days (Table).
Conclusion: In this exploratory study, LNSC increased likelihood of IT-TILs with CRT. Patients with a robust cytotoxic T cell response had a longer survival than patients who did not have a significant immune response. Larger studies are needed to corroborate these findings, and to better characterize tumor immune response with LNSC and CRT.

Table 1. Clinical remission and survival among patients who received liquid nitrogen spray cryotherapy and chemoradiation

Patient	5X cytotoxic T cell increase post treatment	Long-term complete clinical remission	Survival (days)
1	No	Yes	1231
2	No	Yes	735
3	Yes	No	1390
4	No	No	91
5	Yes	No	1414

S474

Do Patients With Scleroderma Benefit From Surgical Treatment for Gastroesophageal Reflux?

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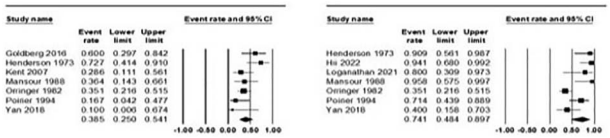
Introduction: Systemic sclerosis (SSc), also called scleroderma, is a systemic inflammatory disease that affects the skin and internal organs. Gastroesophageal reflux (GERD) is common in patients with scleroderma that may be complicated by esophagitis, strictures, and Barret's esophagus. Anti-reflux medications are still considered the first line treatment of GERD in SSc patients. Surgical treatment is usually preserved for reluctant cases. We conducted this meta-analysis to assess for the benefit of surgery in treating GERD in SSc patients.
Methods: A comprehensive literature search of PubMed, Embase, and Web of Science databases was conducted through June 01, 2022. We included all studies that assessed for the outcomes of surgical treatment of GERD in SSc patients. We calculated pooled odds ratios (OR) for the outcomes that were reported in ≥3 studies using a random-effects model.
Results: A total of 142 patients with SSc who underwent surgical treatment of GERD were included in nine studies. Persistence of dysphagia and acid reflux symptoms were used to assess for the outcomes of surgery as they were reported in ≥3 studies. Our meta-analysis showed that there is about 61.5% decrease in dysphagia after surgery with an OR of 0.385 (0.250, 0.541), Figure A. Our study also showed a 26% decrease in acid reflux symptoms after surgery with an OR of 0.741 (0.484, 0.897), Figure B.
Conclusion: The treatment of refractory GERD in patients with SSc remains challenging. Our study showed that surgery has been associated with lower rates of dysphagia and acid reflux. However, further studies should be conducted to assess for the definitive indications, and the adverse outcomes of surgery in SSc patients.



[0474] **Figure 1.** Forest plots of: A, dysphagia, and B, acid reflux after surgical treatment of GERD in patients with systemic sclerosis

S475

Association of Esophageal Inlet Patch to Barrett's Esophagus: Analysis of Risk Factors, High Resolution Esophageal Manometry (HREM) and Esophageal pH-Impedance (EpHI) Results

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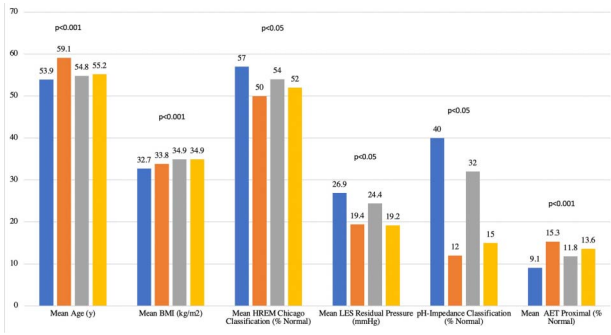
Introduction: Esophageal gastric heterotopia or Inlet Patch (IP) is thought to be embryologic in nature. Barrett's Esophagus (BE) results from reflux. Though IP has been associated with BE in several studies, their relationship is not well defined. The aim of this study is to investigate the potential HREM, EpHI, and risk factor relationships between IP and BE.
Methods: All endoscopic, HREM and EpHI data for patients age ≥ 18 years who had EGD from January 2010 to December 2020 at a single high-volume motility center were reviewed. Patients were grouped by presence or absence of IP and/or BE on EGD. Age, sex, BMI, race, alcohol and tobacco use were recorded. ANOVA and t-test were used to calculate differences in HREM and EpHI testing. A multivariate regression model was constructed to identify independent variables associated with presence of IP and BE.
Results: Of 27,598 unique eligible patients who underwent EGD during the study period, 1,294 (4.7%) had endoscopic evidence of BE; 362 (1.3%) had IP, of whom 62 (17.1%) had both IP and BE ($p < 0.001$). Patients with BE alone, IP alone, and both BE and IP were older and had higher BMI than those without either finding ($p < 0.001$). HREM was normal in 50% of patients with BE alone, 54% of patients with IP alone, 52% of patients with IP and BE ($p < 0.05$). Mean lower esophageal sphincter (LES) residual pressure was lower in patients with BE and/or IP when compared to those without either ($p < 0.05$). EpHI testing was normal in 12% of patients with BE, 32% of patients with IP, 15% of patients with both IP and BE ($p < 0.05$). Mean acid exposure time (AET) was higher in patients with BE and/or IP than those without ($p < 0.001$) (Table). On multivariate regression analysis, patients with only BE, only IP, and both IP and BE were all independently associated with increasing age and BMI, male sex, Caucasian race, Hispanic ethnicity, and current smoking (Table).
Conclusion: In our upper endoscopy database, BE was seen in 4.7%, IP in 1.3%, with 17% of IP patients also having BE. Patients with BE alone, IP alone, and both IP and BE were found to be older, have higher BMI, lower LES residual pressure, and higher AET when compared to those without either endoscopic finding. Factors such as male sex, BMI, Caucasian race, active smoking status were independently associated with BE alone, IP alone, and IP and BE findings. Endoscopic testing and risk factor analysis in individuals with these risk factors should be performed with careful esophageal inspection for both BE and IP.



[0475] **Figure 1.** Differences in Mean High Resolution Esophageal Manometry (HREM) and Esophageal pH-Impedance (EpHI) Testing Characteristics in Patients With and Without Barrett's Esophagus (BE) and Inlet Patch (IP) [BLUE: Patients without BE or IP; ORANGE: Patients with BE Only; GRAY: Patients with IP Only; YELLOW: Patients with Both BE and IP]

Table 1. Multivariate Regression of Risk Factors for Barrett's Esophagus-Only Patients vs Those With Only Inlet Patch vs Those with BE and IP

Factors	Patients with only Barrett's Esophagus			Patients with only Inlet Patch			Patients with Both Inlet Patch and Barrett's Esophagus		
	OR	95% CI	p-Value	OR	95% CI	p-Value	OR	95% CI	p-Value
Age									
	1.02	1.02-1.03	< 0.001	1.04	1.04-1.05	< 0.001	1.05	1.05-1.06	< 0.001
BMI									
	1.20	1.20-1.21	< 0.001	1.02	1.01-1.02	< 0.001	1.11	1.09-1.11	< 0.001
Sex									
Female	Ref	-	-	-	-	-	-	-	-
Male	2.22	1.96-2.51	< 0.001	1.47	1.16-1.85	< 0.001	1.30	1.29-1.31	< 0.001
Race									
African American	Ref	-	-	-	-	-	-	-	-
Hispanic	1.17	1.01- 1.37	< 0.001	1.65	1.19 -2.29	< 0.001	1.12	1.11-1.14	< 0.001
Caucasian	1.87	1.64- 2.15	< 0.001	2.51	1.86- 3.39	< 0.001	1.68	1.67-1.70	< 0.001
Asian	0.66	0.40- 1.09	0.11	0.33	0.22-0.45	0.17	0.89	0.75-0.92	0.54
Smoking Status									
Non-Smoking	Ref	-	-	-	-	-	-	-	-
Current Smoker	1.02	1.02-1.03	< 0.001	1.12	1.11-1.13	< 0.001	1.08	1.07-1.10	< 0.001
Alcohol Status									
Non-Alcohol Drinker	Ref	-	-	-	-	-	-	-	-
Current Alcohol Drinker	0.46	0.28-0.76	< 0.001	0.83	0.65-1.05	0.12	0.82	0.88-1.05	0.55

S476

PPI Discontinuation Rates in Patients With Esophageal Strictures

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Introduction: In March 2018, Canadian physicians received notification of new guidelines encouraging PPI deprescription in most patients with GERD.[1] An adverse event from PPI discontinuation is rebound acid reflux leading to esophageal stricture. This study aims to quantify the proportion of patients with esophageal strictures requiring endoscopic dilation who had previously discontinued their PPI medication before and after implementation of these new guidelines.

Methods: This retrospective cohort study analyzed patients who received an esophageal dilation between the years of 2015-2017 (group 1) and 2019-2021 (group 2). The outcome of interest was the rate of PPI discontinuation between the two groups. All patients from two gastroenterology practices who received esophageal dilations to treat symptomatic strictures during these years were identified for the study using physician billing codes. Information regarding demographics, medications, and previous GI diagnoses were collected using endoscopy reports and medication records from the local hospital medical database. We defined PPI discontinuation as either a 50% dose reduction, frequency reduction or complete medication discontinuation at the time of endoscopic dilation compared to the established PPI therapy from the previous 3 months or longer. The information was coded using a standardized data sheet and entered into SPSS for data analysis.

Results: Data were collected from 223 esophageal dilations. The average patient age of the sample was 58.8 years old. The sample consisted of 124 males (56%) and 99 females (44%). Patients receiving dilations from group 1 (2015-17) had a PPI discontinuation rate of 6.5% (10/152 cases). Meanwhile, patients from group 2 (2019-21) had a PPI discontinuation rate of 24% (17/71 cases). These results were statistically significant ($p<0.001$) following Chi-Squared analysis (Table).

Conclusion: There was a higher rate of PPI discontinuation in patients undergoing esophageal dilation after new PPI deprescription guidelines were sent to physicians. PPI deprescription recommendations may have unintended consequences. Further research is necessary to understand the risks and benefits of discontinuing PPI therapy. 1- https://tinyurl.com/2p8t9a7b

Table 1. Fisher Exact test: p value <0.001

Chi-Squared	PPI Discontinued	PPI Non-discontinued	Total
Group 1	10	142	152
Group 2	17	54	71
Total	27	196	223

S477

A Real World Study of Cumulative Steroid Burden in Patients With Newly Diagnosed Eosinophilic Esophagitis

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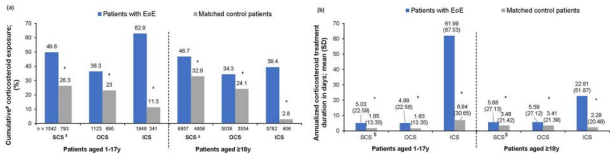
Introduction: Patients with eosinophilic esophagitis (EoE) are at risk for long-term corticosteroid (CS) exposure as swallowed topical CSs (STCs) are routinely prescribed as a treatment. Further, the prevalent type 2 comorbidities (such as asthma) in EoE patients may also be treated with CSs. However, real-world burden of long-term use of STCs in EoE patients is not well documented. The aim of this study is to describe the cumulative CS burden in newly diagnosed EoE patients compared to a general patient population.
Methods: In this retrospective analysis of the US Optum Clinformatics Data Mart (2007–2019), eligible patients had ≥2 claims (≥30 to ≤365 days apart) with an EoE diagnosis and ≥1y of continuous enrollment (up to 31-day allowable gap) before the index date (first claim of EoE diagnosis). The matched (1:1 on age, sex, and history of asthma) patients without EoE met same enrollment and inclusion criteria on the EoE patient's index date. Demographics were extracted in 1-y preindex period, and treatment history with systemic (SCS), oral (OCS), or inhaled CS (ICS) was identified by National Drug Codes. All-cause CSs use was measured at the follow-up starting at the index date and ending at disenrollment or the end of the study.
Results: Overall, 17,777 patients with EoE (3095 1–17y old and 14,682 ≥18y old) were matched with 17,777 patients from a general population (3017 1–17y old and 14,760 ≥18y old) (Table). At baseline, patients with EoE across age groups had significantly ($P< 0.01$) higher exposure to CSs and a longer treatment duration than the matched patients (Table). In the follow-up, the exposure to SCS, OCS, and ICS was significantly ($P< 0.01$) higher in 1–17y old EoE patients (difference: 23.5%, 13.3%, and 51.6%, respectively) and ≥18y old EoE patients (difference: 13.8%, 10.2%, and 36.6%, respectively) than the matched patients (Figure). The mean annualized treatment duration with CSs was also significantly ($P< 0.01$) longer in EoE patients across all age groups versus matched patients (Figure).
Conclusion: This study demonstrated that patients with EoE across all age groups had considerably more prescriptions, cumulative exposure, and treatment duration of SCS, OCS, and ICS than a matched general patient population. Prior and current exposure to CSs should be considered while prescribing CSs to EoE patients across all age groups, particularly pediatric patients, as they have increased likelihood of additional exposure throughout their lifespan.



[0477] **Figure 1.** (a) Cumulative Steroid Exposure and (b) Annualized Steroid Treatment Duration in Patients with EoE and Matched General Population During Follow-up. EoE, eosinophilic esophagitis; ICS, inhaled corticosteroid; OCS, oral corticosteroid; SCS, systemic corticosteroid; SD, standard deviation. *P<0.01. #The cumulative dose was calculated as the sum of the total dose for all dispensed prescriptions included in the drug class over the assessment period. $Oral and parenteral corticosteroids.

Table 1. Baseline Demographic and Clinical Characteristics of Patients with EoE and Matched General Population.

Characteristics	Aged 1–17y		Aged ≥18y	
	Patients with EoE	Matched control patients	Patients with EoE	Matched control patients
Number of patients	3095	3017	14682	14760
Age: mean years (SD)	10.01 (4.84)	10.18 (4.76)	45.02 (15.18)	45.25 (15.27)
Female; *n* (%)	898 (29.0)	866 (28.7)	5567 (37.9)	5599 (37.9)
Race/Ethnicity; *n* (%)				
Asian	110 (3.6)	173 (5.7)	264 (1.8)	842 (5.7)
Black	167 (5.4)	263 (8.7)	726 (4.9)	1436 (9.7)
White	2399 (77.5)	1976 (65.5)	12420 (84.6)	9977 (67.6)
Hispanic	180 (5.8)	368 (12.2)	718 (4.9)	1821 (12.3)
Unknown/Missing	239 (7.7)	237 (7.9)	554 (3.8)	684 (4.6)
Type II comorbidities; n (%)				
Asthma	822 (26.6)	807 (26.7)	1666 (11.3)	1681 (11.4)
Person years of follow-up; mean (SD)	2.91 (2.38)	2.73 (2.41)	2.61 (2.08)	2.42 (2.06)
Cumulative# corticosteroid exposure; *n* (%)				
Systemic (SCS)$	840 (27.1)	577 (19.1)	3983 (27.1)	3065 (20.8)
Oral (OCS)	653 (21.1)	526 (17.4)	2719 (18.5)	2078 (14.1)
Inhaled (ICS)	754 (24.4)	344 (11.4)	1309 (8.9)	343 (2.3)
Annualized corticosteroid treatment duration; mean days, (SD)				
SCS$	3.82 (20.07)	2.04 (12.45)	4.08 (23.01)	2.92 (19.14)
OCS	3.82 (20.07)	2.03 (12.43)	4.02 (22.99)	2.88 (19.11)
ICS	21.88 (56.36)	9.37 (35.66)	6.17 (30.12)	2.21 (19.89)

EoE, eosinophilic esophagitis; ICS, inhaled corticosteroid; OCS, oral corticosteroid; SCS, systemic corticosteroid; SD, standard deviation.
#The cumulative dose was calculated as the sum of the total dose for all dispensed prescriptions included in the drug class over the assessment period.
$Oral and parenteral corticosteroids.

S478

Current Trends in Endoscopic Therapy for T1a Esophageal Cancer in the United States

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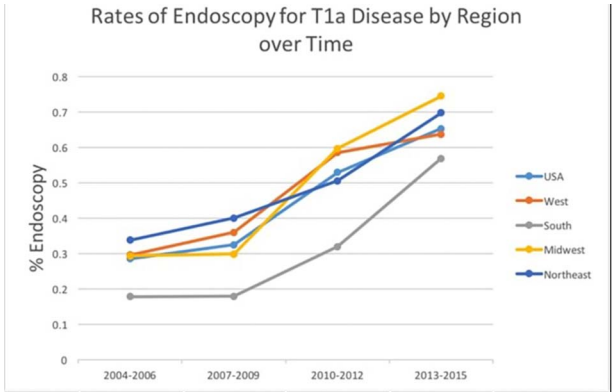
Introduction: Esophageal cancer is the 6th leading cause of cancer mortality worldwide. Minimally invasive endoscopic therapies have become an increasingly widespread modality for early esophageal cancer treatment, with comparable outcomes to surgery. The regional variations and trends over time in the utilization of endoscopic therapies for T1a esophageal cancer have not been explored but are likely important factors in esophageal cancer care.

Methods: Patients with primary T1a esophageal cancer from 2004-2015 via the November 2018 submission of Surveillance, Epidemiology, and End Results (SEER) Program were included. 4 geographic regions comprised of 18 cancer registries covering approximately 30% of the US population were identified: South (Georgia, Louisiana), West (Hawaii, Alaska, Seattle, California, New Mexico, Utah), Northeast (Connecticut, New Jersey), and Midwest (Iowa, Kentucky). Estimates for the percentage of people living at < 150% of the poverty level were obtained using county-level data from the 2010-2014 US Census. Rates of endoscopic therapy were compared between regions over time. Chi-squared testing was used for between-region comparisons. Statistical analysis was performed using R studio (R version 3.6.1, Boston, Massachusetts). Line plots were generated using Microsoft Excel (Figure).
Results: A total of 1788 patients with primary T1a esophageal cancer from 2004-2015 were included. The majority (47%) of the patients were from the West (n=838), with 315, 352, and 283 patients from the South, the Northeast, and the Midwest regions, respectively. Rates of endoscopy differed between regions (p< 0.001) with lowest rates of endoscopy in the South (34.6%) and highest rates of endoscopy in the Northeast (50.6%). The Northeast had the lowest rate of poverty (16% of patients at < 150% poverty level) whereas the South had the highest (30%, p< 0.001). Endoscopy use increased over time in all regions. However, the South had the lowest rates of endoscopy at all time points (Table).
Conclusion: In this population level observational study, we demonstrate that rates of endoscopy for T1a esophageal cancer differ based on geographic region, and appear to be inversely related to poverty level. These findings are especially relevant considering the evolving body of evidence supporting the use of endoscopy as definitive therapy for early esophageal cancer. More research is needed to identify other factors associated with these health disparities to improve health equity and outcomes in early-stage esophageal cancer.



	year				
	2004-2006	2007-2009	2010-2012	2013-2015	% increase/3 years
USA	28.57%	32.50%	52.89%	65.27%	13.05%
West	29.57%	35.96%	58.52%	63.63%	12.48%
South	17.86%	17.95%	31.94%	56.88%	13.11%
Midwest	29.31%	29.87%	59.68%	74.41%	16.51%
Northeast	33.80%	40%	50.58%	69.72%	11.83%

[0478] **Figure 1.** Line plot for rates of endoscopy by region over time

Table 1. Regional Differences in Treatment Modality for T1a Disease from 2004-2015 in the United States

Region	Total cases	Received Surgery (%)	Received Endoscopy (%)	p-value	% persons < 150% poverty level	p-value
				< 0.001		< 0.001
Midwest	283	142 (50.2%)	141 (49.8%)		23.4%	
Northeast	352	174 (49.4%)	178 (50.6%)		16.3%	
South	315	206 (65.4%)	109 (34.6%)		29.6%	
West	838	436 (52.0%)	402 (48.0%)		24.3%	

S479

Acute Esophageal Necrosis in Patients With Diabetic Ketoacidosis: A Systematic Review of Diagnostic and Therapeutic Conundrums

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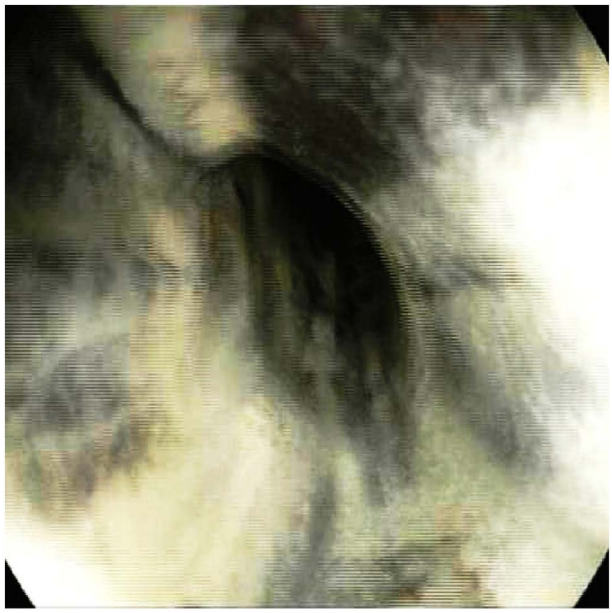
[1]Woodhull Medical Center, Brooklyn, NY; [2]Allama Iqbal Medical College, Lahore, Punjab, Pakistan; [3]St. Joseph Mercy Hospital, Ypsilanti, MI; [4]Wexham Park Hospital, Slough, England, United Kingdom.

Introduction: Acute esophageal necrosis (AEN) associated with diabetic ketoacidosis (DKA) remains an exceedingly rare clinical entity. The likely causal mechanism is related to hypoperfusion and transient hyperglycemic gastric dysmotility, potentially increasing the risk of AEN. To our knowledge, this is the first systematic review of AEN in patients with DKA.
Methods: A systematic search of MEDLINE, Embase, Scopus, and Cochrane was conducted for English-only articles published between inception and June 15, 2022. Abstracts from major gastroenterology conferences and bibliography lists were also reviewed. Search terms "esophageal necrosis" and "black esophagus" were combined using the Boolean operators 'AND' and 'OR' with the terms "diabetic ketoacidosis" and "diabetes mellitus," with all permutations. Two authors independently reviewed each article for eligibility. The search yielded a total of 326 results. However, 28 articles fulfilled the inclusion criteria.
Results: A total of 31 case reports only (clinical evidence level: IV) of AEN in the setting of DKA were included, dating from 2014 to 2022. The mean age of patients was 52.81 ± 13.49 years (range: 30–78 years) and 61% of cases were reported in males. Common presenting symptoms were hematemesis (58%), nausea (55%), abdominal pain (53%), vomiting (35%), and altered mental status (19%). Apart from diabetes, major comorbidities were hypertension (29%), alcoholism (23%), GERD (16%), and COPD (10%). On EGD, 58% had pan-esophageal, 26% had mid-to-distal, and 16% of patients had distal segment disease. Esophageal biopsy was documented in 29% of patients. All patients received insulin and fluid replacement therapies. PPIs in 60%, sucralfate in 32%, antifungals in 29%, and antibiotics were administered in 19% of patients. Blood transfusions were performed in 16% of patients. The mortality rate was 6.4%. AEN complications included esophageal stenosis (6%), as well as stricture formation (6%). (Figure)
Conclusion: This systematic review reiterates the occurrence of AEN in association with DKA. Overt GI bleeding is a common presentation, but patients may develop nausea, abdominal pain, vomiting, and disorientation as major symptoms. Therefore, endoscopists should keep a low threshold for performing EGD in DKA patients. While the cause-and-effect relation of AEN with hyperglycemia are unclear, fluid replacement and gastric acid suppression are pertinent to the management of AEN.



[0479] **Figure 1.** Upper endoscopy showing necrotic-appearing black esophagus in the lower third of esophagus in a female diabetic patient.

S480

Clinical Characteristics and CT Findings in Adult Patients With an Aberrant Right Subclavian Artery: A Single-Center Retrospective Cohort Study

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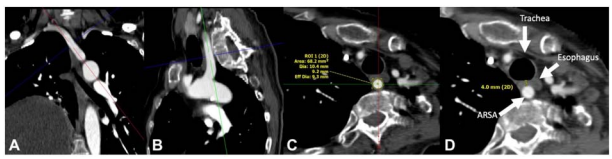
Introduction: An aberrant right subclavian artery (ARSA) in an anomalous artery that arises from the descending aorta distal to the left subclavian. Although most ARSA are discovered incidentally given the absence of symptoms, they may be associated with significant morbidity and mortality. We sought to determine features associated with symptoms in adult patients diagnosed with an aberrant right subclavian artery.
Methods: In this single-center, retrospective study, 386 adult patients were diagnosed with ARSA on chest CT scans performed between June 2016 and April 2021. Patients were grouped by the presence of symptoms, which included dysphagia, shortness of breath, cough, and upper airway wheezing. Four cardiothoracic radiologists reviewed the chest CT scans to measure features of ARSA. Agreement and multivariable logistic regression analyses were performed to determine interobserver variability and features associated with the presence of symptoms, respectively.
Results: The prevalence of ARSA was 1.02% and 81.3% of patients were asymptomatic. Shortness of breath (74.6%) and dysphagia (18.6%) were the most common symptom. Interobserver agreement amongst the reading radiologists was acceptable with most variables having an interclass correlation coefficient or kappa > 0.80. A patient's height > 158 cm (OR: 2.50, P=0.03), cross-sectional area > 60 mm^2 of ARSA at the level of the esophagus (OR: 2.39, P=0.046), distance increase per 1 mm between ARSA and trachea (OR: 0.85, P=0.02), and angle > 108 degrees formed with the aortic arch (OR: 1.99, P=0.03) were associated with symptoms. **(Table) (Figure)**
Conclusion: In our single center study, we found being taller, having a larger cross-sectional area of ARSA at the level of the esophagus, a greater angle at the junction with the aortic arch, and a shorter distance between the ARSA and trachea, were associated with the presence of symptoms, while having a dilated esophagus, and/or atherosclerosis was not. Importantly, the absence of dysphagia should not rule out an ARSA. These findings may help to predict which patients will develop symptoms and potentially become candidates for surgical consideration.



[0480] **Figure 1.** Panels A, B, and C show multiplanar reformats to obtain measurements of ARSA at the level of crossing the esophagus. Panel D shows measurement of the distance between ARSA and posterior wall of trachea

Table 1.

	Median (IQR) or fraction (%) of patients		Association with being symptomatic			
			Unadjusted analysis		Multivariable analysis	
	Symptomatic N = 59	Asymptomatic N = 257	OR (95% CI)	p-value	OR (95% CI)	p-value
Age at diagnosis, years (10 year increase)	60.0 (43.9-68.5)	57.3 (41.5-67.3)	1.08 (0.91-1.29)	0.41	1.00 (0.83-1.21)	0.83
Male	25/59 (42.4%)	85/257 (33.1%)	1.49 (0.83-2.65)	0.18	1.12 (0.60-2.11)	0.73
Weight, kg (10 kg increase)	78.9 (63.3-90.5)	76.5 (62.5-90.7)	0.98 (0.86-1.11)	0.77	0.98 (0.86-1.12)	0.78
Height, cm (10 cm increase)	167 (160.0-175.0)	167 (160.0-173.0)	1.14 (0.89-1.46)	0.29	1.13 (0.88-1.48)	0.37
Height > 158 cm	54/59 (91.5%)	205/254 (80.7%)	2.58 (1.07-7.70)	0.03	2.50 (1.01-7.54)	0.034
Body mass index, kg/m^2 (5 kg/m^2 increase)	25.8 (22.4-30.3)	26.7 (22.9-32.4)	0.93 (0.76-1.05)	0.46	0.98 (0.86-1.11)	0.74
Obesity	16/58 (27.6%)	83/254 (32.7%)	0.78 (0.42-1.48)	0.45	1.09 (0.56-2.15)	0.80
White race	53/59 (89.8%)	206/251 (82.1%)	2.19 (0.96-5.93)	0.09	1.95 (0.83-5.38)	0.15
Ethnicity, Hispanic/Latino	3/59 (5.1%)	21/257 (8.2%)	0.60 (0.17-2.09)	0.42	0.93 (0.25-3.50)	0.92
Family History, negative	57/59 (96.6%)	230/257 (89.5%)	3.35 (0.77-14.48)	0.10	2.29 (0.63-14.78)	0.28
Type of CT scan performed o Chest CT Angiogram o Contrast Chest CT	31/59 (52.5%) 28/59 (47.5%)	122/257 (47.8%) 133/257 (52.2%)	1.00 (reference) 0.83 (0.47-1.46)	0.52	1.00 (reference) 0.61 (0.33-1.12)	0.11
Diameter at origin max, mm (10 mm increase)	17 (14.0-19.0)	16 (13.0-18.0)	1.21 (0.63-2.34)	0.57	0.93 (0.42-2.07)	0.86
Diameter at origin min, mm (10 mm increase)	14 (11.5-17.0)	13 (11.0-16.0)	1.32 (0.65-2.67)	0.45	0.98 (0.43-2.27)	0.97
Cross-sectional area at origin, mm^2 (50 mm^2 increase)	166 (122.5-240.5)	150 (109.0-215.0)	1.03 (0.90-1.18)	0.67	0.98 (0.84-1.15)	0.81
Diameter at crossing of esophagus max, mm (10 mm increase)	12 (10.0-13.5)	11 (10.0-13.0)	1.03 (0.50-2.10)	0.94	0.76 (0.25-2.34)	0.63
Diameter crossing of esophagus min, mm (10 mm increase)	10 (9.0-12.0)	10 (8.0-12.0)	1.23 (0.56-2.69)	0.60	0.76 (0.25-2.34)	0.45
Cross-sectional area at crossing of esophagus, mm^2 (50 mm^{2}increase)	88 (68.0-120.0)	85 (59.0-120.0)	1.06 (0.83-1.36)	0.63	1.03 (0.76-1.35)	0.85
Area > 60 mm	52/59 (88.1%)	189/257 (73.5%)	2.67 (1.23-6.70)	0.02	2.39 (1.08-6.06)	0.046
Distance between ARSA and trachea, mm (1 mm increase)	5 (2.5-6.0)	5 (3.0-6.0)	0.91 (0.81-1.02)	0.11	0.85 (0.75-0.97)	0.02
Distance 7 mm	53/59 (89.8%)	213/257 (82.9%)	1.83 (0.79-4.97)	0.19	2.24 (0.88-5.73)	0.09
Angle of Proximate ARSA with the Arch, degrees (10 degree increase)	110 (90.0-121.0)	101 (73.0-118.0)	1.09 (0.99-1.21)	0.08	1.08 (0.98-1.20)	0.14
Angle > 108 degrees	32/59 (54.2%)	96/257 (37.4%)	1.99 (1.12-3.54)	0.02	1.90 (1.06-3.42)	0.032
Presence of Kommerell aneurysm	2/59 (3.4%)	4/257 (1.6%)	2.22 (0.40-12.41)	0.36	2.26 (0.39-13.07)	0.36
Presence of atherosclerotic plaque within ARSA	23/59 (39.0%)	77/257 (30.0%)	1.49 (0.83-2.69)	0.18	1.31 (0.69-2.47)	0.41
Severity of atherosclerotic plaque o Mild o Moderate o Severe	14/23 (60.9%) 6/23 (26.1%) 3/23 (13.0%)	49/77 (63.6%) 23/77 (29.9%) 5/77 (6.5%)	1.00 (reference) 0.91 (0.31-2.68) 2.10 (0.45-9.89)	0.87 0.35	1.00 (reference) 0.73 (0.23-2.32) 1.82 (0.35-9.38)	0.59 0.47
Presence of thrombus within ARSA	0/59 (0.0%)	3/257 (1.2%)	NA	1.00	NA	NA
Presence of proximal esophagus dilation	0/59 (0.0%)	23/257 (8.9%)	NA	0.01	NA	NA

IQR, interquartile range; OR, odds ratio; 95% confidence interval, CT, computer tomography; ARSA, aberrant right subclavian artery ORs, 95% CIs, and p-values result from logistic regression models. ORs correspond to the increase given in parenthesis (continuous variables) or presence of the given characteristic (categorical variables). Logistic regression was not possible for presence of thrombus within ARSA and presence of proximal esophagus dilation due to zero cell counts; p-values result from Fisher's exact test. Family history included aortic aneurysm, congenital heart disease, or aberrant vessels Continuous variables were examined on the continuous scale but were also dichotomized based on the value with the highest Youden Index on the Receiver Operating Characteristic Curve in unadjusted logistic regression. Multivariable logistic regression models were adjusted for all variables that were associated with being symptomatic with a p-value ≤ 0.10 in unadjusted logistic regression analysis (where such analysis was possible). These variables included height > 158cm, cross-sectional area at crossing with esophagus > 60mm2, angle of proximate ARSA with aortic arch >108 degrees, negative family history, and race.

S481

Complications and Treatment Outcomes of Lymphocytic Esophagitis: Results From a Large Tertiary Care Center Patient Cohort

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Introduction: Lymphocytic esophagitis (LE) is a chronic inflammatory condition characterized by dysphagia and stricturing due to lymphocytic infiltration of the esophagus. LE is rare, has a varied clinical presentation and can be difficult to diagnose, leading to uncertainty regarding potential complications and therapeutic outcomes. We sought to characterize the long term outcomes of patients with lymphocytic esophagitis.

Methods: Patients diagnosed with LE between July 1, 2011 and Dec 30, 2021 at a single tertiary care center were identified. LE was defined by ≥ 10 lymphocytes per high powered field. Basic demographics, comorbidities, endoscopic findings, and therapeutic management were abstracted. Treatment responsive LE was defined by patient reported symptom resolution at last follow-up.

Results: 162 LE patients were identified a mean age at diagnosis of 57.5 (SD: 19.4) years and a slight female predominance (56.8%) (Figure). The most common presenting symptom was dysphagia (74.7%) followed by heartburn or reflux (46.9%). Iron deficiency anemia was found in 17.3% of patients, with coexistent Crohn's disease affecting 14.2% of patients. Strictures affected 22.8% of patients and were predominantly found in the proximal (37.8%) and mid (59.4%) esophagus. Female gender, odynophagia, weight loss of at >10 kg, and white exudates on endoscopy were associated with esophageal stricture, with these patients also more likely to require endoscopic dilation or topical steroids. (Table) Of 116 patients with follow up, 40 had more than 2 follow-up visits with last 27.5 (23.8) months from presentation. 151 (93.2%) patients reported symptom resolution at last follow-up. 33 (21.9%) improved without specific therapy. Notably, topical steroids were associated with persistent symptoms while observation alone with clinical resolution, suggesting an aggressive LE phenotype. Female gender and extra-esophageal sites of lymphocytic involvement, particularly in the colon, along with PPI treatment were also associated with persistent symptoms.

Conclusion: LE has a benign clinical course with a significant number of patients requiring no specific therapy. However, a more aggressive phenotype exists with esophageal strictures relatively common particularly in female patients with exudates on endoscopy. Consequently endoscopic management and medical management should be tailored dependent on presentation.

Demographic profile

Race	
White	141 (87.0%)
Black	12 (7.4%)
Other	9 (5.5%)
Gender	
Female	92 (56.8%)
Average Age at Diagnosis (SD)	57.5 (19.4)
Average BMI at diagnosis (SD)	26.8 (6.3)
Strictures	37 (22.8%)

[0481] **Figure 1.** Demographic profile

Table 1. Clinical association with strictures

	Stricture present (N=37)	No stricture(N=125)	P-value
Demographics			
Race			
White	33 (89.2%)	108 (86.4%)	0.48
Gender			
Female	27 (73%)	65 (52%)	**0.02**
Never smoker	14 (37.8%)	56 (44.8%)	0.72
Symptoms			
Dysphagia	33 (89.2%)	88 (70.4%)	**0.02**
Odynophagia	12 (32.4%)	19 (15.2%)	**0.02**
Loss of appetite	9 (24.3%)	6 (4.8%)	< **0.01**
Comorbidities			
History of GERD	22(59.5%)	72(57.6%)	0.8
Eosinophilic esophagitis	4(10.8%)	8(6.4%)	0.37
Asthma	5 (13.5%)	2 (9.7%)	0.50
Eczema	2 (5.4%)	5 (4.0 %)	0.71
Crohn's disease	4 (10.8%)	9 (15.2%)	0.50
Celiac disease	1 (2.7%)	1 (0.8%)	0.36
Endoscopic findings			
Rings	24(64.9%)	32(25.6%)	< **0.01**
Linear furrows	36(97.3%)	19(15.2%)	< **0.01**
White exudates/plaques	5 (13.5%)	3 (2.4%)	< **0.01**
Location of stricture		0	< **0.01**
Proximal	12	0	.08
Distal	3	0	< **0.01**
Middle	22		
Biopsy findings			
Presence of eosinophils	12(32.4%)	21(16.8%)	**0.03**
Other sites of increased lymphocytes		7(56%)	0.14
Colon	0 (0.0%	121 (95.2%)	0.44
Duodenum/small bowel	34 (919%)	119 (95.2%)	0.17
Ileum	37 (100%)	119 (95.2%)	0.17
Gastric	37 (100%)		
Treatment			
Observation	1(2.7%)	32(25.8%)	< **0.01**
Oral Steroids	15(40.5%)	13(10.4%)	< **0.01**
Topical/Intralesional steroids	14(37.8%)	7(5.6%)	< **0.01**
PPI	26(70.3%)	86(68.8%)	0.86
Esophageal Dilation	34(91.9%)	11(8.9%)	< **0.01**
Biological agents post Diagnosis		9	**0.01**
Infliximab	1	6	**0.01**
Adalimumab	0	2	1.00
Certolizumab	2	2	0.15
Vedolizumab	0	1	0.32
Ustekinumab	0		

S482

Evaluating Multiple Dosing Regimens for Proton Pump Inhibitors (PPI) for the Treatment of Gastroesophageal Reflux Disease (GERD): A Systematic Review and Meta-Analysis

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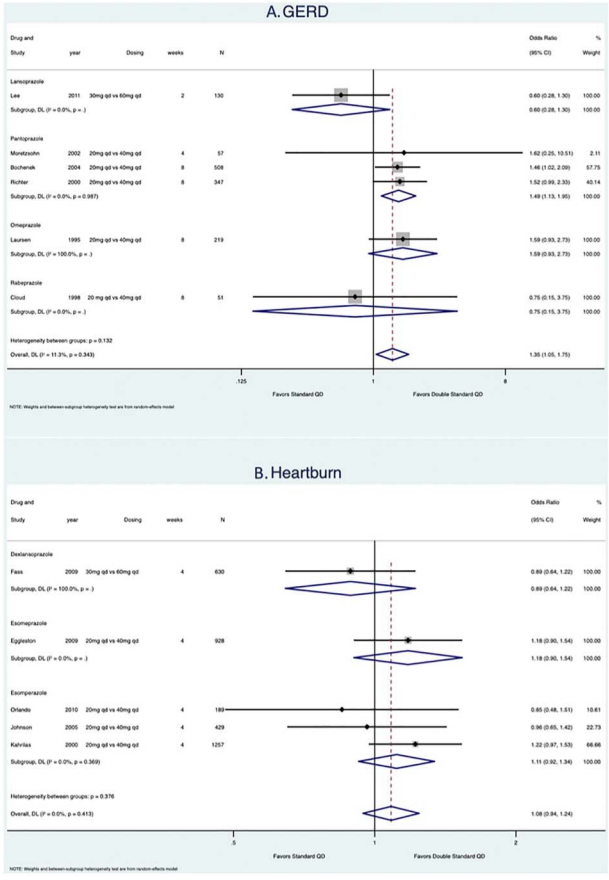
Introduction: Although once-daily dosing of PPI therapy for GERD is standard of practice, clinicians often use twice daily dosing. It remains unclear if this common practice meaningfully improves GERD symptoms of heartburn and/or regurgitation. We performed a systematic review and meta-analysis of randomized controlled trials (RCTs) assessing for resolution of GERD, heartburn, and esophageal healing with regards to various PPI dosages and frequencies.
Methods: A search of EMBASE and PubMed in October 2021 yielded 1381 unique records. Abstract/title screening and full-text review were completed by two independent reviewers, where 51 studies were included in the systematic review and 37 RCTs were included in the quantitative analysis; all included studies compared different doses within PPI. Data abstraction was performed in duplicate using Systematic Review Data Repository+, with discrepancies resolved by a third reviewer. The outcomes were resolution of GERD, heartburn, and esophageal healing within 12 weeks. Risk of bias was independently assessed using the Cochrane Risk of Bias tool (v2). Random-effects meta-analyses were conducted in Stata. Studies were excluded from quantitative review if they did not report outcomes of interest, only assessed outcomes after 12 weeks, or compared out-of-practice dosages (quarter and quadruple standard dose).
Results: A total of 51 RCTs conducted across 27 countries (n=20,226 patients, 55% male, mean age 50 years) were included in the systematic review. Among 37 RCTs included in the quantitative analysis, most compared double standard dose daily vs. standard dose daily or standard dose daily vs. half standard dose daily; few studies compared daily vs. twice daily dosing**. Table** shows odds ratios (OR) and 95% confidence intervals (CI) for outcomes among the various dosing comparisons. For example, when compared to standard dose daily, double standard dose daily led to improved outcomes for GERD (OR 1.35, 95% CI 1.01-1.75) and esophageal healing (OR 1.62, 95% CI 1.27-2.07), but not for heartburn (OR 1.08, 95% CI 0.94-1.24) (**Figure**).
Conclusion: Our meta-analysis revealed, in general, that increasing PPI daily dosages was associated with improved outcomes. However, few studies compared daily vs. twice daily PPI. As twice daily PPI usage is common in clinical practice, further studies are needed to determine whether twice daily dosing actually improves clinical outcomes.



[0482] **Figure 1.** Forest plot comparison for Standard dose, QD vs. Double Standard dose, QD in resolution of GERD symptoms (1A) and Heartburn (1B).

Table 1 Dosing Comparisons across Randomized Controlled Trials (≤12 weeks)

Dosing Comparison	Total Number of RCTs	Total Number of Patients	Outcome	OR (95% CI)
Standard dose BID vs. Standard dose QD (ref)	1 1	202 202	Esophageal healing Heartburn	2.34 (1.27, 4.31) * 3.03 (1.62, 5.68) *
Double standard dose QD vs. Standard dose QD (ref)	7 6 5	2408 1312 3433	Esophageal healing GERD Heartburn	1.62 (1.27, 2.07) * 1.35 (1.05, 1.75) * 1.08 (0.94, 1.24)
Double standard dose, BID vs. Standard dose QD (ref)	1	197	Heartburn	0.77 (0.44, 1.35)
Standard dose QD vs. Half standard dose QD (ref)	9 8 14	1762 1718 3327	Esophageal healing GERD Heartburn	1.79 (1.44, 2.22) * 1.42 (1.15, 1.76) * 1.41 (1.17, 1.69) *
Standard dose QD vs. Half standard dose BID (ref)	2 1	411 205	Esophageal healing Heartburn	1.94 (1.15, 3.26) * 2.14 (1.19, 3.85) *
Double standard dose BID vs. Double standard dose QD (ref)	1 1	190 200	Heartburn GERD	0.90 (0.51, 1.60) 2.63 (1.30, 5.35) *
Standard dose BID vs. Half standard dose BID (ref)	1 1	202 203	Esophageal Healing Heartburn	0.92 (0.47, 1.79) 1.42 (0.74, 2.74)
Half Standard dose, BID vs. Half standard dose QD (ref)	1	324	Esophageal Healing	7.43 (3.81, 14.49) *

*p< 0.05.
QD=daily, BID=twice daily

S483

Development of the Laryngeal Hypervigilance and Anxiety Scale (LHAS) Instrument

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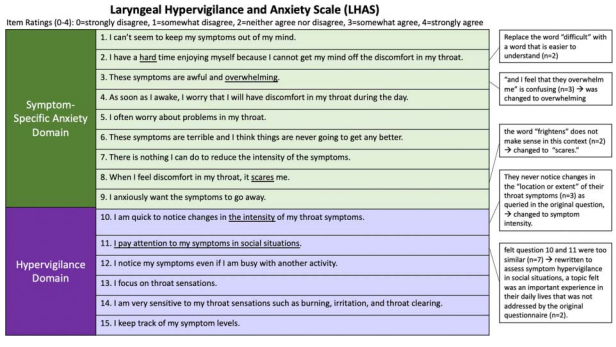
Introduction: Patients experiencing laryngeal symptoms such as throat clearing, sore throat, cough, and dysphonia may experience anxiety and hypervigilance surrounding their condition. These cognitive-affective processes can negatively impact patients' daily lives, social interactions and mental health, and can drive symptom reporting. The Esophageal Hypervigilance and Anxiety Scale (EHAS) is a validated instrument used to evaluate anxiety and hypervigilance surrounding esophageal symptoms. However, there is currently no questionnaire designed to evaluate laryngeal hypervigilance and anxiety, which may differ due to symptoms being concentrated in the throat. We aimed to develop the Laryngeal Hypervigilance and Anxiety Scale (LHAS) to evaluate symptom-specific anxiety and hypervigilance in patients who experience laryngeal symptoms.
Methods: This mixed-methods prospective study was performed from November 2021 to March 2022. A multidisciplinary team (clinical psychologist, esophagologist, laryngologist, and speech language pathologist) drew from the EHAS to propose items for the LHAS. The preliminary LHAS was evaluated through 1:1 cognitive interview with 8 patients with LPR using the Cognitive Methods of Survey Methodology (CASM) to assess: 1) Question comprehension, 2) Information retrieval, 3) Judgment and estimation, 4) Documenting responses. Data collected during the interviews were reviewed with the multidisciplinary team.
Results: Eight patients completed interviews: age range 25 to 74 years, 4 (50%) male, and mean symptom length of 46.5 months (SD 49.1). During participants response review with the multidisciplinary team, 5 EHAS questions were ultimately modified resulting in development of the final 15-item LHAS (Figure); two in the domain of laryngeal symptom hypervigilance and three in the domain of laryngeal symptom specific anxiety. Based on patient feedback, questions 2, 3, and 8 were reworded. Question 10 was changed to assess symptom intensity instead of the location or extent of throat symptoms. Questions 10 and 11 were felt to be too similar, so question 11 was revised to instead assess symptom hypervigilance in social situations.
Conclusion: The LHAS is a 15-item scale that can be used to evaluate symptom-specific anxiety and hypervigilance in individuals experiencing laryngeal symptoms and potentially guide treatment. Future studies to validate psychometric properties of the LHAS are needed.



[0483] **Figure 1.** 15-item Laryngeal Hypervigilance and Anxiety Scale. Green cells denote items specific to symptom-specific anxiety and purple cells denote items specific to hypervigilance. Modifications from the original questionnaire are underlined, and reason for modification are described in the boxes.

S484

Characterizing Lower Esophageal Sphincter Dysfunction, Integrated Relaxation Pressure vs Distensibility Index: Who Gives a Flip?

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Introduction: Characterizing lower esophageal sphincter dysfunction is of paramount importance when classifying disorders of esophageal motility. Integrated relaxation pressure (IRP) during high resolution impedance manometry (HRIM) has traditionally been used but has been found to be imperfect. Functional lumen impedance planimetry (FLIP) has been developed to be complementary with HRIM for discerning esophageal motility disorders. The aim of this study is to evaluate the relationship between distensibility index (DI) and IRP pertaining to LES relaxation made with FLIP compared with HRIM.
Methods: A retrospective review of 227 patients was performed. Patients were classified as having normal IRP (less than 15 mmHg) or abnormal IRP (greater than or equal to 15 mmHg) as measured by HRIM. The average distensibility index as measured by FLIP for patients in both groups was compared. The patient groups were then subdivided into four groups on the basis of normal or abnormal DI using each of

the common standards for abnormality (less than or equal to 2.8 mm2/mmHg and less than or equal to 2.0 mm2/mmHg). Fisher's exact analysis was completed to determine whether abnormal IRP and abnormal DI are related.

Results: In patients with a normal IRP (< 15) as measured by HRIM, the mean DI was 4.02 with a standard deviation of 2.89. In patients with abnormal IRP (≥ 15), the mean DI was 3.03 with a standard deviation of 2.58. The difference in the mean DIs was statistically significant (p-value = 0.0234, t-test) . Table illustrates the number of patients in each IRP and DI subgroup using both cutoff standards. There was no statistically significant difference in the observed patient frequencies of any classification than would be expected by chance.

Conclusion: We found that a normal IRP (< 15mmHg) is associated with higher DIs and that an abnormal IRP (≥15 mmHg) was associated with a DI ≤ 3.1. However, abnormal DI by the standards of either cutoff was not related to having abnormal IRP. Our data supports that both a high IRP and reduced DI suggest impaired LES relaxation, but a DI of less than 2.0 and 2.8 does not predict an IRP of less than 15 mmHg, suggesting some variability between the two metrics. While the chi-squared analysis approached but did not achieve statistical significance in this study, repetition with larger sample sizes in the future may yield a clearer relationship between abnormal IRP and abnormal DI.

Table 1. Fisher's Exact Test of Number of Patients Classified By Distensbility Index (DI) and Integrated Relaxation Pressure Normality and Abnormality

	DI < 2.8 mm2/mmHg	DI ≥ 2.8 mm2/mmHg	DI < 2.0 mm2/mmHg	DI ≥ 2.0 mm2/mmHg
IRP< 15 mmHg	16	32	11	37
IRP ≥15 mmHg	81	83	63	101
	p = 0.07		p = 0.06	

S485

Prevalence of Eosinophilic Esophagitis in Hispanic Children and Young Adults in South Florida

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Introduction: Eosinophilic Esophagitis (EoE) is a chronic allergic/immune Th-2 mediated disease of eosinophil dysfunction/infiltration of the esophageal mucosa which is increasing in developed countries. With advances in treatments for EoE, it is paramount to study characteristics of EoE in varying populations. Studies on the incidence/prevalence of EoE in Spain, Latin America, and US populations have shown conflicting results in minorities with EoE, and there are no studies of the Hispanic population specific to South Florida. Our study aims to evaluate the epidemiology of EoE presenting to specialty clinics in metropolitan Miami area.

Methods: We conducted a 5-year chart review from Pediatric GI and Allergy/Immunology clinics in Miami, FL for biopsy-proven EoE patients. All patients had esophageal biopsies with > 15 eos/hpf. Patients were referred for GI endoscopy and/or Allergy evaluation for EoE. Patients were identified by ICD-10 diagnosis code (K20.0) and categorized by sex, age at diagnosis, race, ethnicity, residential zip codes, presenting symptoms, months to diagnosis, esophageal mucosal appearance, peak eosinophil biopsy count biopsy, PPI responsiveness, atopic history/comorbidities, and food/environment allergy testing.

Results: Our cross-sectional study revealed 227 EoE patients, 168 males (74%), mean 12 + 5yrs (range 3-27), 203 White (89%), 9 Black (4%), 7 Asian (3%), 9 Other (4%), and overwhelming Hispanic 195 (86%) population, consisting of 181 White Hispanic (93%) compared to 14 non-White Hispanics (7%). The prevalence of EoE in Hispanics was 54.4/100,000 in Miami-Dade County, from a pediatric population of 458,224. Even with 55% Commercial vs 45% Medicaid, 3 out of 4 highest EoE/zip code accounted for the top 3 median incomes/zip code. Mean peak eos biopsy count was 58/hpf, serum eos was 433 cells/uL, and IgE 243 kU/L. The most common presenting symptoms were abdominal pain, vomiting, and dysphagia. A majority were PPI nonresponders with atopic comorbidities.

Conclusion: In South Florida, with its White-Hispanic majority, the elevated EoE prevalence from our study is unique to the US literature. Additionally, the highest EoE prevalence was found in zip codes with the highest median incomes. Our clinics found EoE to be increasing in esophageal biopsies of atopic males presenting with abdominal pain and dysphagia. With new EoE therapies treating the underlying systemic disease, epidemiologic data of diverse U.S. populations can help guide treatment decisions and lead to improved care.

S486

The Evolution of TIF in 3 Eras

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Introduction: Lifestyle modifications, pharmacotherapy, and laparoscopic surgeries have been the mainstay treatments for gastroesophageal reflux disease (GERD) until the late 2000s when transoral incisionless fundoplication (TIF) was introduced into the field of surgery. Throughout the years, TIF procedures have evolved and are classified into three Eras for this study; Era 1 (pre TIF 2.0), Era 2 (TIF 2.0), and Era 3 (TIF 2.0 with hiatal repair for Hill 3 or greater, axial displacement > 2.0 cm). Data showing how the evolution of TIF and its guidelines has led to improved GERD outcomes has not yet been analyzed. The aim of this study is to evaluate and compare the outcomes of TIF in three ERAs.

Methods: A systematic review was conducted using EMBASE, PubMed, and Cochrane Library databases (from Feb. 2008 to Sept. 2021) to identify studies investigating the outcomes of TIF and TIF with concomitant hiatal hernia repair. The outcomes analyzed include gastroesophageal reflux symptom scale (GERSS), GERD health related quality of life questionnaire (GERD-HRQL), acid exposure time (AET), DeMeester, reflux symptom index (RSI), and percentage of PPI cessation. Results are expressed as differences in means with standard deviation (SD) and odds ratio (OR). Statistical analysis was done using Microsoft Excel (Microsoft, Redmond, WA) to compare the mean averages of the three groups.

Results: Fifty-nine studies were quantitatively assessed and included in this meta-analysis. A total of 2,905 patients were included; 782 patients who underwent TIF 2.0 with concomitant hiatal hernia repair, 1,695 patients who underwent TIF 2.0, and 428 patients who underwent TIF 1.0. Era 2 had a slightly greater GERSS improvement than Era 3 (4.22 vs 5.44). HRQL improved from Era 1 to Era 2 to Era 3 (18.92 vs 6.86 vs 5.12). Era 3 showed greater RSI improvement than Era 2 (4.97 vs 6.41).DeMeester improved significantly from Era 1 to Era 2 to Era 3 (24.51 vs 22.28 vs 10.02). AET improvement was about the same from Era 1 to Era 2 (6.84 vs 6.81). The percentage of PPI cessation improved from Era 1 to Era 2 to Era 3 (70% vs 75% vs 88%).

Conclusion: HRQL, RSI, and DeMeester scores as well as the percentage of PPI cessation among patients have improved with the evolution of TIF in the three Eras.

S487

Endoscopic Findings Among Patients With Diagnoses of Ineffective Esophageal Motility (IEM) Per the Chicago Classification Versions 3.0 and 4.0

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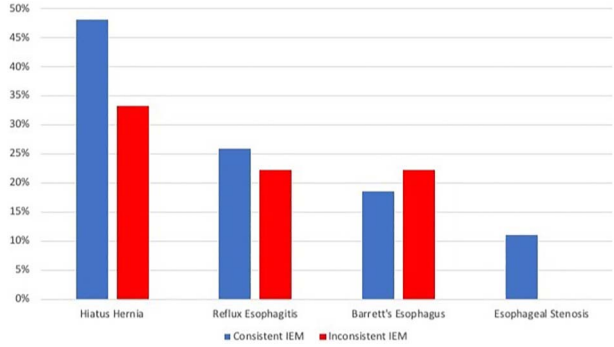
Introduction: Our understanding of esophageal hypomotility, particularly ineffective esophageal motility (IEM) on high-resolution manometry (HRM), continues to evolve, as evidenced by the Stanford IEM Symposium and the changes in HRM diagnostic criteria for IEM presented in the fourth iteration of the Chicago Classification (CC v4.0). Here, we evaluated endoscopic findings among a cohort of patients with IEM based on CC v3.0 and CC v4.0 diagnostic criteria.

Methods: 450 consecutive patients undergoing HRM were reviewed, and those meeting diagnoses of IEM per CC v3.0 thresholds constituted the study cohort. From HRM studies, the numbers of failed, weak, and fragmented swallows were collected, as well as mean distal contractile integral (DCI). Data from the upper endoscopy performed nearest to the HRM study were collected, specifically hiatus hernia, reflux esophagitis, Barrett's esophagus, and distal esophageal stenosis. HRM study data were re-interpreted, and those patients meeting CC v4.0 criteria for IEM ("consistent IEM") were compared to those not meeting CC v4.0 thresholds ("inconsistent IEM"). (Figure)

Results: 36/450 (8%) patients had diagnoses of IEM per CC v3.0 (58.4±2.8 years, 17% F, 58% Caucasian, BMI 29.6±0.9). 86% were on PPI at evaluation, and 56% had reported some dysphagia on symptom questionnaires. Mean DCI was 359.5±30.1, with 3.0±0.4 failed, 5.0±0.4 weak, and 0.6±0.2 fragmented swallows. Endoscopic findings among the total cohort included hiatus hernia (44%), reflux esophagitis (25%), Barrett's esophagus (19%), and distal stenosis (8%). 75% of the cohort retained an IEM diagnosis when re-evaluated with CC v4.0 thresholds. When compared to those patients who did not retain an IEM diagnosis, demographic data, clinical characteristics, and endoscopic findings were statistically similar, although no patients with inconsistent IEM had stenosis noted at endoscopy. (Table)

Conclusion: Hiatus hernia and other endoscopic findings of reflux (particularly reflux esophagitis and Barrett's esophagus) were common among patients with manometric diagnoses of IEM, despite high rates of PPI use. The proportions with these endoscopic findings did not appear to differ significantly based on whether an IEM diagnosis was consistent with CC v4.0 diagnostic criteria, though all patients with

esophageal stenosis at endoscopy had consistent IEM. These findings should encourage further investigations into the potential progression of reflux and its complications among patients with varying degrees of esophageal hypomotility.



[0487] **Figure 1.** Endoscopic Findings among "Consistent IEM" (blue) and "Inconsistent IEM" (red) Cohorts "Consistent IEM" – meeting diagnostic criteria for ineffective esophageal motility on Chicago Classification versions 3.0 and 4.0; "Inconsistent IEM" – meeting diagnostic criteria for ineffective esophageal motility on Chicago Classification version 3.0 but not version 4.0; p-values >0.05 for all comparisons

Table 1. Comparisons Between "Consistent IEM" and "Inconsistent IEM" Cohorts

	"Consistent IEM" *(n=27)*	"Inconsistent IEM" *(n=9)*	*p* Values
Demographics			
Age (years)	59.4±3.4	55.3±4.1	0.52
Gender (female)	11.1%	33.3%	0.12
Race (Caucasian)	63.0%	44.4%	0.33
Clinical Characteristics			
BMI	29.4±1.1	30.1±1.6	0.74
Dysphagia	59.3%	44.4%	0.44
PPI use	81.5%	100%	0.16
HRM Findings			
Mean DCI	293.8±23.4	556.5±63.4	< **0.001***
Failed Swallows	3.3±0.5	1.9±0.5	0.14
Weak Swallows	5.0±0.4	5.0±0.6	1.00
Fragmented Swallows	0.5±0.2	0.7±0.5	0.66
Endoscopic Findings			
Hiatus hernia	48.1%	33.3%	0.44
Reflux esophagitis	25.9%	22.2%	0.82
Barrett's Esophagus	18.5%	22.2%	0.81
Esophageal stenosis	11.1%	0.0%	0.30

IEM, ineffective esophageal motility "Consistent IEM" – meeting diagnostic criteria for IEM on Chicago Classification versions 3.0 and 4.0 "Inconsistent IEM" – meeting diagnostic criteria for IEM on Chicago Classification version 3.0 but not version 4.0 BMI, body mass index; PPI, proton pump inhibitor; HRM, high-resolution manometry; DCI, distal contractile integral.
*indicates p<0.05.

S488

The Diagnostic Capability of FLIP Compared to Barium Esophagram for Esophageal Pathologies

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Introduction: In disorders of LES dysfunction, HRM and TBE have long been the standard of care for diagnosis by LES pressure and fluid retention/capsule arrest. But the Functional Lumen Impedance Planimetry (FLIP), able to measure distensibility (DI) and detect peristalsis, has shown to be a useful adjunct test for such pathologies in practice and many industry funded studies. Specifically these studies found high agreement of normality between FLIP and TBE, as well as established the normal range for DI values. Our novel independent study aimed to confirm the diagnostic role of FLIP by evaluating the agreement between FLIP and TBE diagnoses and evaluate the pathologic range of DI.
Methods: Retrospective review of pre-intervention dysphagia patients with documented outcomes from the above procedures was performed. Retention, arrest, and diagnosis data was collected from TBE reports. Maximum volume DI and diagnosis data was collected from FLIP reports.
Results: Full FLIP testing showed 100% diagnostic sensitivity for LES pathologies, but only 39.58% specificity, an agreement of 54.21% with TBE diagnoses (k=0.24). Using DI< 2.8 as a determinant of abnormality, FLIP showed a sensitivity and specificity of 0.58 and 0.5 with no individual pathology showing significantly improved detection. Using DI< 2.0 as the cutoff for normality showed a sensitivity and specificity of 0.48 and 0.69 and an agreement of only 64.4% (k=0.158) (Table).
Conclusion: We found that FLIP testing during dysphagia workup showed excellent, 100% detection of LES pathologies EGJOO, achalasia and absent contractile response, when used as an adjunct test to TBE and HRM. Though when investigating the individual component metrics that make up the clinical diagnosis, neither cutoff value of 2.8 nor 2.0 for DI was acceptably sensitive or specific to make accurate diagnoses compared to barium study. These findings differ from previous studies which established a DI of 2.8 as a diagnostic value for esophageal pathologies and showed agreement of 0.78 between TBE and FLIP. Our findings support that FLIP is well suited for a role requiring high sensitivity such as intraoperative repair screening or adjunct testing, as opposed to a stand-alone diagnostic test as previous industry funded studies suggested. Further investigation will aim to determine which metrics from FLIP testing used in standard diagnosis are the most sensitive and specific. From this, it could be determined what pathologic physiology is reliably detectable by FLIP in clinical practice.

Table 1. **Sensitivities and specificities of FLIP metrics compared to TBE**

FLIP Metric	Sensitivity	Specificity	Agreement	k
Full Assessment	1	0.396	0.54	0.24
DI< 2.8	0.58	0.5	0.54	0.081
DI< 2 .0	0.48	0.69	0.64	0.158

S489

The Efficacy and Safety of PD-1/PD-L1 Inhibitors for Advanced Refractory Esophageal and GE Junction Cancer: A Meta-Analysis

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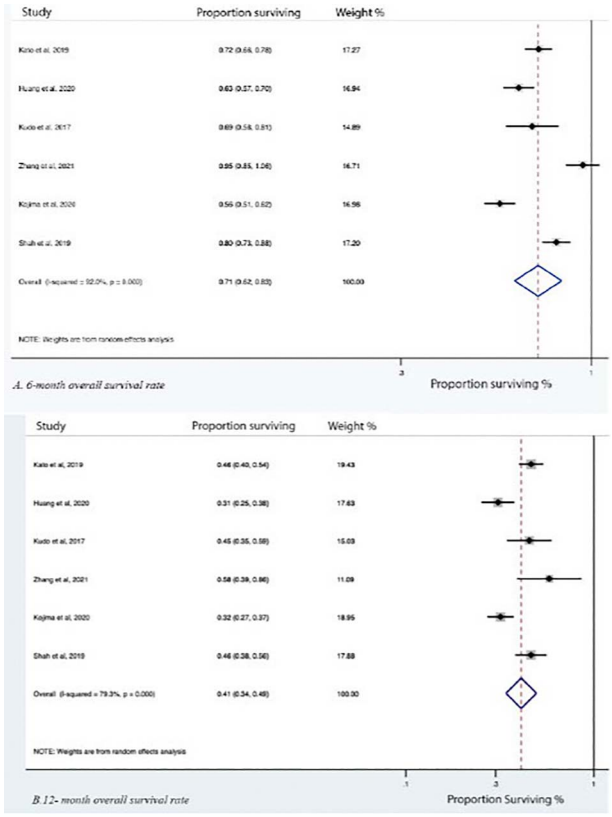
Introduction: Anti-programmed death-1 (PD-1) and programmed death-ligand (PD-L1) immunotherapy have been studied as adjuvant and neoadjuvant treatment for patients with advanced esophageal or gastro-esophageal junction (GEJ) cancer. Our aim was to use the highest quality data available to perform a meta-analysis evaluating their efficacy and safety.
Methods: We reviewed PubMed, MEDLINE, Embase, and Web of Science Core Collection databases from inception to Aug 1st, 2021, to identify studies evaluating the efficacy and safety profile of PD-1 and PD-L1 inhibitor immunotherapy in the management of advanced refractory esophageal or GEJ cancer. Our primary outcome was overall survival. Secondary outcomes were progression-free survival, and objective response including complete response, partial response, stable disease, and progressive disease. Adverse effects were characterized according to Common Terminology Criteria for Adverse Events v 4.0. Pooled rates with 95% confidence intervals (CI) for all outcomes were calculated using a random-effect model.
Results: Literature review identified 12 randomized clinical trial articles and one retrospective chart review study suitable for meta-analysis. Most studies were performed in East Asia. The median age of participants from all studies ranged from 60 to 65 years The majority of patients included in the studies had stage III or stage IV disease. Pooled 6- and 12- month overall survival rates were 71% (95% CI 62%-83%) and 41% (95% CI 34%-49%), respectively (Figure). Pooled 6- and 12- month progression-free survival rates were 30% (18%-52%) and 15% (7%-35%), respectively (Figure). Response rates were as follows: complete response 4% (1%-14%); partial response 30% (17%-52%); stable disease 23% (19%-27%,) and progressive disease 48% (39%-59%). The most common side effect was constipation. It occurred in 17% (7%-41%) and was graded 1-2 (mild) in all cases. Other common adverse effects were diarrhea, anorexia, nausea, and vomiting. The most common non-GI adverse effect was fatigue, with an overall rate of 16% (9%-28%). Fatigue was graded as 1-2 in 94% of cases. The other common non-GI side effects included hypothyroidism and rash.
Conclusion: In summary, use of PD-1/PD-L1 inhibitors provides clinically meaningful rates of survival and response. They demonstrate a well-tolerated safety profile thus supporting their current role as adjuvant or neoadjuvant therapy for advanced esophageal and GEJ cancer.



[0489] **Figure 1.** Overall survival rate at 6- and 12- month in patients taking PD-1/PD-L1 inhibitors

S490

A Single Center Experience in the Management and Follow-Up of Patients With Esophagitis: A Retrospective Study

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Introduction: Gastroesophageal reflux disease (GERD) is a chronic condition in which the reflux of gastric content into the esophagus results in symptoms and complications, such as erosive esophagitis, Barrett's esophagus (BE), and esophageal adenocarcinoma. There are four grades of esophagitis increasing in severity from A to D. In patients with esophagitis on initial endoscopic evaluation, the current American College of Gastroenterology (ACG) guidelines recommend repeat esophagogastroduodenoscopy (EGD) after a minimum 8-week of proton pump inhibitor (PPI) therapy, to ensure healing of esophagitis and to determine the presence of BE. Our objectives were to characterize patients with esophagitis who presented to Saint Louis University Hospital (SLUH), understand practice patterns, and identify variables that predict disease progression and affect clinical outcomes.
Methods: We identified 256 patients who presented to SLUH for EGD for any indication between 2012 and 2018 and were found to have endoscopic diagnosis of esophagitis. Laboratory and pathologic data were reviewed for initial and follow-up endoscopy. All categorical variables were analyzed by chi-square analysis. Analysis of variance (ANOVA) and t-tests were used for continuous data, and analysis was performed using SPSS version 27.0.
Results: Out of the 256 patients who were diagnosed with esophagitis, 61 were classified as Grade A, 59 Grade B, 45 Grade C and 91 Grade D. The mean age was 59 ± 15 and the mean BMI was 27.3 ± 8. PPI prescription percentage, repeat EGD and outcomes are shown in Table. There was no statistically significant association between sex, ethnicity, smoking history, or alcohol use history and development of BE.
Conclusion: Our study showed under-prescription of PPI in patients with esophagitis. Repeat EGD was only recommended for 28%, 32%, 49% and 57% of the patients with Grades A, B, C and D esophagitis, respectively. Stronger efforts should be taken to help adhere to the guidelines in prescribing acid-suppressive medications and recommending repeat EGD for patients with esophagitis. Development of esophageal cancer was the highest in those with Grade D esophagitis. Larger studies are needed to evaluate the risk of BE or dysplasia in patients with Grades A and B esophagitis and to provide additional data on rates of development of BE or esophageal cancer in the respective groups.

Table 1. Results of a single-center study on PPI prescription percentage, repeat EGD and outcomes in patients with endoscopic diagnosis of esophagitis

Grade of esophagitis	PPI treatment recommended	Repeat EGD recommended	Repeat EGD performed	Barrett's esophagus present on follow up	Dysplasia present on follow up	Esophageal cancer present on follow up
A (N=61)	51 (84%)	17 (28%)	6 (35%)	2 (3.3%)	2 (3.3%)	1 (1.6%)
B (N=59)	40 (68%)	19 (32%)	4 (21%)	3 (5.1%)	1 (1.7%)	1 (1.7%)
C (N=45)	38 (84%)	22 (49%)	3 (14%)	1 (2.2%)	1 (2.2%)	1 (2.2%)
D (N=91)	74 (81%)	52 (57%)	19 (37%)	8 (8.8%)	3 (3.3%)	5 (5.5%)

S491

The Epidemiology of Immune Checkpoint-Inhibitor-Induced Esophagitis: A Population-Based Study

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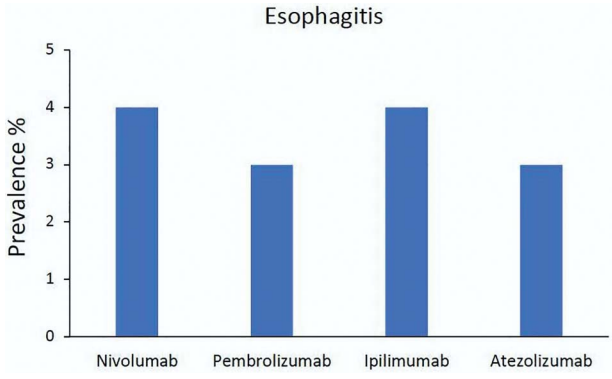
Introduction: Immune checkpoint inhibitor (ICI) induced esophagitis is increasingly recognized as a severe adverse event of ICIs. However, there are limited epidemiological studies with small sample sizes. We aim to utilize a large database to investigate the epidemiology of ICI-induced esophagitis and describe underlying associations.
Methods: A multi-institutional database (Explorys Inc, Cleveland, OH, USA), an aggregate of electronic health record data from 26 US healthcare systems, was surveyed. A cohort of patients on ICIs (nivolumab, pembrolizumab, ipilimumab and atezolizumab) was identified from 2011 to 2022. Subsequently, patients who developed Systematized Nomenclature of Medicine-Clinical Terms diagnosis of esophagitis taking ICIs were selected. The prevalence of ICI-induced esophagitis was calculated, and underlying associations were described.
Results: Of the 70,383,890 patients in the database, we identified 20,200 (0.03%) with a history of ICI use. There were 2430 (12%) patients who developed a new diagnosis of ICI-induced esophagitis at least 1 day of starting ICI therapy. Patients who developed ICI-induced esophagitis were more likely to be Caucasian [OR: 1.32; 95% CI 1.17–1.50] and older than 65 years [OR: 1.14; 95% CI 1.05–1.25]. There was no statistically significant gender-based differences. When compared to patients on ICI therapy who did not develop esophagitis, patients with ICI-induced esophagitis were more likely to have a history of tobacco use [OR: 1.59; 95% CI 1.46–1.74], history of alcohol use [OR: 1.55; 95% CI 1.34–1.81] and obesity [OR: 1.49; 95% CI 1.36–1.64] (Table). Patients who received nivolumab [OR: 8.43; 95% CI 7.83–9.07, p< 0.0001], pembrolizumab [OR: 7.97; 95% CI 7.48–8.48, p< 0.0001], ipilimumab [OR: 4.52; 95% CI 3.27–6.23, p= 0.0007] and atezolizumab [OR: 7.92; 95% CI 6.88–9.11, p< 0.0001] had high odds of developing ICI-induced esophagitis (Figure).
Conclusion: This is the largest study evaluating the epidemiology of ICI-induced esophagitis, confirming an increase in esophagitis risk. Patients with ICI-induced esophagitis were more likely to be Caucasian, older than 65, with a history of tobacco and alcohol use, and obese. The risk of esophagitis should be discussed with patients before initiating these agents, and close follow-up with gastroenterologists is needed.



[0491] **Figure 1.** Prevalence of selected immune checkpoint-inhibitors demonstrating the risk of immune checkpoint-inhibitors induced esophagitis.

Table 1. Baseline characteristics of patients receiving immune checkpoint-inhibitors

Parameter	ICI with Esophagitis n=2,430 (%)	ICI without Esophagitis n=17,770 (%)	OR (95% CI)	p-value
Age				
18-65	840 (34%)	6,650 (37%)	0.88 (0.81-0.97)	0.0063
>65	1,610 (66%)	11,230 (63%)	1.14 (1.05-1.25)	0.0033
Sex				
Female	1,040 (43%)	7,530 (42%)	1.02 (0.93-1.11)	0.6919
Male	1,390 (57%)	10,250 (58%)	0.98 (0.90-1.07)	0.6535
Race				
Caucasian	2,110 (87%)	14,800 (83%)	1.32 (1.17-1.50)	< 0.0001
Non-Caucasian	320 (13%)	2,970 (17%)	0.76 (0.67-0.86)	< 0.0001
Esophagitis Risk Factors				
Alcohol abuse	220 (9%)	1,070 (6%)	1.55 (1.34-1.81)	< 0.0001
Smoking history	940 (39%)	5,040 (28%)	1.59 (1.46 -1.74)	< 0.0001
Obesity	750 (31%)	4,090 (23%)	1.49 (1.36-1.64)	< 0.0001

Univariate analysis used to calculate OR. OR; odds ratio, CI; confidence interval, ICI; immune checkpoint-inhibitors.

S492 WITHDRAWN

S493

Esophageal High Resolution Manometry Classification and Symptoms in an Safety-Net vs Private Academic Hospital

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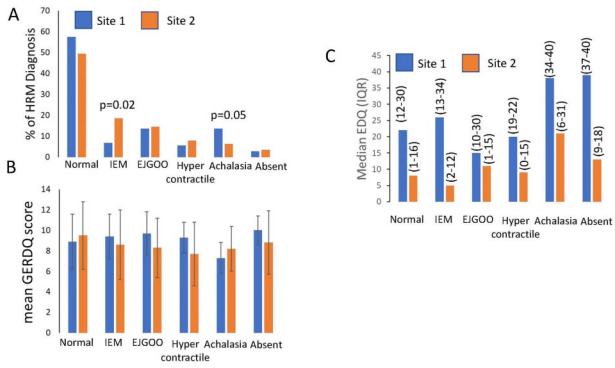
Introduction: The association between esophageal symptoms and high-resolution manometry (HRM) findings have not been evaluated in a safety-net hospital where patients frequently present with advanced disease. We aimed to compare esophageal HRM diagnoses and symptoms between this setting vs a tertiary academic center, using patient-reported outcomes (PROs).
Methods: Adults undergoing standardized esophageal HRM manometry at a safety-net (site 1) and the affiliated academic tertiary care (site 2) hospital were prospectively administered EDQ and GERDQ questionnaires in English or validated Spanish versions according to patient preference. HRM findings were reported per Chicago Classification V4. Patient records were reviewed to quantify symptom duration and esophageal diameter in achalasia patients. Multivariable logistic regression was used for the association of EDQ≥7 with HRM site.
Results: 73 and 178 patients were included at sites 1 and 2, respectively; at site 1, 73% of PROs were administered in Spanish, 27% in English; all site 2 surveys were in English. Ages were similar and a higher % of women had esophageal HRM at both sites. Among HRM diagnoses, there were site differences in the % of IEM (6.8% vs 18.5%, p=0.02) and achalasia (13.7% and 6.2%, p-0.05). Type 2 achalasia was the most frequent sub-type at both sites. For those with achalasia, symptom duration and esophageal diameter were similar at both sites. (Figure) GERDQ scores were similar between sites 1 and 2 (overall and for each HRM diagnosis). Median EDQ scores were higher at site 1 vs 2 (25 vs 8, p< 0.001). A higher % of normal HRMs had EDQ scores ≥ 7 at site 1 vs 2 (85.7% vs 54.6%, p< 0.001). There was no difference in % of EDQ ≥ 7 among diagnoses of IEM, EGJOO, hypercontractile, achalasia, and absent contractility between sites. Multivariable analysis shows that the odds of EDQ ≥ 7 remains higher at site 1 vs 2 after adjusting for age, gender, and diagnosis (OR 4.25, 95% CI 2.00-9.05). (Table)
Conclusion: IEM was more frequently a diagnosis at the private hospital vs achalasia type 2 at the safety net hospital, although symptom duration and esophageal diameter were similar, suggesting similar disease severity. Despite this and an otherwise similar HRM diagnosis profile, dysphagia symptom scores remain more severe in patients at a safety-net hospital vs those at an affiliated private academic, including those normal HRM. This interesting finding without a clear etiology merits further investigation.



[0493] **Figure 1.** (A) HRM diagnoses as the % of all HRM cases at sites 1 and 2; (B) Mean GERDQ scores at sites 1 and 2, standard deviation shown; (C) Median EDQ scores with Interquartile ranges shown at sites 1 and 2.

Table 1. Demographics at site 2 and site 1

Variable	total	site 2	site 1	p-value
age mean (SD)	55.9 (14.2)	55.4 (15.3)	57.1 (10.8)	0.943
female, n (%)	164 (65.3%)	110 (61.8)	54 (74)	0.066
hiatal hernia, n (%)	130 (51.8)	88 (49.4)	42 (57.5)	0.161
normal manometry, n (%)	130 (51.8)	88 (49.4)	42 (57.5)	0.244
IEM, n (%)	38 (15.1)	33 (18.5)	5 (6.8)	0.019
EJGOO, n (%)	36 (14.3)	26 (14.6)	10 (13.7)	0.852
Hypercontractile, n (%)	18 (7.2)	14 (7.9)	4 (5.5)	0.506
achalasia, n (%)	21 (8.4)	11 (6.2)	10 (13.7)	0.051
type 1 achalasia	4 (1.6)	3 (1.7)	1 (1.4)	0.856
type 2 achalasia	17 (6.8)	8 (4.5)	9 (12.3)	0.025
BEDQ >=7, n (%)	158 (64.5)	98 (56.0)	60 (85.7)	< 0.001
BEDQ Score, Median (IQR)	12.0 (3.0-22.0)	8.0 (2.0-16.0)	25.0 (15.0-34.0)	< 0.001
GERDQ Score, Median (SD).001	8.88 (3.00)	8.88 (3.20)	8.85 (2.43)	0.943

Pearson Chi-square: to compare the observed frequencies with the expected frequencies. ANOVA: to test for differences in the means of the normally distributed interval dependent variable. Software: SAS 9.04.01M3.

S494

Diagnostic Delay and Misdiagnosis of Non-Esophageal Eosinophilic Gastrointestinal Diseases

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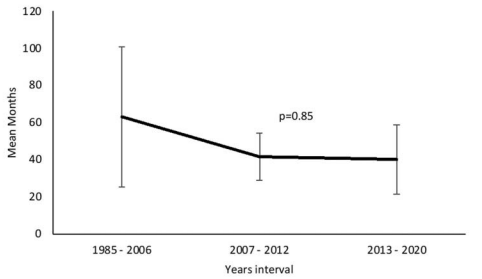
Introduction: Diagnosing non-esophageal eosinophilic gastrointestinal diseases (EGIDs) remains challenging despite increasing awareness, and misdiagnosis is possible. We aimed to determine whether the length of time preceding EGID diagnosis has decreased over time, and to assess the presence of prior non-EGID diagnoses.
Methods: We conducted a retrospective cohort study utilizing the UNC EGID Clinicopathologic Database over a two decade time span. This database contains demographics, clinical characteristics, and procedural data extracted from electronic medical records. EGID subjects were diagnosed with eosinophilic gastritis (EoG) and/or enteritis (EoN) based on clinical presentation and biopsy results. We calculated the length of symptoms prior to diagnosis. ANCOVA models assessed the relationship between symptom length before diagnosis and year of diagnosis adjusted for covariates.
Results: A total of 67 patients were included, with 55% male and 72% white (Table). An atopic condition was diagnosed in 48% of adults and 65% of children. The length of symptoms prior to diagnosis for all patients was 37.1 ± 57.1 months, which was longer in adult patients compared to children (60.2±82.4 vs 22.9±25.6; p=0.01). Prior alternative diagnoses for EGID symptoms were common, with 55% carrying a different pre-EGID diagnosis. The most frequent included non-specific inflammation (10%), GERD (6%), other functional disorder (6%), IBS (4%), dysmotility (4%), infection (4%), and other (13%). Symptom length preceding diagnosis did not significantly associate with year of diagnosis on bivariate (p = 0.58) or multivariate analysis after adjusting for covariates (p = 0.88) (Figure). No association was found for symptomatic period and year of diagnosis when stratified by children (p = 0.26) or adults (p = 0.40). Additionally, multivariate linear regression between length of symptoms and year of diagnosis found no association and regression with year as a continuous variable was also not significant.
Conclusion: Despite increased knowledge regarding EGIDs, a trend towards decreased symptom length prior to diagnosis was not found. Numerically, the time of diagnosis decreased somewhat after the year 2006, though this did not reach statistical significance. Prior to their EGID diagnosis, approximately 1 in 2 patients received an incorrect diagnosis. These data suggest that more efforts should be made to raise awareness of these diseases among medical providers.

Figure: Trend of the mean time to diagnosis (months) within three different time intervals*



*Time intervals represent year EGID was diagnosed, and each time interval represents 6 diagnosis years, which may be non-consecutive

[0494] **Figure 1.** Trend of the mean time to diagnosis (months) within three different time intervals

Table 1. Patient demographics, symptoms, and prior diagnoses among adults and children (n = 67 total)

	All patients (n=67)	Adults (n=67)	Children (n=40)
Age at biopsy (mean years ± SD)	23.4 ± 31.6	49.9 ± 36.6	6.1 ± 5.6
Male (n, %)	37 (55)	10 (37)	27 (68)
White (n, %)	48 (72)	24 (89)	24 (60)
Any atopy (n, %)	39 (58)	13 (48)	26 (65)
Symptoms at diagnosis (n, %)			
Abdominal pain	48 (71)	22 (81)	19 (48)
Dysphagia	24 (36)	15 (56)	9 (23)
Vomiting or regurgitation	53 (79)	18 (67)	35 (88)
Length of symptoms before diagnosis (mean months± SD)	37.1 ± 57.1	60.2 ± 82.5	22.9 ± 25.6
Diagnoses prior to EGID diagnosis (n, %)			
None	23 (34)	6 (22)	34 (60)
Any prior diagnosis	37 (55)	21 (78)	16 (40)
Irritable bowel syndrome	3 (4)	3 (11)	0 (0)
Other functional disease	4 (6)	0 (0)	4 (10)
GERD	4 (6)	1 (4)	3 (8)
Nonspecific inflammation	7 (10)	6 (22)	1 (3)
Crohn's disease	2 (3)	1 (4)	1 (3)
Dysmotility	3 (4)	3 (11)	0 (0)
Protein losing enteropathy	2 (3)	1 (4)	1 (3)
Infection	3 (4)	3 (11)	0 (0)
Other	9 (13)	3 (11)	6 (15)

S495

Epidemiology and Risk of Psychiatric Disorders Among Patients with Gastroesophageal Reflux Disease: A Population-Based National Study

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Introduction: Gastroesophageal reflux disease (GERD) is a chronic disease caused by the reflux of the gastric contents into the esophagus. The chronic symptoms of GERD have been shown to negatively impact the psychological and function status of these patients. Therefore, we examined the prevalence of various psychiatric disorders in patients with GERD and factors associated with them.
Methods: We queried a multicenter database (Explorys Inc, Cleveland, OH) which includes electronic health record data from 26 major integrated US healthcare systems from 1999 to 2022. A cohort of patients with a Systematized Nomenclature of Medicine – Clinical Terms (SNOMED-CT) was identified. We identified patients diagnosed with GERD. We collected demographic data, co-morbidities and psychiatric disorders including: anxiety, depression, bipolar disorder, eating disorder, and autistic disorder. Univariate and multivariate analyses were performed using Statistical Package for Social Sciences version 25.
Results: Of the 70, 301,380 adult individuals (>18 yr old) in the database from 1999 to present, we identified 6,748,3850 patients with GERD (9.7%). Table summarizes the demographic characteristics and co-morbidities of patients in cohort. In univariate analysis, when compared to patients with no history of GERD (controls), GERD patients (cases) were more likely to have anxiety disorder (OR 5.77 [5.76-5.78]), depression (OR 6.22 [6.21-6.23]), bipolar disorder (OR 4.00 [3.98-4.02], eating disorder (OR 4.58 [4.54-4.62]), and autistic disorder (OR 1.98 [1.95-2.02]) (Table). In multivariate analysis adjusted for age, gender and race, we re-enforced that GERD was independently associated with higher risk for anxiety (OR 2.84 [2.84-2.85]), depression (3.60 [3.59-3.61]), bipolar disorder (1.34 [1.33-1.34]), eating disorder (1.37 [1.35-1.38]) and autistic disorder (1.17 [1.15-1.20]). (Figure)
Conclusion: In this large study, we found a higher prevalence of various psychiatric diseases including anxiety, depression, bipolar, eating disorder and autism disorder in GERD patients. Further clinical studies exploring the relationship between GERD and psychiatric disorders are required.

	OR	95% CI	
		Lower	Upper
Anxiety	2.84	2.84	2.85
Depression	3.60	3.59	3.61
Bipolar Disorder	1.34	1.33	1.34
Eating disorder	1.37	1.35	1.38
Autistic disorder	1.17	1.15	1.20

[0495] **Figure 1.** Multivariate analysis for psychiatric diagnoses in GERD patients.

Table 1. Baseline Characteristic of Patients with GERD (cases) and without GERD (Controls)

	GERD		Non-GERD		OR 95% CI
	Number	(Percentage)	Number	(Percentage)	
Total	6,748,850	9.7%	62,556,240	90.2%	
Age (years)					
18-65	3,408,520	51%	44,297,610	71%	0.48 (0.48-0.48)
>65	2,734,010	49%	17,166,600.	27%	2.53 (2.53-2.54)
Gender					
Male	3,301,680	41%	28,127,780	45%	0.83 (0.83-0.83)
Female	3,998,130	59%	33,959,060	54%	1.22 (1.22-1.23)
Race					
Caucasian	4,999,030	74%	32,318,160	52%	2.67 (2.66-2.68)
African American	776,650	12%	6,219,520	10%	1.26 (1.25-1.27)
Hispanic	59,240	1%	837,650	1%	0.91 (0.89-0.93)
Comorbidities					
Smoker	921,230	14%	2,894,580	5%	3.26 (3.25-.266)
Alcohol abuse	269,370	4%	822,040	1%	3.12 (3.10-3.13)
Substance abuse	506,360	8%	1,687,010	3%	2.92 (2.91-2.93)
DM	1,784,190	26%	4,348,050	7%	4.81 (4.80-4.82)
HTN	4,073,950	60%	10,130,140	16%	7.88 (7.86-7.89)
HLD	3,777,920	56%	8,016,350	13%	8.65 (8.63-8.66)
Obesity	1,827,180	27%	3,620,490	6%	6.04 (6.03-6.05)
Anxiety Disorder	1,877,090	28%	3,912,810	6%	5.77 (5.76-5.78)
Depression Disorder	2,249,150	33%	4,651,070	7%	6.22 (6.21-6.23)
Bipolar disorder	312,920	5%	750,170	1%	4.00 (3.98-4.02)
Eating Disorder	63,090	1%	128,500	0.2%	4.58 (4.54-4.62)
Autistic disorder	15,450	0.2%	72,220	0.1%	1.98 (1.95-2.02)

Abbreviations: GERD: Gastroesophageal reflux disease; DM: Diabetes mellitus; HTN: Hypertension; HLD: Hyperlipidemia.

S496

A Comparison of Manometric and Functional Lumen Impedance Planimetry (FLIP) Diagnoses of Esophageal Dysmotility

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Introduction: Functional lumen impedance planimetry (FLIP) has been utilized extensively as an adjunct to high resolution impedance manometry (HRIM) for evaluating disorders of esophageal dysfunction. HRIM and FLIP provide valuable metrics that provide similar but distinct information about esophageal function, resulting in similar but distinct diagnoses. For both tools to be used in parallel to diagnose esophageal disorders, it is imperative to understand concordance rate of diagnoses between the two studies.The aim of this study is to evaluate the extent of agreement between FLIP and HRIM diagnoses by constructing parallels between diagnoses made by FLIP and HRIM on patients who underwent both studies and evaluating whether the modalities aligned by more than random chance.
Methods: A retrospective review of 227 patient charts was performed. Pairs of similar HRIM and FLIP diagnoses pertaining to peristaltic and aperistaltic conditions were formed by comparing and correlating the criteria for each diagnosis by HRIM to criteria by FLIP. Diagnoses without a correlation were designated "other." The number of patients whose FLIP and HRIM diagnoses were and were not in agreement was recorded for each diagnosis pair.
Results: Table shows the specific HRIM and FLIP diagnoses that were correlated, the number of the patients in which their diagnoses by HRIM and FLIP represent the same condition, and the percentage of the patients with each HRIM diagnosis that had the predicted correlating FLIP diagnosis.The overall percentage in agreement among all diagnoses was 26%. Cohen's Kappa of agreement for all studies was statistically significant at 0.121 ($p < 0.0001$). When "other" diagnoses without matching diagnoses between HRIM and FLIP were omitted from analysis, agreement increased to 33.5%. Cohen's Kappa of agreement for paired diagnoses was statistically significant at 0.157 ($p < 0.0001$).
Conclusion: Our study found that FLIP testing agreed with manometric diagnosis more often than random chance would predict, but only 26% of the time. The studies are therefore slightly predictive of one another, though imperfectly. The tools analyze different aspects of esophageal physiology to arrive at their diagnoses. This both complicates direct pairing of diagnoses and also provides each modality a unique role in assessing esophageal dysmotility. These findings support that HRIM and FLIP testing may be considered complementary tools to utilize in parallel for patients with suspected esophageal dysmotility.

Table 1. Correlated HRIM (High Resolution Impedance Manometry) and FLIP (Functional Lumen Impedance Planimetry) Diagnoses and Their Agreement Rates

HRIM Diagnosis	Correlating FLIP Diagnosis	Number in Agreement	Percent of Total in Agreement
Normal	Normal	7	41.2%
Diffuse Esophageal Spasm	Normal Distensibility with Repetitive Retrograde Contractile Response	0	Undefined
Type 1 Achalasia	EGJOO with Absent Contractile Response	14	77.8%
Type 3 Achalasia	EGJOO with Repetitive Retrograde Contractile Response	5	33.3%
EGJOO	EGJOO with Normal Contractile Response	29	25.7%
Aperistalsis	Normal Distensibility with Absent Contractile Response	2	33.3%
Other (Jack Hammer, Ineffective Esophageal Motility, Type 2 Achalasia, Fragmented Peristalsis)	Other (Normal Contractile Response with Increased EGJ Distensibility, Absent Contractile Response with Increased EGJ Distensibility, Diminished or Disordered Contractile Response)	1	1.9%

EGJ - Esophagogastrojejunal, EGJOO - Esophagogastrojejunal Outflow Obstruction)

S497

Effect of Proton Pump Inhibitor Treatment in "PPI Non-Responsive" Patients With Eosinophilic Esophagitis

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Introduction: EoE patients were historically divided into proton pump inhibitor (PPI) responders and non-responders for diagnosis. We observed that some EoE patients have a decline in eosinophil count after PPI treatment without achieving histologic response, but little is known about this group of patients. We aimed to determine the effect of PPIs on reducing esophageal eosinophilia in patients deemed non-responsive to PPIs.
Methods: We analyzed a prospective cohort of adults with an incident diagnosis of EoE at University of North Carolina, but who did not meet the threshold for histologic response (< 15 eos/hpf) after PPI-only therapy (total daily dose of 40-80mg of any of the approved medications for ≥8 weeks). Symptoms, endoscopic features, and histologic features were recorded. Pre- and post-PPI treatment esophageal biopsies were re-read by pathologists to determine peak eosinophil counts and other histologic findings. We compared eosinophil counts and response metrics between these groups.
Results: We identified 125 PPI "non-responsive" EoE patients with pre- and post-PPI samples available (mean age 39 years; 66% male; 94% white). Peak pre- and post-PPI treatment eosinophil counts were 102.1 ± 69.8 and 102.9 ± 101.1 (p=0.93); counts did not decrease by proximal or distal locations, and associated histologic findings were similar pre/post treatment, apart from a decrease in lamina propria fibrosis (p< 0.001). With the exception of a decrease in heartburn (19% vs 11%; p=0.006), symptoms were similar pre/post treatment, as were endoscopic findings. However, 75 patients (60%) had some decrease in eosinophil count while 30 patients (24%) had ≥50% decrease in counts. When comparing the ≥50% decrease and < 50% decrease groups, clinical, endoscopic, and histologic features were similar at baseline and post-PPI, but the ≥50% decrease group had significant improvement in eosinophil degranulation, microabscesses, and spongiosis (Table).
Conclusion: Peak eosinophil counts and dysphagia did not change overall after PPI treatment in EoE patients deemed PPI non-responsive, but frequency of heartburn improved. Approximately a quarter of EoE patients had ≥50% decrease in eosinophil counts, reflecting a >100 eos/hpf decrease, which was associated with improvements in other histologic findings. The effect of PPIs in "non-responders", and whether PPIs have a role in combination therapies in this sub-group, should be prospectively studied.

Table 1: Comparison of baseline (pre-PPI treatment) and post-PPI treatment features of patients with <50% and ≥ 50% decrease in eosinophil counts after PPI treatment

	<50% decrease in eosinophil counts (n = 95)	≥ 50% decrease in eosinophil counts (n = 30)	p
Age at diagnosis (mean years ± SD)	39.6 ± 13.2	38.6 ± 14.2	0.72
Male (n, %)	64 (67)	18 (60)	0.46
White (n, %)	90 (95)	28 (93)	0.77
Baseline peak eosinophil counts			
Mean eos/hpf ± SD)	83.7 ± 58.6	160.2 ± 71.5	< 0.001
Post-PPI treatment peak eosinophil counts			
Mean eos/hpf ± SD)	120.7 ± 108.9	46.5 ± 30.8	< 0.001
Percent decrease (mean ± SD)	81.1 ± 198.2	-69.9 ± 14.0	< 0.001
Post-treatment endoscopy findings (n, %)			
Exudates	55 (58)	12 (40)	0.09
Rings	77 (81)	23 (77)	0.60
Edema	50 (53)	14 (47)	0.57
Furrows	86 (91)	24 (80)	0.12
Stricture	46 (48)	15 (50)	0.88
Narrowing	32 (34)	8 (27)	0.47
Hiatal hernia	17 (18)	4 (13)	0.56
Dilation performed	45 (47)	12 (40)	0.48
Initial diameter (mean mm ± SD)	11.9 ± 4.4	11.7 ± 3.6	0.88
Final diameter (mean mm ± SD)	14.5 ± 3.1	13.8 ± 2.6	0.50
Total EREFS score (mean ± SD)	4.0 ± 1.9	3.7 ± 2.7	0.58
Post-treatment histologic findings (n, %)			
Eosinophil degranulation	58 (95)	6 (67)	0.004
Eosinophil microabscesses	43 (70)	2 (25)	0.01
Basal cell hyperplasia	34 (57)	1 (14)	0.03
Spongiosis	56 (92)	6 (60)	0.005
Lamina propria fibrosis	14 (38)	3 (60)	0.34

[0497]

S498

The Eosinophilic Esophagitis Patient With Multiple Atopic Conditions: Clinical Characteristics and Treatment Response to Topical Steroids

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Introduction: Patients with eosinophilic esophagitis (EoE) commonly have other atopic conditions, but the impace of multipe allergic diseases is unknown. We aimed to determine whether EoE patients with multiple atopic conditions have differences in presentation or response to topical corticosteroid (tCS) treatment.
Methods: This retrospective cohort study of the UNC EoE Clinicopathologic database assessed adults and children with a new diagnosis of EoE. Demographics, clinical characteristics, and procedural data were extracted. We calculated the total number of atopic comorbidities and defined a group with ≥2 atopic conditions (not including allergic rhinitis given its high prevalence in our region). For those with tCS treatment and follow-up endoscopy/biopsy, we assessed histologic response (< 15 eos/hpf), global symptom response, endoscopic response, EREFS, and an endoscopic severity score (ESS). Patients with and without multiple atopic conditions were compared at baseline, and also before and after treatment.
Results: Of 1020 EoE patients with atopic disease information, 426 (42%) had no atopy, 235 (23%) had 1 atopic comorbidity, 211 (21%) had 2, 113 (11%) had 3, and 34 (3%) had 4. The mean age of EoE diagnosis varied by associated atopic condition (EoE in patients with eczema was diagnosed at 18.5 yrs, with food allergy at 24.5 yrs, asthma at 27 yrs, allergic rhinitis at 28 yrs). The 180 (18%) patients with ≥2 atopic diseases were younger (22 vs 31 yrs; p< 0.001) and had more vomiting, less abdominal pain, more exudates and edema on endoscopy, and higher peak eosinophil counts (73.4 vs 62.6; p=0.003). On

multivariate analysis, younger age, lack of abdominal pain, exudates, and higher eosinophil counts were independently associated with multiple atopy. In 465 patients treated with tCS, there was no difference in histologic response in patients with and without multiple atopic conditions (Table), and response rates were between 56%-63% for patients with 0-4 concomitant atopic conditions.

Conclusion: EoE patients commonly have multiple atopic diseases. At time of diagnosis, patients with ≥2 atopic diseases were younger, less likely to have abdominal pain, and more likely to have exudates on endoscopy and a higher eosinophil count on biopsy. However, there were no major differences in histologic treatment response to corticosteroids, though a non-response rate of ~40% was seen regardless of atopic status.

Table 1: Treatment outcomes of topical corticosteroid by atopic status (n = 465)

	<2 atopic conditions (n = 368)	≥2 atopic conditions (n = 97)	p
Type of steroid used (n, %)			0.79
Fluticasone	111 (30)	27 (28)	
Budesonide	256 (70)	70 (72)	
Ciclesonide	1 (<1)	0 (0)	
Mean steroid dose (mcg ± SD)	1735 ± 667	1726 ± 838	0.91
Symptom response (n, %)*	111 (80)	32 (67)	0.06
Post-treatment peak eosinophil count (mean eos/hpf ± SD)	23.2 ± 34.3	29.0 ± 46.2	0.17
p value vs baseline	< 0.001	< 0.001	
Histologic response (n, %)			
<15 eos/hpf	209 (57)	57 (59)	0.73
≤6 eos/hpf	185 (50)	50 (52)	0.80
<1 eos/hpf	113 (31)	29 (30)	0.88
Post-treatment endoscopic findings (n, %)			
Normal	66 (18)	32 (33)	0.001
Exudates	89 (25)	23 (24)	0.87
Rings	173 (48)	32 (38)	0.07
Edema	100 (28)	30 (31)	0.51
Stricture	122 (34)	29 (30)	0.51
Narrowing	67 (19)	14 (15)	0.35
Crepe-paper mucosa	4 (1)	0 (0)	0.30
Dilation	115 (32)	30 (31)	0.90
Candida	25 (7)	8 (8)	0.66
Endoscopic response (n, %)	263 (72)	67 (69)	0.59
Post-treatment endoscopic severity (mean scores ± SD)			
ERFES	2.3 ± 1.9	2.2 ± 2.2	0.77
p value vs baseline	< 0.001	< 0.001	
ESS	1.8 ± 1.4	1.6 ± 1.6	0.27
p value vs baseline	< 0.001	< 0.001	

[0498]

S499

Prevalence of Dabigatran-Induced Esophagitis on Upper Gastrointestinal Endoscopy: A Systematic Review and Meta-Analysis

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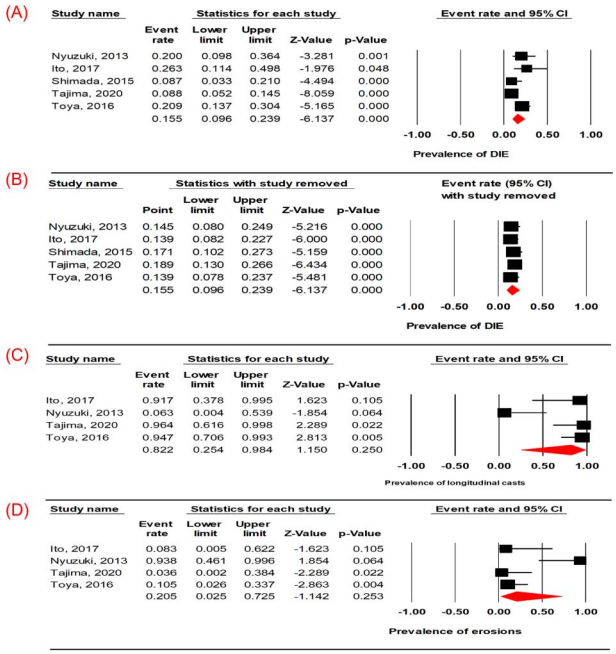
Introduction: Dabigatran-induced esophagitis (DIE) has been reported increasingly recently in the literature. However, the exact prevalence of DIE is uncertain. Therefore, we performed a systematic review and meta-analysis to define and provide a quantitative assessment of the prevalence of DIE on endoscopy.

Methods: A comprehensive literature search of PubMed/Medline, Embase, and Web of Science was conducted on April 01, 2022, to include all studies that reported the prevalence of DIE among patients undergoing upper endoscopy. Two independent reviewers (AB and RM) screened and shortlisted articles and performed data extraction. Any discrepancy was resolved by consensus. The statistical analysis was performed using Open Meta Analyst (CEBM, Oxford, UK). Pooled event rate and corresponding 95% confidence intervals (CI) were calculated using the random-effects model and DerSimonian Laird method. Heterogeneity was assessed using the Higgins I^2 index (I^2 values >50% implied the presence of significant heterogeneity).

Results: Five retrospective cohort studies with 339 patients were included. All studies originated from Japan. The pooled prevalence rate of DIE was 15.5% (95% CI 0.096-0.239, I^2=62.4%, Figure A). A leave-one-out sensitivity analysis showed similar results (Figure B). Four studies reported the detailed endoscopic features of DIE. All DIE occurred in the mid and/or lower esophagus. Longitudinal mucosal casts were the most common endoscopic feature, with a pooled rate of 82.2% (95% CI 0.254-0.984, I^2=74.8%, Figure C). The pooled rate of mucosal erosions was 20.5% (95% CI 0.025-0.725, I^2=72.5%, Figure D).

Conclusion: Nearly 15% of patients receiving dabigatran were found to have dabigatran-induced esophagitis on endoscopy. Physicians should be cautious about using dabigatran in patients with a history of esophagitis or gastroesophageal reflux disease. Patients who receive dabigatran should undergo an upper endoscopy to evaluate for DIE if they develop gastrointestinal symptoms. Prospective, large-scale, multicenter studies are needed to further understand DIE.



[0499] **Figure 1.** (A) forest plot showing the pooled overall prevalence of dabigatran-induced esophagitis. (B) Leave-one-out sensitivity analysis for prevalence of dabigatran-induced esophagitis. Forest plots showing the pooled rate of (C) longitudinal mucosal casts and (D) erosions in dabigatran-induced esophagitis.

S500

Long-Term Follow-Up of Esophageal Strictures in Eosinophilic Esophagitis Using Structured Esophagram Protocol

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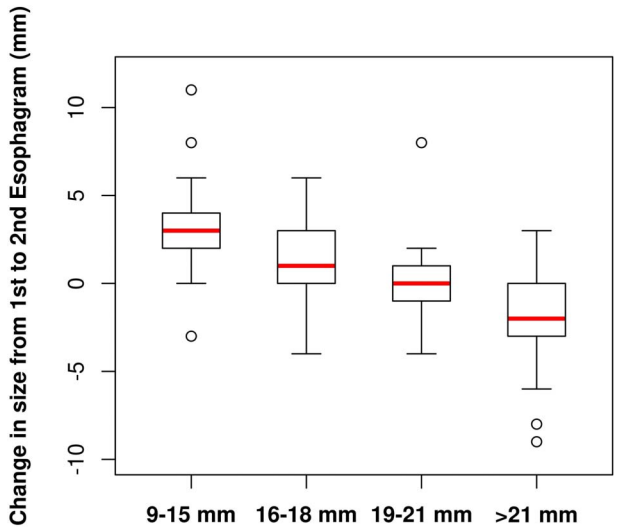
Introduction: Reversal of transmural fibrostenosis in eosinophilic esophagitis (EoE) is not well studied. Our aim was to determine the effect of medical therapy, dilation and initial diameter on esophageal lumen diameter using serial structured esophagrams over a period of years.
Methods: Retrospective study of 78 patients who completed two EoE protocol esophagrams at an academic tertiary referral center 2003 to 2021. Maximum and minimum esophageal diameters were measured on images during rapid swallowing in the RAO recumbent position. EoE was diagnosed by consensus definition and classified as active using ≥15 eosinophils per high power field (hpf). Demographics, medical therapies, and endoscopic data were obtained by chart review. Change in esophageal diameter was analyzed with Wilcoxon signed rank test and reported as median, 25th percentile (Q1), and 75th percentile (Q3) values.
Results: Median age at first esophagram was 36.2 and 60.3% were male. Medical therapies during last esophagram were PPI (39.5%), swallowed topical steroids (31.6%), diet elimination (13.2%), biologic therapies (1.3%), and clinical trials (1.3%). Eleven patients had dilation before the first esophagram and 33 between esophagrams without significant effect on results. Median years between esophagrams was 2.6 (**Table**). Median maximum diameter significantly increased by 1.0 mm (Q1: -1.0 mm, Q3: 3.0 mm) (P=0.034) independent of dilation (P=0.744). Median maximum diameter change per year significantly increased by 0.4 mm (Q1: -0.4 mm, Q3: 1.3 mm, P=0.010). The increase appeared most profound in patients starting in the lowest maximum diameter group (9-15 mm) with median increase of 3.0 mm while the highest starting maximum diameter group (>21 mm) had further narrowing by 2.0 mm (**Figure**). There was no difference in maximum diameter change for patients on medical therapy compared to no therapy at second esophagram at 1.0 mm (Q1: -1.0 mm Q3: 3.0 mm) and 1.0 mm (Q1: 0.0 mm Q3: 2.0 mm) respectively (P=0.640); however, for patients in disease remission at second esophagram, there was a significant increase in maximum diameter per year compared to active disease at 0.8 mm (Q1: 0.0 mm Q3: 5.3 mm) and 0.0 mm (Q1: -0.4 mm Q3: 0.6 mm) respectively (P=0.019).
Conclusion: Long term medical therapy leads to a small, but significant improvement in esophageal diameter in EoE. Whether this improvement is due to reversal of fibrosis or transmural inflammation is unclear.



[0500] **Figure 1.** Maximum Diameter Change Between Esophagram 1 and 2 based on starting maximum esophageal diameter.

Table 1. Esophagram Characteristics

	No Dilation (n=43)	Dilation (n=34)	P-Value	Total (n=78)	P-Value
Median Years Between Esophagrams (Range)	2.7 (0.1-11.6)	2.4 (0.1-12.4)		2.6 (0.1-12.4)	
Median Maximum Diameter Change, mm	1.0	1.0	0.744	1.0	**0.034**
Q1, mm	-1.0	0.0		-1.0	
Q3, mm	2.5	3.0		3.0	
Median Maximum Diameter Change Per Year, mm	0.3	0.4	0.961	0.4	**0.010**
Q1, mm	-0.4	0.0		-0.4	
Q3, mm	1.5	1.3		1.3	
Median Minimum Diameter Change, mm	0.0	1.0	0.317	0.0	0.277
Q1, mm	-2.0	-1.0		-1.5	
Q3, mm	2.0	3.0		2.0	
Median Minimum Diameter Change Per Year, mm	0.0	0.4	0.249	0.0	0.059
Q1, mm	-0.7	-0.3		-0.5	
Q3, mm	0.9	1.5		1.1	

mm, millimeters; Q1, 25th percentile; Q3, 75th percentile

S501

High Burden of Disease and Associated Costs for Eosinophilic Gastrointestinal Diseases: Results From an Online Patient-Centered Research Network

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Introduction: Data regarding health care-related costs and the burden of disease for non-EoE eosinophilic gastrointestinal diseases (EGIDs) are lacking, particularly from the patient perspective. We aimed to determine the patient-reported health care burden of disease and costs related to care for non-EoE EGIDs.
Methods: We performed a retrospective cohort study based in EGID Partners (egidpartners.org), an online patient-centered research network designed and launched in 2020 by patient advocacy groups (PAGs) and researchers. Subjects were recruited via informational emails, social media, directed messages through patient healthcare portals, webinars, and by physicians. Adult (≥18 years) EGID patients and caregivers of children < 18 years with EGIDs could join and complete surveys which included a burden of disease questionnaire. This instrument recorded patient-reported healthcare utilization over the prior year related to heath care visits and procedures, as well as out-of-pocket costs/payments. We calculated the median total costs and number of visits.
Results: Of 58 non-EoE EGID patients with health care utilization data (mean (SD) age 29 (19) years; 69% female; 95% white; 88% with an atopic condition; mean (SD) 7.4 (9.9) years of symptoms prior to diagnosis), 13 had eosinophilic gastritis (EoG), 17 had eosinophilic enteritis (EoN), 6 had eosinophilic colitis (EoC), and 22 had multiple areas of overlap; additionally, 27 had esophageal involvement. The median number of health care visits over the prior year was 12 (IQR: 5-33; range 1-90), with a median of 5 outpatient doctor visits, 3 urgent care/ED visits or hospitalizations, and 2 endoscopy visits; results were similar for adult patient report (n=42) or caregiver report for pediatric patients (n=16) (Table). The annual median costs were $1000 (IQR: $100-$3570; range: 0-$100,400). Median costs for outpatient visits, testing, and medications were $250, $400, and $325, respectively. Costs were similar for adult patients and caregivers (Table).
Conclusion: Patients with non-EoE EGIDs experience a high health care burden, with frequent health care encounters (median of 1 encounter/month) and substantial out-pocket costs (median of $1000/year). Both adult and pediatric providers must maintain awareness of the substantial burden in costs to EGID patients, including challenges for patients to manage their disease given these costs.

Table – non-EoE EGID costs overall, and by adult patient vs caregiver of the pediatric patient

	Overall non-EoE EGID population (n = 58)	Adult report (n = 42)	Caregiver report (n = 16)	p
Health care encounters - median (IQR)				
Total number of encounters	12 (5-33)	12 (5-29)	13.5 (6-33.5)	0.81
Outpatient visits	5 (3-15)	5 (3-19)	5 (3-15)	0.65
Urgent care/ER/hospital	3 (2-5)	3 (1-3)	3.5 (2-9)	0.32
Endoscopies	2 (1-3)	2 (2-3)	2 (1-3)	0.43
Testing	5 (3-12)	5 (3-12)	4 (1-7)	0.27
Costs in USD - median (IQR)				
Total costs	$1000 ($100-$3570)	$1050 ($100-$3600)	$350 ($0-$2600)	0.57
Outpatient visits	$250 ($0-$1845)	$500 ($0-$1846)	$250 ($0-$1000)	0.87
Urgent care/ER/hospital	$215 ($0-$1200)	$230 ($0-$1800)	$200 ($0-$300)	0.69
Testing	$400 ($0-$1400)	$525 ($0-$1400)	$225 ($0-$2750)	1.0
Medications (EGID-related)	$325 ($100-$1010)	$400 ($100-$1010)	$135 ($100-$440)	0.37

[0501]

S502

Clinical Features and Treatment Response to Topical Steroids in Ethnic and Racial Minority Patients With Eosinophilic Esophagitis

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Introduction: Differences in EoE presentation or treatment response by ethnic or racial minority status remains understudied. We aimed to determine whether EoE patients of Hispanic/Latinx ethnicity or non-white race have differences in presentation at diagnosis or response to topical corticosteroid (tCS) treatment.
Methods: We conducted a retrospective cohort study of the UNC EoE Clinicopathologic database with subjects of any age with a new diagnosis of EoE. Ethnicity and race were recorded as documented in the chart. For the subset who had treatment with a tCS and a follow-up endoscopy/biopsy, we assessed histologic response (< 15 eosinophils/hpf), global symptom response, endoscopic response, EREFS, and an endoscopic severity score (ESS). Hispanic EoE patients were compared to non-Hispanics at baseline, and before and after treatment. The same analyses were repeated for white vs non-whites.
Results: Of 1026 EoE patients with ethnicity data, 23 (2%) were Hispanic and most clinical features at presentation were similar to non-Hispanic EoE patients. Out of 466 patients who received tCS, 8 were Hispanic and had numerically higher eosinophil counts (47.0 vs 24.5; p=0.09) and numerically lower histologic response (38% vs 57%; p=0.27) post-treatment. When comparing EoE patients in terms of race, non-white patients (13%) had many differences in presentation: younger age at diagnosis, less insurance, shorter symptom duration, more vomiting, less dysphagia and food impaction, fewer typical endoscopic features, and less dilation. On multivariate analyses, age, vomiting, and furrows remained independently associated with non-white race. Of 475 patients with race data treated with tCS, the 49 non-whites had a significantly lower histologic response rate (41% vs 59%; p=0.01) (Table). After controlling for age, insurance, symptom length prior to diagnosis, total steroid dose, and whether dilation was performed, non-whites were less than half as likely to have histologic response (aOR 0.42, 95%CI: 0.21-0.83).
Conclusion: Only 2% of EoE patients at our center were Hispanic, and they had similar clinical presentations as non-Hispanics. While treatment response was lower, this assessment was limited by a small sample size. The non-white EoE group was larger (13%), and presentation was less dysphagia-specific. Non-white patients also had a lower histologic response to tCS which persisted after accounting for differences in presentation.

Table 1. Treatment and response data compared between white and non-white EoE patients

	White (n = 426)	Non-White (n = 49)	p
Type of steroid used (n, %)			0.06
Fluticasone	140 (33)	8 (16)	
Budesonide	285 (67)	41 (84)	
Ciclesonide	1 (<1)	0 (0)	
Mean steroid dose (mcg ± SD)	1755 ± 711	1415 ± 635	0.002
Symptom response (n, %)	130 (78)	9 (64)	0.27
Post-treatment peak eosinophil count (mean eos/hpf ± SD)	22.5 ± 34.3	39.0 ± 49.8	0.003
p value vs baseline	< 0.001	0.02	
Histologic response (n, %)			
<15 eos/hpf	253 (59)	20 (41)	0.01
≤6 eos/hpf	223 (52)	18 (27)	0.04
<1 eos/hpf	131 (31)	12 (24)	0.37
Post-treatment endoscopic findings (n, %)			
Normal	84 (20)	15 (31)	0.08
Exudates	96 (23)	16 (33)	0.11
Rings	206 (49)	7 (15)	< 0.001
Edema	114 (27)	17 (35)	0.24
Furrows	192 (46)	20 (42)	0.58
Stricture	145 (35)	8 (17)	0.01
Narrowing	80 (19)	1 (2)	0.003
Crepe-paper mucosa	3 (1)	1 (2)	0.33
Dilation	139 (33)	8 (19)	0.04
Candida	32 (8)	2 (4)	0.38
Endoscopic response (n, %)	311 (73)	26 (54)	0.006
Post-treatment endoscopic severity (mean scores ± SD)			
ERFES	2.3 ± 1.9	2.2 ± 2.0	0.83
p value vs baseline	< 0.001	0.008	
ESS	1.8 ± 1.5	1.4 ± 1.5	0.09
p value vs baseline	< 0.001	0.13	

[0502]

S503

Examining the Diagnostic Pattern of Eosinophilic Esophagitis Among Medicaid Enrollees in the Deep South U.S.

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Introduction: Eosinophilic esophagitis (EoE) is a chronic, antigen-driven inflammatory disease characterized by clinical symptoms of esophageal dysfunction and histologic findings of increased eosinophilia levels in the esophagus. In the past two decades, it has transformed from a case-reporTable disease to a disease widely recognized by physicians. A steady increase in incidence and prevalence has been seen in the United States. Still, there is limited information on the recognition of EOE in the low-income population. This study sought to examine the diagnostic pattern and factors that influence the diagnosis of EoE in the Medicaid population in the deep South US.
Methods: This study used Alabama Medicaid individual-level data, including claims, enrollee demographic, and geographic variables between 2012 and 2020. We used the International Classification of Disease code 9th and 10th edition to identify patients with the outcome variable of EoE diagnosis (ICD-9: 530.13; ICD-10: K20.0). Descriptive statistics were performed, using frequency and percentages to summarize categorical variables. EoE diagnosis prevalence was defined as the number of EoE diagnoses per 100,000 Medicaid patients. A multivariable logistic model was used to examine the association between EoE diagnoses and the independent variables. A p-value of < 0.05 was considered statistically significant. Statistical analyses were performed using SAS 9.4 software.
Results: 2,080 beneficiaries in the state of Alabama Medicaid program had a diagnosis of EoE between 2012 and 2020. The overall estimated prevalence of EoE in this population was 112.4 per 100,000, with a higher prevalence observed among non-Hispanic Whites, 97 per 100,000. The incidence of EoE increased from 25 per 100,000 to 62 per 100,000. A majority of the cases were children and adolescents (58%), non-Hispanic whites (60.1%), males (53%), and living in large metro areas (75%). Significant factors associated with a higher likelihood of a diagnosis of EoE were children compared to adults, females, and living in the large metro area compared to rural.

Conclusion: The prevalence of Eosinophilic Esophagitis has increased among low-income populations in the deep South US. Patients' demographic characteristics are associated with the likelihood of recognition of EoE in this population.

S504

Severity of Dysphagia Predicts Patients With Obstructive Lower Esophageal Sphincter Physiology

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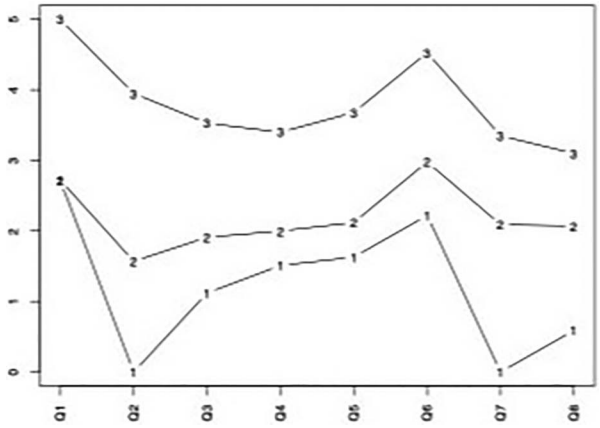
Introduction: Restrictive function of the lower esophageal sphincter (LES) is the hallmark of achalasia and esophagogastric junction outflow obstruction (EGJOO), which are the most functionally relevant disorders of esophageal motility. We aimed to determine whether the pattern and / or severity of dysphagia can identify patients with obstructive physiology of the lower esophageal sphincter.
Methods: Data from undergoing high-resolution manometry (HRM) according to Chicago Classification (CC) version 4.0 at a tertiary care center were retrospectively analyzed per IRB approved protocol (#109825). The Brief Esophageal Dysphagia Questionnaire (BEDQ) score items were used to construct 3 unbiased latent classes. CC 4.0 diagnosis, functional metrics on HRM, and quantitative metrics were compared.
Results: Data from 147 patients (age range 21 – 92, 66.7 % female) was included (Table). Latent class (LC) analysis based on question items 1-8 from the BEDQ showed 3 classes which were predominantly discriminated based on overall BEDQ score (Figure). Overall, 43.5% had normal HRM diagnosis based on CC 4.0, and 40.1% had a diagnosis of EGJOO or achalasia. Chi-square analysis showed no differences in the proportions of patients with normal motility. However, the proportion of patients with EGJOO was higher in LC 2. Also, supine integrated relaxation pressure (IRP) was higher in LC 2 and 3 groups. LC 2 had a trend towards a higher distal contractile integral (DCI) which may be the reason for the different symptom profile.
Conclusion: A higher severity of dysphagia correlates with a greater degree of obstructive physiology of the LES. Notably, a high percent of patients with more severe dysphagia have normal manometry, which likely underscores the importance of esophageal hypervigilance and visceral anxiety.



[0504] **Figure 1.** X-axis: Brief esophageal dysphagia questionnaire (BEDQ) Question y-axis: Average Item Score

Table 1. Clinical Data Based on Latent Class Groups

	LC 1 (n=51)	LC 2 (n=56)	LC 3 (n=40)	P value
Age [mean (SD)]	[60.9 (16.2)]	[59.1(15.71)]	[52(17.26)]	0.029
% female [number (%)]	[33(64.7%)]	[39(69.7%)]	[26(65.0%)]	0.835
BEDQ score [mean (SD)]	[9.8 (4.9)]	[17.4 (7.3)]	[30.4 (7.4)]	0.000
CC diagnosis [number (%)]				
Normal	[22(43.1%)]	[24 (42.9%)]	[18 (45.0%)]	0.975
EGJOO	[9(17.6%)]	[21 (37.50%)]	[5 (12.5%)]	0.008
Ineffective esophageal motility	[6(11.8%)]	[1 (1.8%)]	[4 (10.0%)]	0.132
Type 1 Achalasia	[4(7.8%)]	[2 (3.6%)]	[3 (7.5%)]	0.626
Type 2 Achalasia	[4(7.8%)]	[1 (1.8%)]	[5 (12.5%)]	0.129
Type 3 Achalasia	[1(2.0%)]	[2 (3.6%)]	[2 (5.0%)]	0.782
Combined EGJOO / Achalasia Type 1,2,3	[18 (35.3%)]	[26 (46.4%)]	[15 (37.5%)]	0.465
Absent contractility	[2 (3.9%)]	[3 (5.4%)]	[1 (2.5%)]	0.782
Distal Esophageal Spasm	[1(2.0%)]	[2 (3.6%)]	[2 (5.0%)]	0.733
Hypercontractile esophagus	[2 (3.9%)]	[0 (0.0%)]	[0 (0.0%)]	0.156
LES metrics [mean (SD)]				
BLESP	[34.0 (39.1)]	[37.2(22.3)]	[35.8(16.1)]	0.838
Supine IRP	[13.5 (7.3)]	[18.4 (10.2)]	[20.2(12.1)]	0.004
Upright IRP	[11.6 (7.3]	[13.5(9.0)]	[14.5(12.8)]	0.346
DCI	[1458.7(2158.8)]	[2138 (3138)]	[1166 (1254)]	0.124
DL	[7.3(2.2)]	[6.7 (1.9)]	[6.8(1.3)]	0.210
Functional markers of impaired bolus transit				
% with PEP or CP ≥20% [number (%)]	[(11 (21.6%)]	[21 (37.5%)]	[11 (27.5%)]	0.186
% with IBT ≥20%	[23(45.1%)]	[24(42.9%)]	[18(45.0%)]	0.967

Abbreviations: BEDQ – Brief esophageal dysphagia questionnaire, BLESP – Baseline lower esophageal sphincter pressure, CP-Compartmentalized pressurization, DCL-Distal contractile integral, DL- distal latency, EGJOO- Esophagogastric junction outflow obstruction, IBT- Incomplete bolus transit, IRP- Integrated relaxation pressure, LC-Latent class, PEP- Pan-esophageal pressurization

S505

Characteristics of and Healthcare Cost Drivers Among U.S. Patients With Eosinophilic Esophagitis With High versus Non-High All-Cause Costs: An Analysis of Insurance Claims Data

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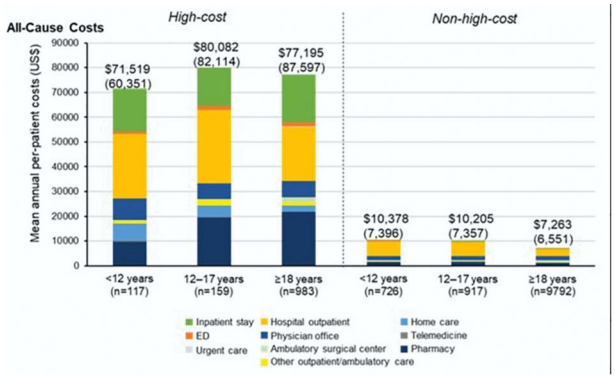
Introduction: Data on healthcare resource utilization (HCRU) and costs in patients with eosinophilic esophagitis (EoE) are limited. We examined all-cause HCRU and costs in US patients with newly diagnosed EoE, comparing differences in demographic/clinical characteristics and cost drivers between those considered high-cost (HC) and non-high-cost (NHC).
Methods: Retrospective analysis of 2017–2021 MarketScan Commercial and Medicare administrative claims data including EoE patients with ≥12 months' continuous health plan enrollment pre- and post-first observed EoE diagnosis code (index date). Patients were stratified by all-cause HCRU cost group (HC vs NHC) and age (< 12, 12–17, ≥18 years). HC was defined *post hoc* as a post-index date all-cause cost distribution ≥$30,000. Annual per-patient costs were reported by care setting for the 12-months pre- and post-index date; demographic/clinical characteristics were considered at index. Statistical analyses were descriptive.
Results: 12,694 patients had incident EoE (mean age 38 years, 63% male), with pre- and post-diagnosis average annual all-cause costs of $9,643 and $14,573 per patient, respectively. The HC group (n=1,259, 9.9% of all incident patients) had a higher proportion of children, adolescents and females and a higher mean Charlson Comorbidity Index score than the NHC group (**Table**). The HC group had 7.4- and 10.0-fold higher pre- and post-diagnosis all-cause costs than the NHC group, respectively. Post-EoE diagnosis, the key cost drivers for all-cause costs were inpatient stays (24%; mostly unrelated to EoE), and hospital outpatient visits (30%) for the HC group, and hospital outpatient visits (42%) and physician office visits (20%) for the NHC group. Pharmacy costs were a notable cost driver in the HC group pre- and post-EoE diagnosis (35% and 26%) compared with the NHC group (15% and 16%). Inpatients costs increased 2.2-fold during the post- vs pre-diagnosis period in the HC group but decreased by 66% in the NHC group. Adolescents in both groups had higher all-cause costs than adults (**Figure**).
Conclusion: EoE patients comprising the HC group had a higher proportion of children, adolescents and females and a greater comorbidity burden than the NHC group. Following EoE diagnosis, though most costs were unrelated to EoE, a substantial increase in inpatient stay costs was observed in the HC group vs a reduction in the NHC group. The differences observed between these two groups require further evaluation.



[0505] **Figure 1.** Healthcare resource utilization-associated costs (2020 US$) for patients with incident EoE in the high-cost and non–high-cost groups by age group for all-cause costs during the follow-up period. ED, emergency department; EoE, eosinophilic esophagitis. High cost was defined post hoc as a post-index date all-cause cost distribution ≥$30,000. Numbers above the bars represent the mean (standard deviation) annual per patient costs.

Table 1. Demographic and clinical characteristics, and healthcare resource utilization-associated costs (2020 US$) among patients with incident EoE in the high-cost versus not–high-cost groups

	12-Month Pre-Diagnosis Period		12-Month Follow-Up	
	High-cost group (n=1,259)	Non-high-cost group (n=11,435)	High-cost group (n=1259)	Non-high-cost group (n=11,435)
Demographics				
Age group at index date, n(%)				
< 12 years	117 (9.3)	726 (6.4	NA	NA
12-17 years	159 (12.6)	917 (8.0)	NA	NA
≥18 years	983 (78.1)	9,792 (85.6)	NA	NA
Age (years), mean (SD)	36.6 (55.3)	38.3 (16.3)	NA	NA
Sex, n (%)				
Male	696 (55.3)	7,367 (64.4)	NA	NA
Female	563 (44.7)	4,068 (35.6)	NA	NA
Clinical characteristics				
CCI score, mean (SD)	1.4 (1.8)	0.7 (1.1)	NA	NA
Most common Charlson comorbidities, n (%)				
COPD	306 (24.3)	1,841 (16.1)	NA	NA
Hypertension	274 (21.8	1,736 (15.2)	NA	NA
Depression	191 (15.2)	904 (7.9)	NA	NA
Diabetes with complications	110 (8.7)	381 (3.3)	NA	NA
Skin ulcers	70 (5.6)	356 (3.1)	NA	NA

Table 1. (*continued*)

	12-Month Pre-Diagnosis Period		12-Month Follow-Up	
	High-cost group (n=1,259)	Non-high-cost group (n=11,435)	High-cost group (n=1259)	Non-high-cost group (n=11,435)
Mild liver disease	75 (6.0)	354 (3.1)	NA	NA
Cancer, nonmetastatic	65 (5.2)	245 (2.1)	NA	NA
Rheumatic disease	51 (4.1)	96 (0.84	NA	NA
All-cause per patient costs, $, mean (SD)				
Inpatient stay	8,449 (44,382)	829 (7,849)	18,558 (52,962)	278 (1,926)
ED	1,188 (3,156)	395 (1,415)	1,692 (4,613)	310 (1,117)
Urgent care	44 (159)	24 (96)	52 (162)	29 (102)
Outpatient/ambulatory				
Hospital outpatient	9,925 (29,858)	2,047 (6,207)	23,350 (38,416)	3,232 (4,673)
Physician office	848 (13,918)	1,208 (1,906)	6,709 (14,709)	1,545 (1,825)
Ambulatory surgical center	402 (1,519)	253 (1,200)	1,445 (4,806)	739 (1,658)
Other	820 (4,002)	188 (939)	1,574 (5,326)	240 (668)
Home care	2,771 (28,443)	60 (595)	3,278 (28,309)	59 (487)
Telemedicine	7 (83)	3 (83)	98 (525)	29 (216)
Pharmacy	15,081 (61,159)	905 (2,707)	20,275 (47,270)	1,236 (2,415)
Total	43,533 (96,716)	5,915 (12,682)	77,032 (84,714)	7,696 (6,758)

Footnotes: CCI, Charlson Comorbidity Index; COPD, chronic obstructive pulmonary disease; ED, emergency department; EoE, eosinophilic esophagitis; NA, not applicable; SD, standard deviation. High-cost was defined post hoc as a post-index date all-cause cost distribution ≥$30,000.

S506

Evaluating the Diagnostic Accuracy of GerdQ for Diagnosis of Gastroesophageal Reflux Disease: A Meta-Analysis

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Introduction: Establishing an accurate diagnosis of GERD is challenging, especially in resource-limited settings lacking accepted reference tests such as upper endoscopy and ambulatory pH-metry. Furthermore, guideline recommendations regarding using symptom-based GERD questionnaires were inconsistent, highlighting the lack of evidence available for such questionnaires. This meta-analysis aims to assess the diagnostic accuracy of GerdQ in comparison to upper endoscopy and/or pH-metry for establishing GERD diagnosis.
Methods: Studies published up to April 18, 2022, and indexed in Ovid MEDLINE, Ovid EMBASE, SCOPUS, Web of Science, and the Cochrane Library were searched. Diagnostic test accuracy (DTA) studies comparing GerdQ to an accepted reference test (upper endoscopy and/or pH-metry) for GERD diagnosis in adult patients with symptoms suggestive of GERD were eligible for inclusion. The quality of studies was assessed using the Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2) tool. Meta-analysis using the random-effects model (DerSimonian-Laird) was done to calculate the overall sensitivity, specificity, likelihood ratios (LRs), and the diagnostic odds ratio (DOR). The hierarchical summary receiver operating characteristics (HSROC) curve was calculated using the bivariate model with the area under the receiver operating characteristic curve (AUC).
Results: A total of 14 studies with 12566 participants were analyzed in this meta-analysis. The pooled estimates of sensitivity, specificity, positive LR, negative LR, and DOR for GerdQ (cut-off value of ≥8) were 67.8% (95%CI 57.1%-76.9%), 66.6% (95%CI 57.7%-74.4%), 1.83 (95% 1.49-2.24), 0.55 (95%CI 0.46-0.67), and 3.79 (95%CI 2.36-6.08), respectively. The HSROC curve showed an overall AUC of 0.705. The subgroup analysis based on Asian and non-Asian studies showed similar pooled sensitivity, specificity, and DOR.
Conclusion: GerdQ had moderate sensitivity and specificity for establishing GERD diagnosis. GerdQ could still be recommended as a diagnostic tool for GERD only when the PPI test is unavailable or contraindicated.

S507

Esophageal Function Assessment Using Endoscopic Functional Luminal Imaging Probe (ENDOFLIP) in Patients With Different Obesity Classes

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Introduction: Patients with obesity have been found to have a higher prevalence of esophageal motor disorders compared to the general population, with abnormal lower esophageal sphincter (LES) function and altered peristalsis on manometry. Patients with class 3 obesity can experience minimal symptoms despite abnormal manometry suggesting abnormal visceral sensation. Endoscopic functional luminal imaging probe (EndoFLIP) assesses luminal distensibility and peristalsis during endoscopy. This study aims to evaluate esophageal characteristics using EndoFLIP in patients with obesity and esophageal symptoms and determine clinical differences between obesity classes.
Methods: We conducted retrospective chart review of patients with obesity and esophageal symptoms who had undergone EndoFLIP testing at a single tertiary care center between 2020-2022. Data was collected on patient demographics, symptoms, medical history, and EndoFLIP measurements. Statistical analysis was performed using Fisher exact testing.
Results: 33 patients with a BMI ≥30 were included (81% women, mean age 50.2 years, mean BMI 39.4). 9 (27%) had class 3 obesity, 9 (27%) class 2 obesity and 15 (45%) class 1 obesity. Most common symptoms were dysphagia (72%), heartburn (48%), reflux (48%), and regurgitation (42%). On EndoFLIP, 8 (24%) had reduced esophagogastric junction distensibility index (EGJ-DI), of which 2 (13%) were classified as obesity class 1, 4 (44%) obesity class 2 and 2 (22%) obesity class 3 (**Table**). 17 (52%) had normal repetitive antegrade contractions (RACs), 7 (21%) diminished/disordered contractile response (DDCRs) and 9 (27%) absent contractility. Abnormal contractility patterns were seen in 7 (47%) obesity class 1, 4 (44%) obesity class 2 and 5 (56%) obesity class 3. There were no significant differences between obesity classes with regards to medication use, co-morbidities, symptoms, endoscopy and EndoFLIP findings.
Conclusion: In this cohort, symptomatic patients in different obesity classes did not have significantly different LES function or peristalsis on EndoFLIP. EGJ distensibility was reduced in a quarter of the study population and seen more frequently in patients with class 2 obesity. Nearly half of the patients had abnormal peristalsis with DDCRs and absent contractility, with similar representation between obesity classes. Prospective controlled studies with EndoFLIP comparing symptomatic and asymptomatic patients in different obesity classes are needed to validate these findings.

Table 1. **Comparison of patient characteristics and EndoFLIP findings by obesity class**

	Class 1 Obesity BMI 30-35 (N=15)	Class 2 Obesity BMI 35-40 (N=9)	Class 3 Obesity BMI >40 (N=9)	p-value
MEDICATIONS N (%)				
PPI	8 (53)	6(67)	5 (56)	0.67
H2 blocker	5 (33)	1 (11)	2 (22)	
Opiods	2 (13)	0	2 (22)	
Benzodiazepines	0	1 (11)	0	

Table 1. (*continued*)

	Class 1 Obesity BMI 30-35 (N=15)	Class 2 Obesity BMI 35-40 (N=9)	Class 3 Obesity BMI >40 (N=9)	p-value
SYMPTOMS N (%)				
Reflux	6 (40)	6 (67)	4 (44)	0.57
Dysphagia	12 (80)	7 (78)	5 (56)	
Heartburn	7 (47)	4 (44)	5 (56)	
Regurgitation	3 (20)	4 (44)	7 (78)	
Belching/Nausea	2 (13)	1 (11)	1 (11)	
Epigastric abdominal pain	4 (27)	2 (22)	2 (22)	
Vomiting	1 (7)	2 (22)	1 (11)	
EGD FINDINGS N (%)				
Esophagitis	4 (27)	2 (22)	3 (33)	0.78
Gastritis	8 (53)	4 (44)	5 (56)	
Fluid in esophagus	1 (7)	2 (22)	3 (33)	
ENDOFLIP FINDINGS				
EGJ-distensibility index N (%) [mean]				
Normal	13 (87) [5.4]	5 (56) [4.65]	7 (78) [4.98]	0.26
Reduced	2 (13) [2.27]	4 (44) [0.91]	2 (22) [2.82]	
Contractility pattern N (%)				
RACs	8 (53)	5 (56)	4 (44)	1
DDCRs	3 (20)	2 (22)	2 (22)	
Absent contractility	4 (27)	2 (22)	3 (33)	

BMI = Body Mass Index; PPI = Proton pump inhibitor; H2 blocker = histamine 2 blocker (eg. famotidine); EGD = Esophagogastroduodenoscopy; EGJ = Esophagogastric Junction; RACs = Repetitive Antegrade Contractions; DDCRs = Diminished or Disordered Contractile Responses

S508

Upper Gastrointestinal Manifestations of SARS-CoV-2 Infection in the United States: A Population-Based Study

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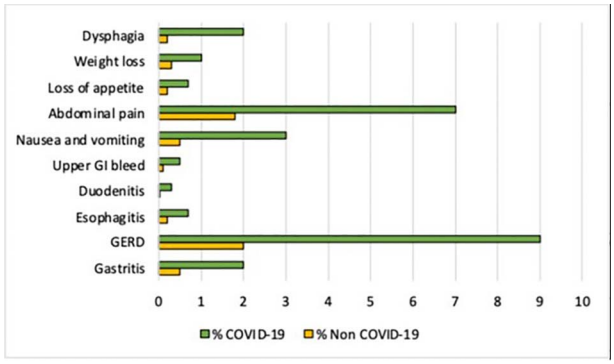
Introduction: Extrapulmonary manifestations of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) Infection are frequently reported and correlate with disease severity and mortality. Our study aimed to assess the association between upper gastrointestinal (GI) disorders and upper GI symptoms with COVID-19 infection.
Methods: We queried a large multi-center database (Explorys Inc., Cleveland, OH, USA), an aggregate of electronic health records of 26 different healthcare systems with 360 hospitals. In the last two years, we identified patients with a Systemized Nomenclature of Medicine-Clinical Terms (SNOMED-CT) diagnosis of "COVID-19". We compared Demographic data and clinical characteristics of patients with and without a diagnosis of COVID-19.
Results: Among the 70,039,864 individuals included in this database, 34,720 individuals were diagnosed with a COVID-19 infection, a prevalence rate of 493 per 100,000 in the US population. COVID-19 infection was more commonly associated with patients of age >65 years (OR 1.18, $p < 0.0001$) and in African American (OR 2.90, $p < 0.0001$). There was no statistically significant gender-based differences. COVID-19 patients were more likely to be suffer from upper GI disorders such as gastritis (OR 4.38), gastroesophageal reflux disease (GERD) (OR 6.02), esophagitis (OR 3.84), upper GI bleeding (OR 4.91), and duodenitis (OR 4.95), $p < 0.0001$ to all. COVID-19 patients were also found to be more likely to have upper GI symptoms such as nausea and vomiting (OR 4.12), abdominal pain (OR 3.70), loss of appetite (OR 3.27), weight loss (OR 2.98), and dysphagia (OR 11.84), $p< 0.0001$ to all (Figure).
Conclusion: In this large population-based study, we found an increased association of upper GI symptoms and upper GI disorders with a diagnosis of COVID-19 infection. It is unclear if patients with a concomitant upper GI etiology have a prolonged or more severe clinical course or prolonged virus shedding in GI specimens. Further prospective studies are required to evaluate this association. (Table)



[0508] **Figure 1.** A comparison of the prevalence of upper gastrointestinal symptoms and conditions in patients with and without COVID-19 infection.

Table 1. **A comparison of the baseline characteristics and upper gastrointestinal conditions and symptoms of patients with and without COVID-19 infection**

	COVID-19 patients (n, %)	Non-COVID-19 patients (n, %)	OR	CI	p-value
Demographics					
Age: 18-65	23,030 (66%)	47,926,050 (68%)	0.92	0.90 to 0.94	< 0.0001
Age: >65	11,730 (34%)	21,254,620 (30%)	1.18	1.15 to 1.21	< 0.0001
Male	15,620 (45%)	31,412,530 (45%)	1.01	0.99 to 1.04	0.1954
Female	19,060 (55%)	38,452,220 (55%)	1.01	0.99 to 1.03	0.3521
Caucasian	16,680 (48%)	37,840,470 (54%)	0.79	0.78 to 0.81	< 0.0001

Table 1. (*continued*)

	COVID-19 patients (n, %)	Non-COVID-19 patients (n, %)	OR	CI	p-value
African American	8,440 (24%)	7,023,300 (10%)	2.9	2.83 to 2.97	< 0.0001
Upper GI Conditions and Symptoms					
Gastritis	800 (2%)	376,990 (0.5%)	4.38	4.08-4.70	< 0.0001
GERD	3,140 (9%)	1,142,660 (1.6%)	6.02	5.81-6.25	< 0.0001
Esophagitis	250 (0.7%)	132,790 (0.2%)	3.84	3.39-.35	< 0.0001
Duodenitis	110 (0.3%)	45,130 (0.01%)	4.95	4.11-5.97	< 0.0001
Upper GI bleed	160 (0.5%)	66,230 (0.1%)	4.91	4.21-.74	< 0.0001
Nausea and vomiting	740 (3%)	370,390 (0.5%)	4.12	3.83-4.43	< 0.0001
Abdominal pain	2,240 (7%)	1,286,290 (1.8%)	3.70	3.55-3.87	< 0.0001
Loss appetite	230 (0.7%)	143,250 (0.2%)	3.27	2.87-3.72	< 0.0001
Weight loss	350 (1%)	239,400 (0.3%)	2.98	2.69-3.31	< 0.0001
Dysphagia	760 (2%)	132,790 (0.2%)	11.84	11.01-12.72	< 0.0001

Univariate analysis used to calculate OR. OR; odd ratio. CI; confidence interval.

S509

Barriers to Barrett's Esophagus Screening Within Veterans Affair Patient Population

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Introduction: Barrett's esophagus (BE) is a metaplastic change in the distal esophagus in which squamous epithelium is replaced by columnar epithelium with goblet cells. Chronic gastroesophageal reflux disease (GERD) is strongly linked to the development of BE, which is a known precursor lesion to esophageal adenocarcinoma (EAC). There is no universal guideline for BE screening, however AJG suggest a single screening endoscopy in patients with chronic GERD symptoms and 3 or more addition risk factors, such as male sex, age > 50 years, white race, tobacco smoking, obesity and family history of BE or EAC. Within the Veteran's Affair (VA) hospital in Northport, New York, many veterans possess multiple risk factors for BE. Residents in VA primary care clinic are diligent in colorectal cancer screening, yet there is concern for limited offerings for BE screening. Our project aims to study the barriers to BE screening within a high-risk veteran population.
Methods: This is a survey-based study. A total of 36 internal medicine residents working in VA primary care clinic were asked to fill out a survey regarding their perspective towards BE screening. The results of the survey are compiled in Table.
Results: 36 residents within the clinic completed the survey. As shown in Table, 35 out of 36 residents expressed that the primary care clinic does not screen for BE adequately. 30 residents expressed uncertainty regarding referral criteria for BE screening, 24 residents revealed having never referred patients for BE screening. When asked about barriers regarding BE screening, consensus polling showed that there is a lack of resident education surrounding indications for screening. Other common barriers include lack of transportation for veterans to appointments, the COVID 19 pandemic, and lack of health literacy within the veteran population.
Conclusion: Although there is no established guideline for BE screening, per AJG there is recommendation for a one-time screening endoscopy in susceptible population. VA patients pose a high-risk population that appears to have low screening rates. Patients appear to be placed on long term PPIs without re-assessment and endoscopic screening despite possessing multiple risk factors for BE. Our survey shows that within our resident cohort there is concern for lack of awareness regarding screening criteria for BE. With the initiation of this project, we hope to increase awareness of BE screening within the resident group and improve health outcomes within veteran population.

Table 1. 36 residents from the Internal Medicine program working in VA Long Island answered the survey regarding Barrett's Esophagus screening. The questions asked on the survey are listed in the first column, and the answer is listed after each question accordingly

Question	Answer from Survey			
Do you think our clinic is screening enough for BE?	1 answered yes	35 answered no		
When seeing patient on chronic PPI, do you tend to take further history regarding their GERD before continuing their PPI?	2 answered always	15 answered sometimes	15 answered rarely	4 answered never
When you receive request for PPI renewal, do you ask for more information before renewing?	1 answered always	4 answered sometimes	18 answered sometimes	13 answered never
Do you know the risk factors for BE?	27 answered yes	9 answered no		
Do you know when to refer patients to GI clinic for BE screening?	6 answered yes	30 answered no		
How often in the past have you referred veterans to GI clinic for EGD and BE screening?		2 answered sometimes	10 answered rarely	24 answered never

S510

A Clinical Dilemma: Surveillance of Barrett's Esophagus in the Face of Concurrent Esophageal Varices

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Introduction: The diagnosis and management of non-dysplastic, dysplastic, and neoplastic Barrett's esophagus (BE) can be complicated by the presence of esophageal varices (EV). Due to the bleeding risk associated with esophageal varices, biopsies of suspected BE can be challenging to obtain. As a result, patients with both varices and BE may not receive adequate surveillance of their Barrett's esophagus and may be at an increased risk for esophageal adenocarcinoma.
Methods: This is a retrospective chart review to analyze whether patients with Barrett's esophagus and concurrent esophageal varices received adequate surveillance of BE related pathology. ICD 10 codes were used to extract data from 2010-2021 for patients who had concurrent diagnoses of both BE and esophageal varices. Outcomes analyzed included whether biopsies were obtained in diagnosis and surveillance of BE, and the development of dysplasia and/or esophageal adenocarcinoma.
Results: A total of 12 patients were included in the cohort. The mean age of patients was (63.8 ± 9.7) years and 75% (9/12) were male. An equal number of patients had long segment and short segment BE. The majority of the cohort had large EV (75%). Only 5 (41.7%) of the 12 patients with EV and BE received adequate surveillance. In the 5 cases, biopsies were obtained to confirm the diagnosis of BE and routine endoscopic surveillance of BE was performed every 3-5 years with repeat biopsies. The remaining 7 patients did not receive adequate surveillance of BE as described in Table. Of these 7 cases without adequate surveillance, 2 patients never had biopsies from the suspected BE due to bleeding concerns. One patient had an initial biopsy confirming BE but insufficient surveillance biopsies due to bleeding risk. Two cases (cases #6 and #7) developed advanced pathology (high grade dysplasia and invasive esophageal adenocarcinoma) with 1 resulting death from esophageal cancer.

Conclusion: In summary, this small study of 12 patients with BE and EV suggests that endoscopic surveillance may not be prioritized in the setting of varices. As a subset of these patients may still develop dysplasia and even adenocarcinoma, decision-making in this setting should weigh the relative risks of surveillance endoscopy and biopsies versus a more conservative approach. Two of these patients without adequate surveillance developed advanced pathology. This study highlights the importance and difficulty in providing adequate endoscopic surveillance in patients with BE and EV.

Table 1. Cases without Adequate Barrett's Esophagus (BE) Surveillance; adequate surveillance defined as repeat biopsy every 3-5 years for BE without dysplasia, in 3 to 6 months for indefinite dysplasia

Case	Length BE	Size of Esophageal Varices	Biopsy for Diagnosis?	BE Progression Seen Endoscopically?	Biopsy after progression?
1	short	small	N/A due to bleeding concerns	none	N/A
2	long	large	N/A due to bleeding concerns	none	N/A
3	unspecified	small	intestinal metaplasia	none	N/A
4	long	small	N/A due to bleeding concerns	nodular development	metaplasia, negative for dysplasia
5	short	large	N/A due to bleeding concerns	cratered ulcer	brush biopsy negative for malignancy
6	long	large	indefinite for dysplasia	increased length BE	high grade dysplasia
7	long	large	N/A due to bleeding concerns	nodular development	esophageal adenocarcinoma

S511

Oral Nitroglycerin Solution to Treat Esophageal Food Impaction (NEFI): A Multicenter Retrospective Study

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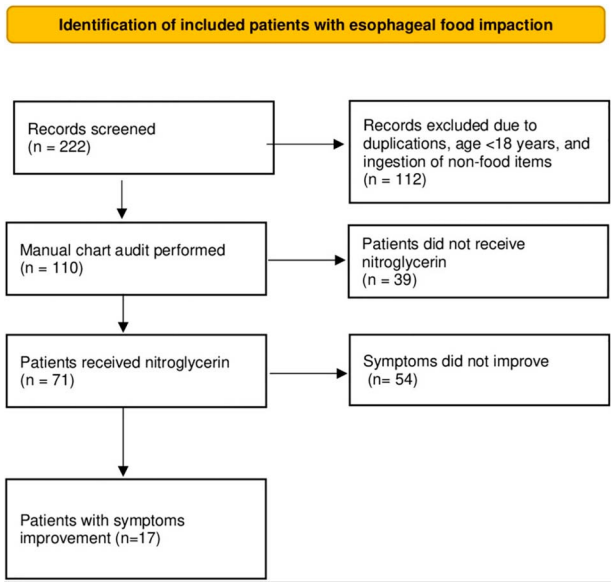
Introduction: Esophageal food impaction (EFI) is a relatively common occurrence, with estimated 13 episodes/100,000 people/year. It is initially treated with a trial of medications, such as glucagon and benzodiazepines; however, with limited success. Patients usually require an urgent endoscopy if these drugs fail. Recently, anecdotal reports of successful use of oral nitroglycerin (NTG) in EFI have been reported. The possible mechanism is NTG-induced smooth muscle relaxation by cGMP generation. However, a single-arm study found that oral NTG alleviated EFI symptoms in only 2 of the 17 subjects, and EGD showed the presence of food bolus in 12 out remaining 15 patients. This multicenter retrospective study aims to identify the effectiveness of oral NTG in EFI patients.
Methods: This is a retrospective chart audit of patients who visited ER of 3 community hospitals with EFI symptoms from 1Jan 2020 to 1Nov 2021. Patients were identified by the discharge ICD-10 codes T18.128A and T18.2XXA. Inclusion criteria were adult and non-pregnant patients. Patients were excluded if they had swallowed non-food items such as metallic objects or batteries. The study was approved by IRB (1690712-1).
Results: A total of 71 pts (mean age 62.52yrs) (Figure) received a maximum of 2 doses of oral NTG solution (prepared by dissolving 0.4 mg of NTG in 5-10cc of water) orally. Seventeen patients (24%) had improvement in their symptoms. The oldest patient was 102yrs old who had improvement in their symptoms and did not need urgent EGD. Twelve patients did not undergo EGD and were discharged from the ER with instructions to get elective EGD in 4-6 weeks as outpatients. Five patients who underwent EGD even after improvement in their symptoms showed the absence of food bolus in 3 patients, and the other two patients had esophagitis. A total of 13 patients (13/54 patients) who did not improve with NTG showed features of eosinophilic esophagitis. None of these patients had malignant appearing stricture on EGD. Predictors of non-response appeared to be a history of EoE and proximal impaction.
Conclusion: Oral NTG solution worked in about 24% of pts presenting to ER with EFI. The efficacy of oral NTG appears to be similar to other currently used medications such as glucagon, and it can be used as an adjunct therapy when other conservative managements fail. The purpose of using NTG is not to avoid EGD but to avoid emergent EGD. Therefore, these patients should undergo EGD on the follow-up to determine the cause of food impaction.



[0511] **Figure 1.** Identification of included patients with esophageal food impaction

S512

Predictive Model for Refractory Benign Esophageal Strictures

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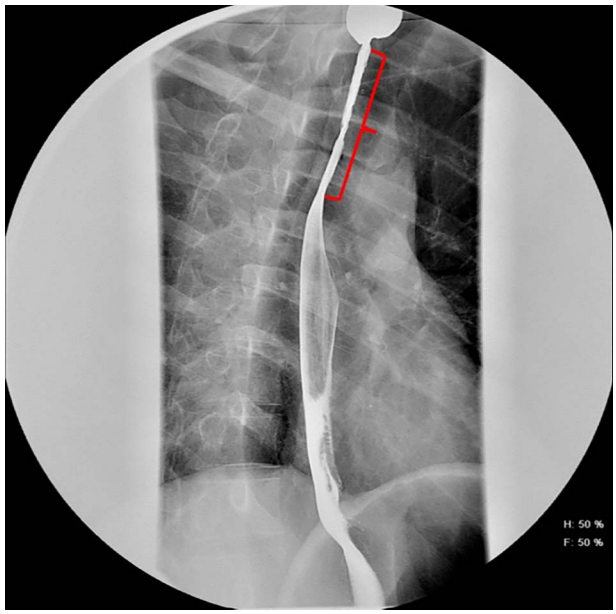
Introduction: Refractory benign esophageal strictures (RBES) are defined by inadequate response to endoscopic dilation. While adjunctive modalities such as corticosteroid injection improve outcomes in RBES, lack of reliable predictors results in therapeutic delays with associated cost and morbidity. We sought to establish a predictive model for RBES.
Methods: Patients were identified through search of CPT codes for esophagogastroduodenoscopy (EGD) with esophageal stricture dilation, with identified cases performed after October 1, 2012 reviewed sequentially. In addition, a cohort of RBES patients from a prospectively maintained clinical database of self-dilation patients was identified. Demographic information, endoscopic findings, and dilation characteristics were collected. Malignant strictures, Schatzki rings, and previously treated strictures were excluded. RBES was defined by inability to achieve or maintain a diameter ≥14mm over 5 consecutive dilation sessions. Univariate and multivariable regression models were performed. Multivariable models were chosen by minimizing the AIC statistic, with model intercepts adjusted due to the increased prevalence RBES.
Results: 128 patients with index EGD and esophageal dilation were identified, with 25 (19.5%) meeting criteria for RBES. An additional 63 RBES patients were identified from the self-dilation patient cohort for a total of 88 RBES and 103 non RBES patients included in the analysis. Male gender, longer length, smaller diameter, upper/middle esophageal location, and radiation induced strictures were associated with RBES ($p < 0.05$). Given inconsistent reporting of stricture length and diameter, multivariable analysis both with and without these variables was performed with both yielding strong predictive models with c-statistic of 0.87 and 0.85, respectively. **(Table)** Subsequently, a predicted probability formula (Score=Intercept +coefficient1 *variable1 + coefficient2 *variable2 +…. Risk= 1/1+exp(-Score)) was created for RBES risk prediction at the time of index EGD for individual patients. **(Figure)**
Conclusion: RBES can be predicted at index EGD based on patient characteristics and stricture features. Further, we demonstrate that a strongly predictive formula can calculate RBES risk on a case-by-case basis, potentially allowing for individualized patient care to guide therapeutic approach and reduce associated morbidity and cost in esophageal stricture management.



[0512] **Figure 1.** Esophagram from a 35-year-old-male who sustained caustic ingestion injury leading to this 7cm stricture in the proximal esophagus (red bracket). Endoscopy displayed a minimum stricture diameter of 4mm. Utilizing model 1, which includes stricture length and diameter, this patient had a predicted RBES risk of 0.60 at the time of index endoscopy. This patient went on to develop RBES.

Table 1. Multivariable models for RBES with and without consideration of stricture length and diameter Model 1 is a multivariable model that includes stricture length, diameter, and location

Variable	Odds Ratio	Confidence Interval	p-value	Model Coefficient	Model Intercept
Model 1: N=116, c=0.87					-0.3963
Stricture Length	1.34	0.95-2.17	0.174	0.2927	
Stricture Diameter	0.73	0.61-0.86	< 0.001	-0.3131	
Lower Esophagus Location	0.23	0.07-0.72	0.012	-1.4765	
Model 2: N=183, c=0.85					-3.5810
Anastomotic	0.30	0.11-0.76	0.012	-1.2024	
EOE/LP	0.45	0.14-1.47	0.185	-0.7912	
Peptic/CP Bar	0.07	0.02-0.24	< 0.001	-2.6409	
Male Gender	3.15	1.45-7.10	0.004	1.1470	
Lower Esophagus Location	0.24	0.08-0.70	0.009	-1.4354	
Age	1.03	1.00-1.06	0.035	0.0304	

Similarly, Model 2 is a multivariable model that did not consider stricture length or diameter. Both models can be used individually to calculate a predicted risk of RBES utilizing the equation Score=Intercept +coefficient1 *variable1 + coefficient2 *variable2 +…. and Risk= 1/(1+exp(-Score)). EOE=Eosinophilic Esophagitis, LP=Lichen Planus, CP Bar=Cricopharyngeal Bar.

S513

GERD Symptoms Often Improve After Magnetic Sphincter Augmentation (MSA) Device Removal

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Introduction: Gastroesophageal reflux disease (GERD) affects over 20 million people in the United States. Chronic reflux of gastric contents into the distal esophagus may result in benign or malignant esophageal strictures causing varying degrees of dysphagia. Magnetic Sphincter Augmentation device (MSA), or LINX, creates an artificial narrowing of the distal esophagus at the level of the LES to prevent gastric reflux into the esophagus. Individuals intolerant of this implanted device require surgical excision. Dense scarring at the site of MSA device explantation, may prevent reflux recurrence in a select group of patients.
Methods: Between Oct 2017 and June 2021, 118 MSA devices were placed at our institution. Each patient underwent GERD-Health Related Quality of Life Questionnaire (GERD-HRQL), General Anxiety Disorder (GAD-7) questionnaire, endoscopy, Barium Swallow, Esophageal Manometry and pH monitoring to assess esophageal function prior to MSA device placement. . 8 out of 118 (6.7%) patients had their LINX removed due to intolerance. After surgical explantation of the device, follow-up visits compared GERD related symptoms to those obtained prior to their initial anti-reflux surgery.
Results: The mean time from MSA device placement to removal in patients with dysphagia was 170.6 days, whereas for those with anxiety related hypersensitivity, it was only 24 days. Causes for removal included esophageal perforation, dysphagia or hypersensitivity related chest pressure. The longer the implants remained in place before removal, the more extensive the scar tissue encountered at time or removal. Five of eight patients (62%) experienced improvement in their GERD-HRQL scores after removal of the MSA device when compared to scores obtained prior to LINX implantation. The residual band of scar tissue observed at the site of device removal, appears to restrict relaxation of the esophageal outlet and prevents reflux of gastric contents into the distal esophagus.
Conclusion: These results indicate that fibrosis at the site of MSA device explantation prevents heartburn symptoms in a majority of patients by reducing LES relaxation. We do not recommend pursuing a fundoplication at time of LINX removal as symptoms of GERD may be adequately controlled by surgical scarring at the level of the LES. Individuals with anxiety and a hypersensitive esophagus are not good candidates for the MSA device.

ESOPHAGUS

S2254 Presidential Poster Award

Use of Upadacitinib in Refractory Esophageal Lichen Planus: Endoscopic Improvement in "Planus" Sight

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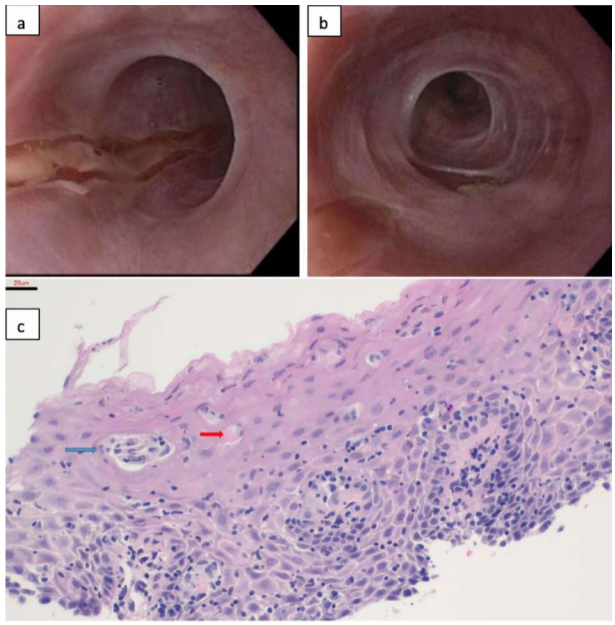
Introduction: Lichen planus (LP) is an inflammatory skin condition that affects oropharyngeal and esophageal mucosa. Esophageal LP (ELP) has a prevalence of 0.19% but is thought to be underdiagnosed. It presents with ulceration, exudates, rings and/or strictures. Although pathogenesis of LP is incompletely understood, the JAK signaling pathway is thought to play a role. Upadacitinib is a selective JAK1 inhibitor approved for use in ulcerative colitis. We present a case of refractory ELP with endoscopic and histologic response to upadacitinib after failing standard treatment.
Case Description/Methods: A 68-year-old female with history of Sjogren's syndrome, LP, and prior peptic stricture at the gastroesophageal junction presented with dysphagia to both liquids and solids, intermittent reflux, regurgitation, and self-limited impactions. An EGD showed esophageal stenosis, severe esophagitis, and mucosal ulceration (**Figure A**). Passage of the scope resulted in dilation; however, formal dilation of stenosis was not performed due to severity of esophagitis. Esophageal biopsies revealed squamous mucosa with parakeratosis, dyskeratotic cells and scattered lymphocytes consistent with ELP. Subsequently, the patient recalled having a remote history of oral lichen planus. She was started on pantoprazole 40 mg twice daily and budesonide oral slurry with limited response. With co-management by gastroenterology and dermatology, she was initiated on mycophenolate 500 mg daily and increased to 2000 mg twice a day. She continued to lack both histologic and symptomatic improvement remaining limited to a soft and liquid diet resulting in a 20lb weight loss. She was started on monotherapy with upadacitinib 30 mg twice daily. This resulted in marked symptomatic recovery with repeat endoscopy 3 months later showing dramatic macroscopic and histologic improvement (**Figure B**), with only some residual fibrostenotic disease remaining (**Figure C**).
Discussion: Multimodal treatment is typically employed in ELP with medical therapy and endoscopic dilation. Systemic or topical steroids are first line, with efficacy estimated at 60-70%. Other therapies include tacrolimus, cyclosporine, mycophenolate, rituximab, adalimumab, and tofacitinib, however data for these therapies are limited. To date, there are only 2 cases reported in the literature of successful treatment of oro-esophageal LP with upadacitinib. Given profound improvement seen in our patient, upadacitinib may offer another alternative for these difficult-to-treat patients.



[2254] **Figure 1.** 1a. ELP on initial diagnostic endoscopy before initiation of therapy. 1b. Follow up endoscopy performed after 12 weeks of upadacitinib treatment. 1c. Lichenoid esophagitis: lymphocytic infiltrates, focal histiocytic aggregate (blue arrow) and dyskeratosis (Civatte body, red arrow).

S2255 Presidential Poster Award

Oral Viscous Budesonide Ameliorates PPI-Refractory Lymphocytic Esophagitis: A Longitudinal Clinical, Endoscopic, and Histologic Outcome Case Report

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Introduction: Lymphocytic esophagitis (LyE) is a new and emerging immune-mediated esophageal disease, manifesting clinically as dysphagia. Its natural history and effective treatments remain poorly characterized. We present a patient with LyE complicated by esophageal strictures refractory to proton-pump inhibitor (PPI) therapy, who demonstrated clinical, endoscopic and histologic improvement on swallowed oral viscous budesonide (OVB).
Case Description/Methods: A 77-year-old nonsmoker nonatopic female with a history of remote buccal lichen planus, lymphocytic colitis, depression, anxiety, osteoarthritis, presented with chronic progressively worsening dysphagia to solids refractory to omeprazole 20 mg twice daily. Initial EGD elsewhere showed a narrowed esophagus with diffuse pallor, edema, decreased vascularity, diffuse rings, mucosal scarring, and distal strictures status post dilation. Esophageal biopsies showed LyE with >25 intraepithelial lymphocytes (IEL)/hpf proximally and distally. Our index EGD, 5 months after the initial outside EGD, revealed similar findings requiring esophageal dilation to 15-mm. Optimization of omeprazole was attempted but was limited to 20 mg daily due to dizziness. Repeat EGD after 3 months (month 8) showed worsening disease. OVB at 2 mg twice daily was added at month 9 to low-dose PPI, with clinical improvement within 2 weeks. OVB was reduced to 1 mg twice daily after 3 months due to joint pain. After 5 months on OVB and low-dose PPI, EGD showed partial improvement, with histologic remission proximally but not distally. EGD after 2 additional months on OVB monotherapy, off PPI, showed continued endoscopic improvement with decreased edema, improved vascularity, and improved esophageal caliber with no mucosal scarring. Mild diffuse esophageal rings were still present but appeared improved. Two distal esophageal strictures were dilated to 15-mm. Pan-esophageal biopsies improved histologically. Patient remains clinically improved on reduced OVB dose at 0.5 mg twice daily.
Discussion: LyE has clinical and endoscopic features reminiscent of eosinophilic esophagitis (EoE); however, esophageal non-granulocytic infiltration with >20 peripapillary IEL/hpf is a predominant histologic feature within a spongiotic epithelium. Guidance for LyE therapy has not been established. Using OVB dosing regimen from EoE clinical trials, our case details longitudinal clinical, endoscopic and histologic outcomes in PPI-refractory LyE with treatment response to OVB, serving a basis for future studies.

S2256 Presidential Poster Award

Multifocal Pyloric Gland Adenoma of the Esophagus Treated by Circumferential Endoscopic Submucosal Dissection

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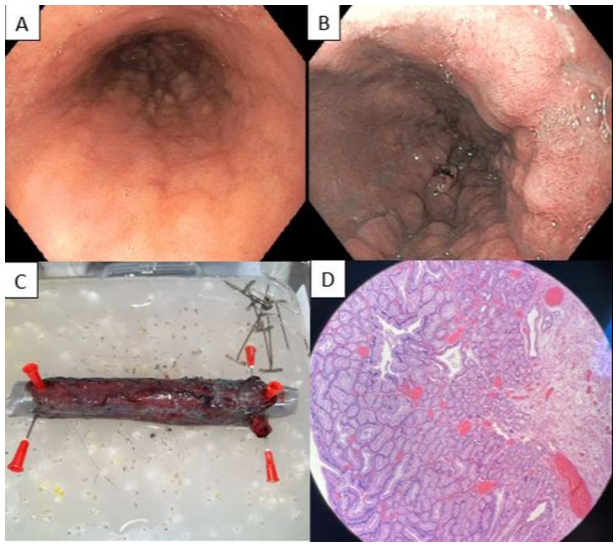
Introduction: A pyloric gland adenoma (PGA) is a rare precancerous neoplasm typically seen as an isolated polypoid lesion in the stomach. We present a case of multifocal, circumferential PGA within long-segment Barrett's esophagus treated by endoscopic submucosal dissection (ESD).
Case Description/Methods: A 49-year-old female presents complaining of pyrosis and regurgitation. She reports a long history of GERD and adheres to esomeprazole twice daily, but continues to have breakthrough symptoms. Her risk factors include White race, active tobacco use and obesity. EGD demonstrated endoscopic evidence of Barrett's esophagus, C10M14, with extensive carpeted nodularity from lateral to posterior wall with circumferential involvement at the GEJ with extension to the cardia. Close examination under high definition white light and NBI showed scattered areas of tortuous, dilated pit pattern without ulceration or evidence of malignancy. Random and targeted biopsies were obtained throughout the esophagus to demarcate the lateral and circumferential extent of mucosal abnormality and to evaluate for dysplasia. Pathology showed columnar mucosa with intestinal metaplasia and multifocal PGA without dysplasia. Deemed to be a poor candidate for esophagectomy, the patient underwent successful circumferential ESD with prophylactic steroid injection to prevent stricture formation (**Figure**).
Discussion: PGA is an uncommon lesion of the gastrointestinal tract with a transformation rate to adenocarcinoma up to 47%. It predominantly affects female (3:1) with a mean age of diagnosis of 73 years. While most PGAs are observed in the stomach, extragastric sites including the esophagus, duodenum and pancreas have been reported. In the esophagus, PGA may arise in either Barrett's or normal epithelium and often appears as a single protruding lesion. Histologically, it consists of tightly packed pyloric glands lined by cuboidal to columnar cells with round nuclei and small nucleolus in a background of eosinophilic, ground-glass cytoplasm. While there is no guideline on the management of PGA, resection is indicated due to its malignant potential. This case poses a unique, challenging clinical conundrum owing to its extensive involvement. To our knowledge, this is the first case of a circumferential, multifocal PGA in the esophagus and we demonstrated ESD to be a feasible management option for select patients in whom close interval repeat EGDs can be performed for both post-procedural complications and recurrence of lesion surveillance.



[2256] **Figure 1.** A. Mid-esophagus on high definition white light showing carpeted nodularity in background of Barrett's Esophagus B. Mid-esophagus on NBI with nodules demonstrating dilated, tortuous pit pattern C. Gross specimen of circumferential ESD of esophagus measuring 13.9cm in length affixed to plastic tube. D. Tightly packed pyloric glands lined by cuboidal or low columnar epithelium with ground glass eosinophilic cytoplasm, round basally located nuclei with inconspicuous nucleoli, and absent apical mucin.

S2257 Presidential Poster Award

Cirrhosis, Varices, and Barrett's Esophagus: WATS3D-only Surveillance and Band Ligation in the Management of Nondysplastic Barrett's Esophagus Progressing to High Grade Dysplasia With Underlying Esophageal Varices

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Introduction: Wide-area transepithelial sampling with 3-dimensional computer-assisted analysis (WATS^{3D}) is an emerging technique used to collect esophageal samples via transepithelial brushing. WATS^{3D} can be a safe and useful tool in Barrett's esophagus (BE) management in patients with underlying small esophageal varices (EV) where traditional 4 quadrant cold forceps biopsies (CFB) would be contraindicated due to the risk of adverse events such as bleeding. We describe the utility of WATS^{3D}-only surveillance combined with band ligation in the management and eradication of BE which progressed to high grade dysplasia (HGD) in a patient with underlying cirrhosis and EV.
Case Description/Methods: We present a 66-year-old male with a history of nondysplastic (ND) BE (C0-M1), small Grade 1 EV and cirrhosis who presented for BE surveillance. Due to underlying EV and associated risk of bleeding, CFB was not performed and sampling with WATS^{3D}-only was undertaken. WATS^{3D} was first performed with surveillance esophagogastroduodenoscopy (EGD) in 2015 and demonstrated ND BE. On further EGD surveillance, BE histology remained ND until early 2021 where WATS^{3D} revealed low grade dysplasia (LGD). Repeat EGD with WATS^{3D} brushing was performed 4 months later, which demonstrated progression to HGD. Interval surveillance EGD with WATS^{3D} brushing was, again, performed 4 months later and demonstrated LGD with rare foci of HGD. Of note, in both instances band ligation of the dysplastic segments was done. EGD with WATS^{3D} 3 months later revealed endoscopic clearance of BE post-banding and pathology report revealed, ND, non-goblet cell metaplasia. The final interval surveillance EGD with WATS^{3D}, 3 months later, showed complete eradication of BE with no evidence of intestinal metaplasia. Table 1 provides a thorough chronological description from first EGD to complete resolution of BE, 8 years later.
Discussion: WATS^{3D} has been increasingly shown to be an effective BE surveillance and screening tool. However, given the lack of data regarding appropriate surveillance windows for WATS^{3D}-only BE surveillance, we performed sampling at shorter intervals than what would otherwise be recommended, to confirm the lack of dysplasia. This case presents a unique approach to WATS^{3D}-only surveillance combined with band ligation therapy of dysplasia in the management of BE in a cirrhotic patient with underlying EV. Additionally, this case is unique in clearly documenting progression of a short segment of ND BE to HGD with WATS^{3D} sampling alone.

Table 1. Summary of findings and intervention from first EGD to complete resolution of BE (8 year window)

Date	Variceal Grade	Prague Score	Number of BE Islands	Sampling done by WATS3D	Pathology Findings	Banding therapy (# of bands)
04/09/14	2	C0-M1	3	No	N/A	0
07/29/15	2	C0-M1	Scattered	No	N/A	0
12/2315	1	C0-M1	Scattered	Yes	No dysplasia	0
06/15/16	1	C0-M1	Scattered	Yes	No dysplasia	0
02/08/17	2	C0-M1	Scattered	No	N/A	4
01/22/18	1	C0-M1	1	No	N/A	0
01/30/19	2	C0-M1	2	No	N/A	0
01/29/20	1	C0-M1	2	No	N/A	0
02/01/21	1	C0-M1	2	Yes	Low-grade dysplasia	0
06/01/21	1	C0-M1	2	Yes	High-grade dysplasia	3
10/25/21	1	C0-M1	2	Yes	Low-grade with rare foci of high-grade dysplasia	2
01/25/22	1	N/A	3	Yes	Non-goblet cell metaplasia, no dysplasia	0
04/25/22	1	N/A	0	Yes	Squamocolumnar, no dysplasia or metaplasia	0

S2258 Presidential Poster Award

Subcutaneous Emphysema of the Penile Shaft: A Rare Complication of Peroral Endoscopic Myotomy

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Introduction: Peroral endoscopic myotomy (POEM) is a procedure introduced in 2010 that has gained notoriety in recent years for the treatment of achalasia, largely replacing the conventional Heller myotomy. It has been shown to have less complications than traditional management and many patients no longer require symptomatic management after the procedure. As with any procedure, adverse events can occur. In the case of POEM, these include perforation, bleeding, and events related to insufflation, such as pneumothorax, pneumoperitoneum, and subcutaneous emphysema.
Case Description/Methods: A 64 y.o male with a past medical history of hypertension and GERD underwent POEM for persistent achalasia. FLIP panometry showed evidence of Type 1 achalasia. Gas insufflation with CO2 was utilized to distend the esophagus and mucosal tissues in order to create a submucosal tunnel. A full thickness myotomy in a posterior orientation was started at 35cm from the incisors and was extended to 42 cm from the incisors, with extension into the cardia by 3cm. The tunnel was closed with endoscopic clips and hemostasis was obtained. During the procedure, there was build-up of CO2 in the abdomen during the procedure, necessitating needle decompression after the POEM was completed. During the decompression, while under anesthesia, the patient had a violent coughing episode. During post-operative recovery, asymptomatic crepitus of the penile shaft was discovered, presumably due to the coughing episode and tracking of carbon dioxide into the distal tissues. Patient continued to display crepitus during the remainder of his hospital stay that was nontender and did not interfere with urination.
Discussion:: Peroral Endoscopic myotomy (POEM) is now considered the first line for treatment of achalasia due to its safety and effectiveness of symptom reduction shown by multiple meta-analyses. Although adverse events are rare, the highest risk is for insufflation complications, especially subcutaneous emphysema. This case presentation is unique because this is the first mention of subcutaneous emphysema of the penile shaft, as extension is typically only into the legs, chest, head neck, labia, or scrotum.

S2259 Presidential Poster Award

The Efficacy and Safety of Treatment Outcomes for Refractory Benign Esophageal Strictures Using a Novel Combination of Needle-Knife Stricturoplasty, Balloon Dilation, and Steroid Injection

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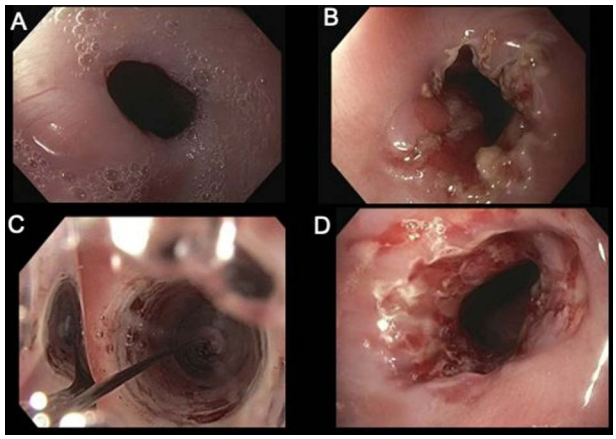
Introduction: Benign esophageal strictures that are refractory to standard endoscopic techniques can significantly impair a patient's quality of life leading to complications such as malnutrition and weight loss. When repeat dilations fail to achieve an adequate luminal diameter or resolve dysphagia, further therapy with needle knife or steroid injections are needed. However, patients can still clinically fail. In an effort to manage such strictures we employed a novel triple combination of needle-knife stricturoplasty, balloon dilation, and steroid injection to assess clinical outcomes and safety.
Case Description/Methods: This was a single center retrospective study of all adult patients with benign strictures that were refractory to conventional endoscopic therapy and removable self-expanding metal stenting. The triple therapy consisted of at least 4 longitudinal needle knife incision followed by balloon dilation and then targeted 4 quadrant intralesional steroid injections (**Figure**). Primary success was defined as a 50% reduction in repeat endoscopic therapy needed. Secondary outcomes included periodic dilation index, esophageal diameter changes, technical success, and complications. Four patients (average age 49.7 years, average body mass index 22.8 kg/m^2) underwent endoscopic therapy for complex benign strictures using our triple therapy technique (Table). Stricture etiologies included peptic strictures (n= 3) and an anastomotic stricture (n=1). All patients previously required esophageal stenting (range 1-3). There was 100% technical success rate with no adverse events. The average diameter of the esophagus before and after triple therapy was 4.2 ± 1.63 mm and 13 ± 1.36 mm, respectively. The periodic dilation index was 6.3 (range 12-2) before and 1.5 (range 5–0) after triple therapy. The mean length of follow up was 316 days (range 116-425).
Discussion: Triple combination therapy may be useful in benign strictures that are refractory to standard techniques. We do recommend needle knife before dilation to enhance the efficacy of steroid injections. In light of our findings, this method should be considered when strictures are refractory after 2-3 dilation sessions and/or stent therapy. Larger studies are needed to validate these findings and identify predictive factors that can enhance clinical success using this novel combination.



[2259] **Figure 1.** Esophageal stricture (A) that was treated with needle knife (B), balloon dilation (C) and then steroid injections (D).

Table 1. Patient characteristics and clinical outcomes

Patient	Age/Sex	Stricture Etiology	Initial stricture diameter	Stricture diameter after triple therapy	Number of triple therapy procedures	Length of follow up (days)
1	30/Male	GERD	7 mm	13.5 mm	1	425
2	59/Male	Anastomotic	3 mm	15 mm	2	421
3	57/Male	GERD	3 mm	11.5 mm	4	304
4	53/Male	GERD	4 mm	12 mm	2	116

S2260 Presidential Poster Award

Treatment of Achalasia With Endoscopic Ultrasound-Guided Botulinum Injection in the Setting of Esophageal Varices

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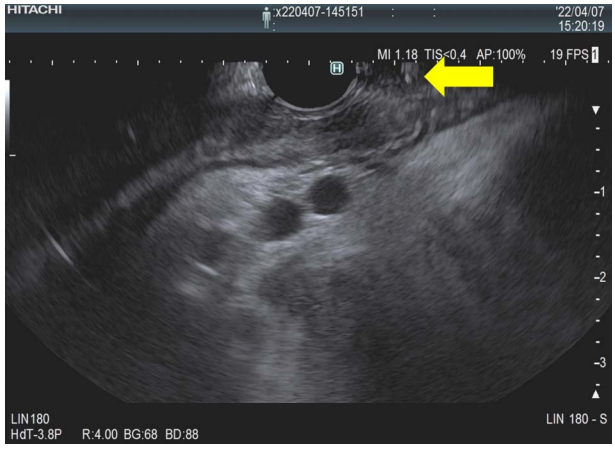
Introduction: Achalasia in the setting of esophageal varices prompts difficult decisions in management given potential complications from liver disease and increased risk of variceal bleeding from stagnant food causing esophageal inflammation. Considering treatment options like pneumatic dilation, botulinum toxin injection, peroral endoscopic myotomy, or heller myotomy presents a challenging dilemma. We describe a case of achalasia treated with endoscopic ultrasound (EUS) guided botulinum toxin injection in a patient with esophageal varices.
Case Description/Methods: A 69-year-old man with cirrhosis secondary to non-alcoholic steatohepatitis complicated by esophageal varices, portal hypertensive gastropathy, and portal vein thrombosis presented with dysphagia and malnourishment. Grade 2 large middle and lower esophageal varices and a Schatzki ring were found during esophagogastroduodenoscopy (EGD) and dilated with a through-the-scope balloon to 18mm. His dysphagia partially improved. Esophageal manometry showed pan-pressurization consistent with type 2 achalasia. Given his varices and 30 day post operative mortality risk of 34%, surgical management such as Heller myotomy was excluded. Co-existing achalasia with dysphagia made it more challenging to treat the esophageal varices in 3 separate EGD's. After multidisciplinary discussion, it was decided to proceed with an EUS-guided Botulinum toxin (Botox) injection for the treatment of achalasia. The muscularis propia (MP) of the lower esophageal sphincter (LES) was identified by EUS, which was used to guide an endoscopic needle into this layer for injection of 100 units of botulinum toxin while avoiding intervening vessels and varices. Varices were subsequently ligated. On follow-up, the patient was able to eat and drink normally.
Discussion: In patients with liver cirrhosis, achalasia worsens nutritional status which could prevent candidacy for transplant. Botox injections can temporarily counteract the loss of inhibitory neuron function in achalasia by inhibiting acetylcholine release in the excitatory neurons that stimulate the LES. This provides an important window to improve nutritional status and likelihood of transplant candidacy. EUS-guided Botox injection to avoid varices followed by variceal ligation is potentially a safer method for delivering botulinum toxin to the LES. EUS allows identification of the MP and identifies an endoscopic needle trajectory that will not course through any potential vessels, such as varices as demonstrated in this case.



[2260] **Figure 1.** EUS demonstrating avoidance of esophageal varices as the endoscopic needle advanced towards the muscularis propia for botulinum toxin injection at the lower esophageal sphincter.

S2261 Presidential Poster Award

Vape-Induced Herpes Simplex Esophagitis in an Immunocompetent Host

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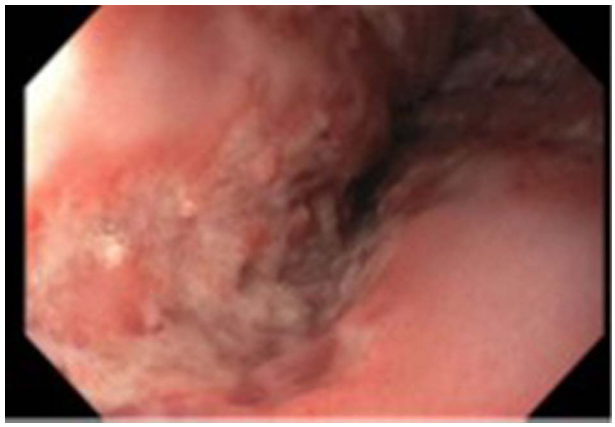
Introduction: Herpes Simplex Virus esophagitis is a histopathologic diagnosis almost exclusively present in immunocompromised patients. Typical complaints include retrosternal chest pain or non-specific GERD-like symptoms, however occasionally the disease manifests as severe dysphagia and odynophagia. We present a case of a 28-year-old male with no significant medical history presenting to the emergency department on back-to-back days with retrosternal chest pain and worsening odynophagia. Less than 2 months ago he had begun vaping on a daily basis, frequently in a group setting and sharing with friends. During the preceding week he noted fevers, lethargy, and odynophagia and was presumed to have strep throat. Subsequent EGD with biopsies revealed HSV esophagitis. IV acyclovir almost immediately resolved his symptoms; the patient was quickly transitioned to oral medication and discharged home. HSV esophagitis in an immunocompetent host is exceedingly rare, and vape-induced esophagitis has also been sparingly reported in literature in recent years. Both infectious and non-infectious etiologies for esophagitis should be considered in appropriate populations, and while guidelines for infectious esophagitis in immunocompetent hosts are lacking, we propose initiating antiviral therapy for such patients.
Case Description/Methods: Our case presentation involves a young, immunocompetent man presenting for evaluation of severe dysphagia and odynophagia. Upon further evaluation the patient was found to have HSV esophagitis requiring IV antiviral therapy. Notably, the patient had recently begun using a vape, or nicotine, pen with his friends, and we theorize that he had contracted HSV from these recreational activities. HSV esophagitis is exceedingly rare in immunocompetent hosts and, as such, is worthy of discussion and recognition in this rare case (**Figure**).
Discussion: A link between esophageal damage and vaping has been described briefly in literature, and with the massive influx in vape-users on a daily basis in the USA and across the world, more research and knowledge is needed about both short-term and long-term effects of using such products. This case effectively illustrates the dangers of both vaping on the mucosa barriers of the GI tract as well as the transmission of HSV among vape-sharers. As vaping continues to rise as a social activity, we are confident this will not be the last case reported with such a relationship.



[2261] **Figure 1.** Middle 1/3rd of esophagus; inflammation consistent with grade D esophagitis is seen, with characteristic ulcerations.

S2262 Presidential Poster Award

A Rare Case of Metastatic Muscle Invasive Bladder Cancer to the Esophagus

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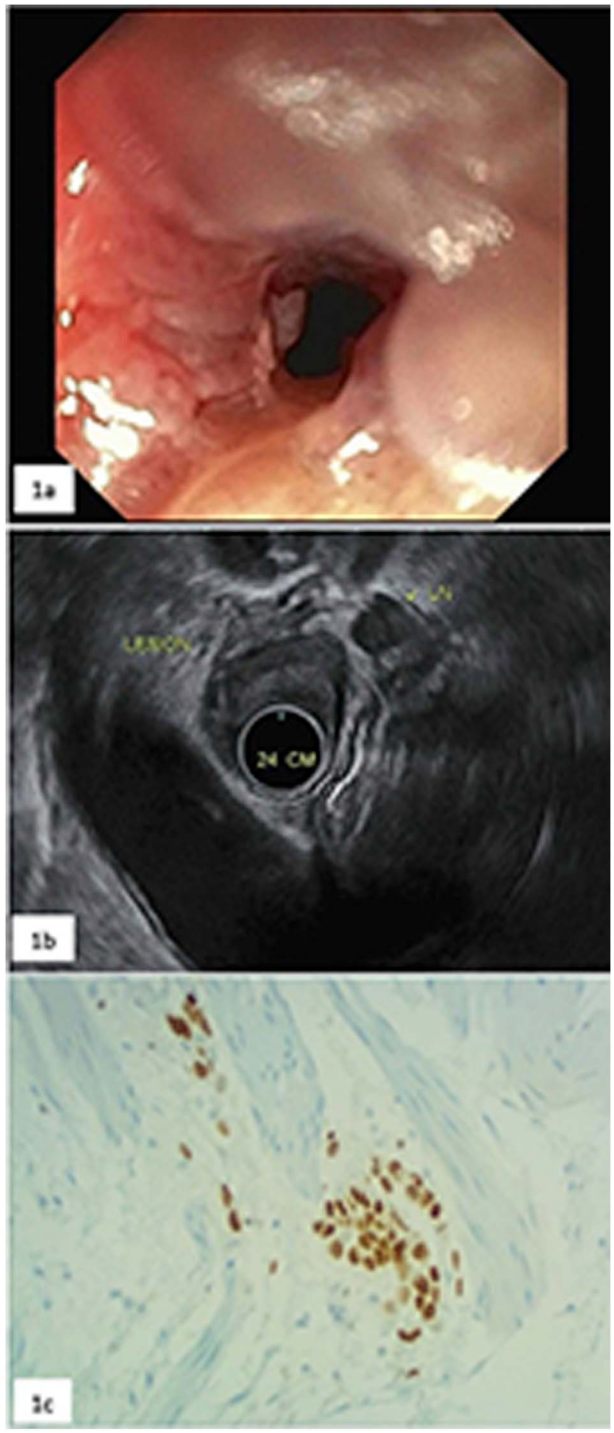
Introduction: Muscle invasive bladder cancer (MIBC) spreading to the esophagus is very rare. Here we report a case of a severe esophageal stricture caused by metastatic spread of MIBC.
Case Description/Methods: A 57-year-old man presented to our institution with 4 days of worsening dysphagia and odynophagia to both solids and liquids. He had been diagnosed with stage IV MIBC 3 months prior. Of note, the patient had a 20-pack-year smoking history, quit 15 years ago. A CT chest without contrast showed nodular thickening of the esophagus at the level of the aortic arch and superior distension of the esophagus as evidenced by a small amount of layering oral contrast. Additional findings included mediastinal lymphadenopathy concerning for metastasis. No findings of metastasis had been seen at a staging CT 2 months prior. A barium esophagogram revealed a mid-esophageal stricture with shouldering. Direct visualization via EGD showed a severely stenotic section of esophagus, at 25 cm from the incisors, measuring 5 mm x 1 cm (**Figure a**). This malignant appearing stricture was only able to be traversed using a pediatric gastroscope. Biopsies were obtained. Then a limited radial echoendoscopy was performed from the proximal end of the stricture and showed a mass in the thoracic esophagus, stage uT3N2Mx (**Figure b**). An 18 mm x 12.3 cm fully covered metal stent was then placed under fluoroscopic guidance. Histopathology revealed rare, atypical cells within muscle, consistent with metastatic urothelial carcinoma. Immunohistochemical staining was positive for pankeratin, CK7 and GATA (**Figure c**). The patient was diagnosed with metastasis of MIBC to the esophagus. The patient died after the fourth cycle of chemotherapy with gemcitabine-cisplatin.
Discussion: Over the last decade, there have been increasing reports of esophageal cancer metastasizing to the bladder. Here we report a case of bladder cancer metastasizing to the esophagus. To our knowledge, this is the 2nd ever mentioned report of such a finding. Documented incidence of metastasis to the esophagus is about 6%. MIBC most commonly spreads to regional lymph nodes, bone, lung, liver, and peritoneum. The 5-year survival rate of MIBC is 6% once metastasis is established. Although endoscopic findings showed irregular mucosa, not all malignant causes of esophageal stenosis have this appearance. This case highlights the importance of maintaining a broad differential when assessing esophageal strictures on a patient with known malignancy as metastasis may present in uncommon places.



[2262] **Figure 1.** 1a. Malignant appearing intrinsic stenosis seen on EGD measuring 5mm (inner diameter) x 1 cm (in length). 1b. EUS: A mass that was partially circumferential with irregular endosonographic borders was found in the thoracic esophagus at 24 cm from the incisors and lymphadenopathy is seen on the right. 1c. Pathology: Rare, atypical cells within muscle, immunoreactive for GATA stain, consistent with metastatic urothelial carcinoma.

S2263 Presidential Poster Award

Esophageal Perforation Following Atrial Fibrillation Ablation: A Review of Ablation-Associated Esophageal Injury

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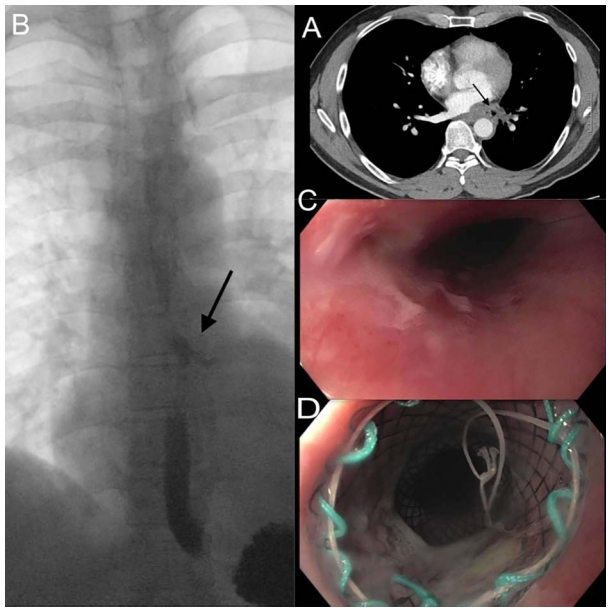
Introduction: Catheter ablation is a common treatment for refractory atrial fibrillation (AF). Due to the close proximity of the esophagus to the left atrium, there is risk for esophageal injury, some of which have high morbidity. We present a case of a patient who developed an esophageal perforation, pulmonary vein thrombosis, and embolic stroke one month after AF ablation.
Case Description/Methods: A 49-year-old male with a history of AF presented to the hospital with heartburn, dysphagia, fevers and interscapular pain one month after AF ablation. On exam he was febrile to 103.3F, abdominal exam was benign and no crepitus was appreciated. Labs showed WBC 10.9 K/uL. CT chest with IV contrast showed thickening in the posterior wall of the left atrium and small air pockets in

the left infrahilar region (**Figure A**). Blood cultures were obtained, and later grew Streptococcus mitis. On hospital day 2, he developed left upper extremity weakness. Brain MRI showed small embolic infarcts. TEE was attempted but incomplete due to resistance in the proximal esophagus. Gastrograffin swallow study showed extravasation of contrast from the esophagus, consistent with an esophageal perforation (**Figure B**). CTA chest showed hemorrhage in the left lower lobe (LLL) and venous congestion with occlusion of the left pulmonary vein. Esophagoscopy showed blood throughout the esophagus with a small mucosal defect with clot at 38 cm, without evidence of atrio esophageal fistula (AEF) (**Figure** C). He underwent a left lower lobectomy. He was treated with ceftriaxone, vancomycin, and micafungin. After failed conservative therapy, a partially covered esophageal stent was placed **(Figure D**). He was discharged on a 6-week course of ceftriaxone.

Discussion: As catheter AF ablation becomes increasingly common, it is important to recognize the potential for esophageal injury. Patients present 1 to 4 weeks post-ablation with chest pain, acid reflux, and dysphagia. Imaging of choice is CT with IV and oral contrast. Management depends on the extent of injury but ranges from endoscopic stent placement to open surgical intervention. Techniques to reduce the risk of injury include using an esophageal temperature probe and gastric suppression therapy. Esophageal injury may occur in about 47% of patients, including mild thermal burns, vagus nerve injury, perforation and AEF. This case outlines the importance of keeping esophageal pathology in the differential in patients who present with non-specific symptoms during the months following AF ablation.



[2263] **Figure 1.** Image 1A. A computed tomography (CT) chest with intravenous contrast showing no evidence of an atrial-esophageal fistula but showed mild thickening in the left posterior aspect of the left atrium, also with tiny pockets of air in the left infrahilar region (arrow). Image 1B. Gastrograffin fluoroscopic swallow study showing evidence of an esophageal leak (arrow) 3cm below the left mainstem bronchus at the site of the tiny air pockets previously seen on CT imaging. Image 1C. Endoscopic imaging showing a small mucosal defect. Image 1D. Endoscopic imaging showing a partially covered esophageal stent.

S2264 Presidential Poster Award

A Case of Progressive Untreated Eosinophilic Gastrointestinal Disorder Complicated by Eosinophilic Myocarditis

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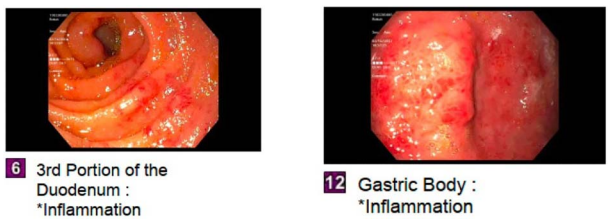
Introduction: Eosinophilic gastrointestinal diseases (EGID) are immune-mediated conditions characterized by GI dysfunction and histological evidence of eosinophilic infiltration. While usually confined to the GI tract, severe inflammation can involve multiple organ systems, typically under the umbrella term of hypereosinophilic syndrome (HES). Patients can present with cardiac involvement such as eosinophilic myocarditis which results in an uncommon, but potentially lethal complication. We present a case of a patient with prior history of eosinophilic esophagitis (EoE) subsequently presenting with diffuse EGID complicated by eosinophilic myocarditis.

Case Description/Methods: A 63-year-old female with a history of EoE and breast cancer post mastectomy presented with acute epigastric and chest pain. The patient had biopsy-proven EoE which was managed with PPI in the past. On physical examination, she had diffuse abdominal tenderness. Labs were remarkable for peripheral eosinophilia peaking at 57%. Initial high sensitivity troponin I was 300 ng/L without EKG changes, and ultimately peaked at 7821 ng/L. CT of the abdomen and pelvis showed thickening of the stomach, duodenum, and jejunum. Left heart catheterization revealed LAD disease without obstructive disease. EGD demonstrated severe inflammation, erythema, and eosinophilic infiltration in the gastric body, antrum, and throughout the duodenum. High dose steroids were initiated with subsequent improvement in symptoms, serum troponin, and complete resolution of peripheral eosinophilia. Patient followed up as an outpatient, where cardiac MRI confirmed eosinophilic myocarditis, and she was started on Mepolizumab for maintenance therapy and prevention of relapse.

Discussion: EGID are increasingly prevalent disorders that can result in significant morbidity and mortality without prompt diagnosis. This patient had a history of EoE and developed diffuse GI involvement and subsequent eosinophilic myocarditis. Her presentation as atypical chest pain suggestive of NSTEMI resulted in delay of initiation of steroids until after heart catheterization. Our case suggests that without glucocorticoid suppression, eosinophilia can cause widespread tissue infiltration and damage. The majority of these patients have chronic disease that require long term maintenance therapy. Mepolizumab has been demonstrated to be an effective agent for hypereosinophilic disorders. When managing EGID, it is pertinent to recognize early involvement of systemic eosinophilic infiltration.



[2264] **Figure 1.** EGD.

S2265 Presidential Poster Award

A Rare Case of Esophageal Carcinoma After Tracheoesophageal Fistula Repair

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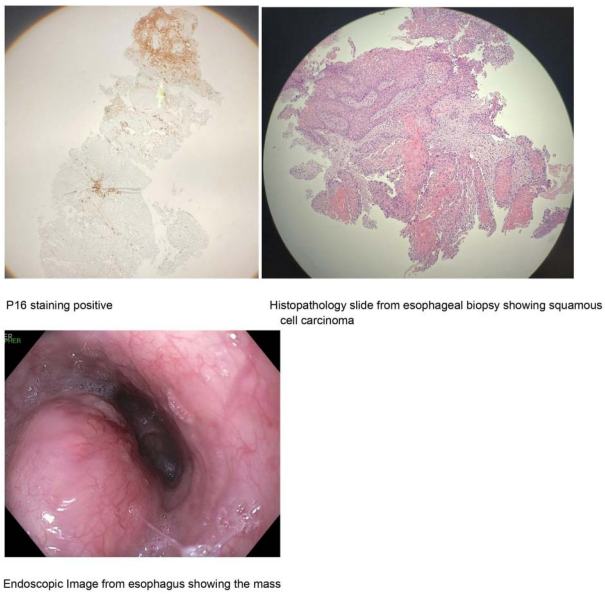
Introduction: Tracheoesophageal fistula (TEF) constitutes one of the commonest congenital anomalies with an incidence of roughly 1 in 3500 births with treatment consisting of surgical correction in very early life. Chronic complications can include esophageal stricture, dysphagia, gastroesophageal reflux disease (GERD), Barrett's esophagus, and esophageal cancer. While rare, these patients do have an increased risk of esophageal carcinoma attributable to chronic GERD leading to ongoing mucosal disruption. Sparce data on esophageal cancer after TEF repair appears to show an increased risk of this event occurring after 40 years of age.
Case Description/Methods: The patient is a 32-year-old man with a past medical history of Cystic Fibrosis, GERD, osteoporosis, and tobacco use, and a past surgical history significant for Tracheoesophageal fistula repair. The patient presented to a primary care physician with complaints of dysphagia. He reported dysphagia only to liquids that started 2 months before presentation. The dysphagia was gradually progressed to solids. He was referred to gastroenterology, and an EGD was performed showing a single traversable mass measuring 5 cm in the esophagus (20 cms. from incisors) covering one-quarter of the circumference, and cold forceps biopsy was performed. The EGD also revealed signs of the previous tracheoesophageal fistula repair and mild generalized atrophic mucosa. Biopsies taken from the esophagus and stomach were sent for pathology. Pathology from the esophageal biopsy came back positive for moderately differentiated Squamous cell carcinoma and gastric biopsy revealed chronic gastritis with complete intestinal metaplasia. The patient was referred to oncology and underwent a PET scan which revealed the esophageal malignancy and bilateral pulmonary nodules. The patient was started on chemoradiation therapy and follows up with oncology regularly (**Figure**).
Discussion: This case describes the importance of continuity of care during the transition from pediatrics to adult care in the field of gastroenterology in patients with a history of TEF repair, given the patient's young age. While it appears esophageal cancer after TEF repair is rare, there should be an investigation into guidelines for adequate screening in this disease process.



[2265] **Figure 1.** Histopathology and endoscopic images.

S2266 Presidential Poster Award

Achalasia as a Sequelae of COVID-19

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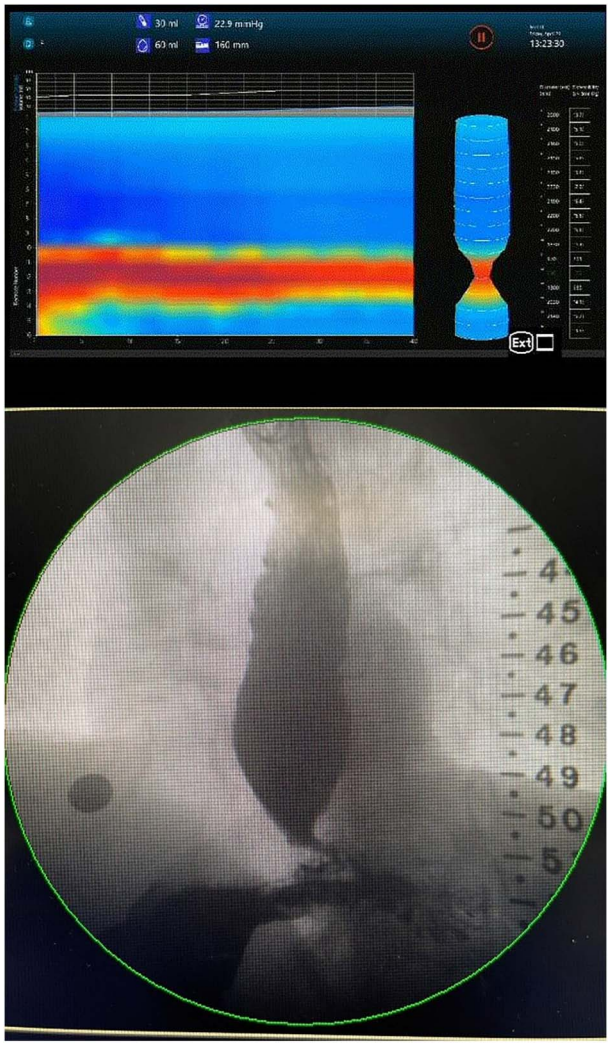
Introduction: Achalasia is a neurodegenerative motility disorder of distal esophagus and lower esophageal sphincter characterized by loss of myenteric neurons in esophagus. It therefore results in deranged peristalsis and characteristic manifestations of regurgitation, dysphagia and retrosternal chest pressure sensation. Recent studies have suggested inflammatory neurodegenerative insult from viral infection as a potential etiology. Sars-Cov-2 causes multiple gastrointestinal (GI) manifestations like ageusia, nausea, vomiting, pain and diarrhea. We present a rare case of achalasia that presented soon after COVID infection in an otherwise healthy male.
Case Description/Methods: A 63-year-old man was referred for further evaluation of dysphagia that started a few months after a non-severe COVID infection with associated ageusia. He reported progressive dysphagia to both solids and liquids with concomitant regurgitation and chest pain. By the time he presented, he had lost 45 lbs over the course of 6 months and had an Eckardt score of 8. High resolution manometry was suggestive of evolving type II achalasia. A follow up Endoflip exam with a 16 cm catheter inflated to 60 cc revealed a esophagogastric diameter of 7.3 mm and a distensibility index (DI) of 1.9. Timed barium esophagogram showed a 5 cm contrast column in distal esophagus at 5 minutes. The patient has since been referred for per oral endoscopic myotomy (**Figure**).
Discussion: Sars-Cov-2 enters the GI epithelial cells through ACE2 receptors and exerts its effects through an aberrant immune response involving T- lymphocytes rather than direct epithelial damage. An anomalous immune reaction resulting in degeneration of inhibitory neurons in the myenteric plexus may be the cause of achalasia in COVID-19. On literature review, we came across at least 1 case report of a patient developing achalasia after COVID-19. A Venezuelan study noted that the frequency of patients with achalasia during the year 2020 and 2021 was far greater than those of previous years and at least 2/3rd of these patients had presented with COVID-19 infection. It will be interesting to note if coronavirus can be isolated from muscle biopsies of these subjects as has been the case with VZV previously. Further investigation especially into patients presenting with GI symptoms with COVID infection is warranted.



[2266] **Figure 1.** Endoflip ; Barium Esophageogram.

S2267

Esophageal Mucosal Calcinosis: A Rare Site of Calcium Deposition in End-Stage Renal Disease

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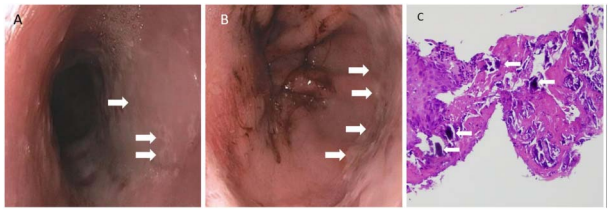
Introduction: Calciphylaxis, otherwise known as calcium uremic arteriolopathy, is defined as calcium deposition around blood vessels in skin and fat tissue which occurs in 1-4% of patients with end-stage renal disease (ESRD). Calcium deposition in the esophagus is extremely rare; to date, there have been only 4 cases reported worldwide. We report the fifth case of esophageal mucosal calcinosis occurring in a young male with ESRD.
Case Description/Methods: A 37-year-old Thai man with ESRD on peritoneal dialysis since 2005 presented with generalized weakness and odynophagia due to oral ulcers, resulting in poor PO intake. He denied drinking alcohol, illicit drug use, or smoking. On exam his abdomen was soft, non-distended, non-tender, without any guarding. Past medical history included hypertension and COVID-19 in January 2022. Laboratory tests revealed neutropenia and pancytopenia, hyperphosphatemia, and hypocalcemia. EGD revealed distal esophageal esophagitis and hemorrhagic erosive gastropathy. Biopsy showed ulcerative esophagitis with dystrophic calcification, consistent with esophageal mucosal calcinosis .No intestinal metaplasia was noted. Immunohistochemistry was negative for CMV, HSV1, and HSV2. The patient was treated with pantoprazole 40mg IV every 12 hours, Magic Mouthwash 5ml qid, and Carafate 10mg qid. He was transferred to a cancer center where he had a bone marrow biopsy formed which was negative. His symptoms resolved and the patient was discharged to home (**Figure**).
Discussion: Esophageal mucosal calcinosis is extremely rare. It is due to a combination of factors involving acidosis and the phenotypic differentiation (and apoptosis) of vascular smooth muscle cells (VSMC) into chondrocytes or osteoblast-like cells. These changes, along with the passive accumulation of calcium and phosphate, induce calcification. Acidosis is well-known to promote inflammation of the arterial walls, releasing cytokines that induce vascular calcification. The benefits of treatment with sodium thiosulfate remain unclear. An ample collection of cases should help devise standardized treatment options and establish management guidelines for this condition.



[2267] **Figure 1.** A. Circumferential thick white esophageal plaques with friability and circular erosions along the mid esophagus spanning down to the GE junction. B. Circumferential thick white esophageal plaques with friability and circular erosions along the GE junction. Blood seen in the center is due to severe hemorrhagic gastropathy from coagulopathy. C. Biopsy showing ulcerated esophagitis with basophilic calcium deposits(white arrows) within the fibrinopurulent exudate and beneath the squamous mucosa (H&E, original magnification 200x).

S2268

Dysphagia Megalatriensis: A Modern Day Mimicker of Gastric Dysphagias

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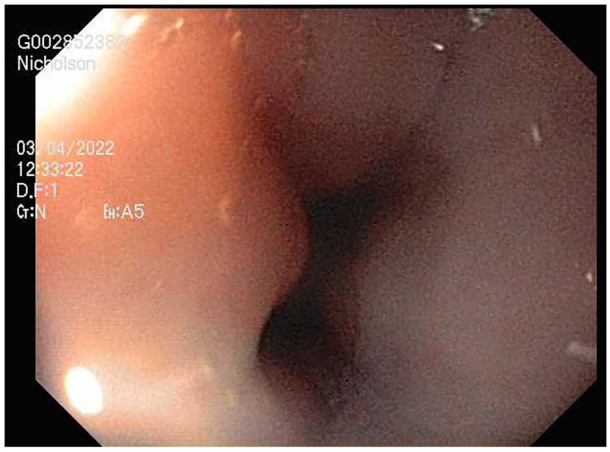
Introduction: Cardiomegaly- induced dysphagia, also known as Dysphagia Megalatiensis had been previously reported to be secondary to Left Atrial enlargement. We are reporting an uncommon case where the dysphagia was induced by Left Ventricular enlargement.
Case Description/Methods: The patient is a 59-year-old female with a past medical history of heart failure with reduced ejection fraction (EF) of 30%, who presented to the outpatient clinic with 3 months duration of dysphagia to solids and liquids. Her symptoms had started a few years prior to presentation and had worsened significantly in the past 3 months. She complained of regurgitation of undigested food associated with intermittent heartburn, not alleviated by antacids. Review of systems (ROS) was positive for recent lower extremity edema unremarkable otherwise. Laboratory workup was negative for anemia with normal biochemical and liver function tests. The patient was vitally stable with a physical remarkable for mild pitting edema of bilateral lower extremities with a normal abdominal exam. Barium esophagogram revealed narrowing of the lower esophagus and delay of barium emptying. Esophagogastroduodenoscopy showed an extrinsic compression in the mid esophageal area, with narrowed esophageal lumen of 25-30 cm from the incisors in the absence of fixed structures or strictures. Transthoracic echocardiogram (TTE) followed by nuclear medicine cardiac perfusion stress test diagnosed severe left ventricular dilatation with an EF of 25% highlighting this left ventricular dilatation as the primary etiology for this patient's dysphagia (**Figure**).
Discussion: This case highlights that achalasia could be the presentation of cardiomegaly and that left ventricular dilatation is a legitimate etiology that should always be considered in an outpatient setting. Dysphagia Megalatiensis is often a challenging diagnosis but when pretest probability is high a cardiac workup is warranted.



[2268] **Figure 1.** Mid-esophageal external compressor.

S2269

Malignant Dysphagia in Latent Triple Negative Metastatic Breast Cancer

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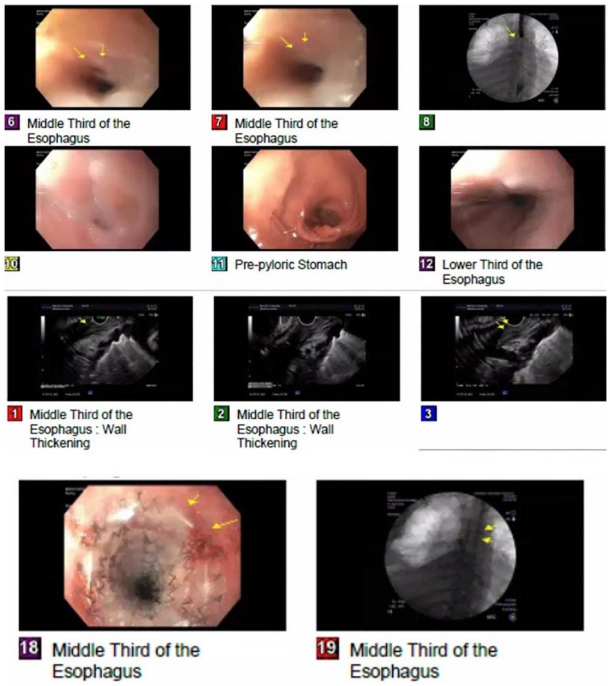
Introduction: Luminal gastrointestinal metastasis of breast cancer is rare and esophageal metastasis from breast cancer is reported in less than 100 cases. We present a unique case of metastatic esophageal cancer from a primary breast malignancy, 20 years post initial diagnosis.
Case Description/Methods: A 79-year-old African American female with past medical history of triple negative metastatic breast cancer, COPD, HTN, & T2DM presented to the hospital with 3 weeks of progressive dysphagia to liquids & solids, regurgitation and 10kg weight loss. No heartburn, nausea/vomiting or change in bowel habits. No prior EGD and colonoscopy many years ago showed 2 benign polyps. She was diagnosed with breast cancer in early 2000s and underwent right mastectomy; recurrence was discovered in 2014, which led to lumpectomy, chemotherapy/radiation. Vital signs stable on arrival. Physical examination notable for cachectic female; no lymphadenopathy, abdominal distension/tenderness or edema. Labs showed: WBC 7.9, Hb 11, MCV 82, Plt 291. EGD, showed severe stenosis in the mid-esophagus – dilation was attempted, but unsuccessful; biopsies were negative. Esophogram revealed severe stenosis of the mid-esophagus. CT thorax demonstrated a focal density in the mid-esophagus & multiple hepatic lesions concerning for metastasis. Endoscopic ultrasound (EUS) revealed severe stenosis of mid-esophagus; dilation, fine needle aspiration (FNA) and stent placement were performed. Pathology demonstrated metastatic triple negative breast cancer. The patient planned to start paclitaxel but was placed on hospice (**Figure**).
Discussion: Esophageal metastasis of breast cancer has a prevalence of 0.59-5.9%. The most common presenting symptom is dysphagia. Studies describe a latency period between the diagnosis of breast cancer and symptoms of esophageal metastasis. Diagnosis is difficult as mucosal involvement is rare and most cases will present with stricture and normal mucosa. EUS with FNA is necessary to confirm diagnosis. Some success has been shown with expandable stents for symptomatic relief as dilation is limited by high risk of perforation. As in our case, esophageal metastasis is usually part of multi-organ metastasis, so treatment aimed at the primary malignancy, but palliative in most cases. Concern for malignant dysphagia must be included in the differential for breast cancer patients presenting with dysphagia. Due to difficult diagnosis and latency period, more routine screening with EUS may be beneficial.



[2269] **Figure 1.** Repeat EGD with EUS & Fluoroscopic guided stent placement.

S2270

An Incidental Finding of a Rare Esophageal Squamous Papilloma

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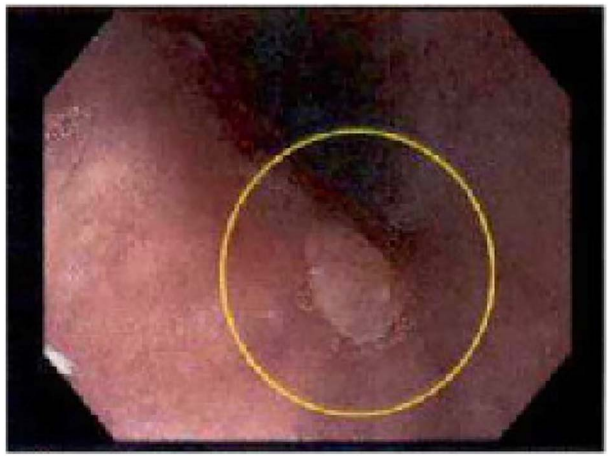
Introduction: Benign esophageal squamous papillomas are rare and usually incidental lesions discovered on endoscopy. The prevalence of these lesions are estimated to be less than 0.01%. Etiology has been controversial, however it has been thought to be caused by mucosal irritation secondary to chronic GERD or esophagitis. We present a case of a 70-year-old man who presented with chronic diarrhea who underwent EGD and colonoscopy found to have H. Pylori associated gastritis with an incidental finding of a rare, but benign, esophageal squamous papilloma in the mid-esophagus.
Case Description/Methods: A 70-year-old man with a medical history of prostate adenocarcinoma, colonic polyps, and CKD stage 3 presented to his outpatient gastroenterology appointment for evaluation of chronic diarrhea. The patient reported having intermittent diarrhea occurring about every 3 days for the past 2 months. He reported it occurred anywhere from 1 to 5 times a day. Patient stated he had recent surgeries for his prostate adenocarcinoma requiring him to take antibiotics, however his last antibiotic dose was 3 months prior to presentation. His last colonoscopy was 5 years ago where colonic polyps were removed, and he was told to have a repeat colonoscopy in 5 years. Vitals, physical exam, and labs were unremarkable. Fecal calprotectin, fecal fat, and tissue transglutaminase/IgA were all within normal limits. Clostridium difficile was also ruled out. Patient subsequently underwent an upper endoscopy and colonoscopy. Biopsies from upper endoscopy revealed H. Pylori associated gastritis in the gastric antral and fundic mucosa, which the patient was subsequently treated for. However, an inflamed, esophageal squamous papilloma was also incidentally found in the mid-esophagus and excised during the procedure.
Discussion: An esophageal squamous papilloma is an incidental and extremely rare finding found on endoscopy. The endoscopic appearance is usually a wart-like exophytic mass located in the mid-distal esophagus as seen in this patient's upper endoscopy (**Figure**). They are usually excised when discovered and patients do not need further surveillance given the benign nature of these lesions. There have been a few reported cases of the carcinomatous transformation of large, symptomatic esophageal papillomas, however the small number of cases makes drawing any assumptions or conclusions difficult. Therefore, it is important to fully excise and biopsy esophageal squamous papillomas when found to prevent further symptoms from arising.



[2270] **Figure 1.** Esophageal Squamous Papilloma Appearance on Patient's Upper Endoscopy.

S2271

Dysphagia Aortica: An Achalasia Mimic and Pitfalls in Esophageal Manometry Interpretation

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Introduction: Dysphagia aortica is a rare clinical entity wherein compression of the esophagus is due to aneurysmal dilatation of the aorta, resulting in dysphagia symptoms. Approximately 70 cases of dysphagia aortica have been reported in literature; 9 of these have been in the US. Clinical attributes of dysphagia aortica include older age, spinal abnormalities, and hypertension.
Case Description/Methods: This is an 82-year-old female with relevant history of prior ascending aortic aneurysm repair with known 54 mm thoracoabdominal aortic aneurysm (TAAA), mild to moderate dysphasia, hiatal hernia and GERD presented with a food impaction. EGD was performed for food bolus retrieval and revealed a tortuous esophagus with abnormal motility/spasticity in the middle and lower esophagus. Esophageal manometry revealed a median IRP of 12.2 and 60% ineffective swallows but was limited by the inability to advance the probe beyond 43 cm. The diagnosis of achalasia was made, and the patient underwent 3 botulinum toxin injections over the next year, but without significant relief of dysphagia. A repeat CT showed interval enlargement of TAAA to 60 mm at level of diaphragmatic hiatus which compressed the distal esophagus.
Discussion: Dysphagia aortica is mostly attributed to aortic aneurysm, tortuosity or dissection. Symptoms include dysphagia, cough, sternal pain and weight loss. Clinicians must be aware that LES pressure may not be reliably differentiated from other contributors to intraluminal pressure such as crural diaphragm or TAAA. Therefore, a high index of suspicion must be maintained for dysphagia aortica when interpreting manometry based on patients' clinical attributes and comorbidities. In contrast to previously reported literature, a localized high-pressure zone was not initially noted on manometry in our patient and subsequent CT imaging demonstrated extrinsic compression – adding to the subtle variations by which dysphagia aortica may represent a diagnostic conundrum.

S2272

Inlet Patch Polyp Mimicking Esophageal Cancer

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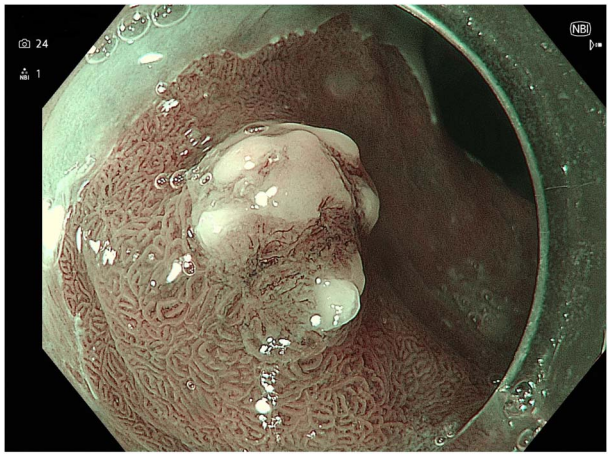
[1]University of Cincinnati, Cincinnati, OH; [2]GastroCenter Olymed, Kyiv, Kyyiv, Ukraine; [3]CSD Medical Laboratory, Kyiv, Kyyiv, Ukraine.

Introduction: Heterotopic gastric mucosa (HGM) in the proximal esophagus also known as cervical inlet patch is a prevalent accidental finding during EGD.
Case Description/Methods: 56 y.o. female with no prior PMH presented with a 4-year history of constipation, heartburn, epigastric pain, and weight loss. Symptoms were not controlled with the PPI trial. EGD showed 2 areas of gastric mucosa heterotopy in the duodenal bulb, sized up to 5 mm. In the cervical esophagus, an area of HGM sized 15x20 mm with protruding lesion Paris 0-Is sized 5x7mm was visualized. In the narrow-band imaging, the vessel pattern was irregular, with dilated interpupillary loops, and an irregular surface pattern. Malignancy was suspected with biopsies obtained. Pathology showed gastric-type epithelium with active inflammation, erosion, and hyperplastic polyp in HGM. On repeat EGD lesion was completely removed with hot snare polypectomy. Final pathology showed inflammatory (granulation) polyp without dysphasia or neoplastic process. The patient's dyspeptic symptoms improved on follow-up with double dose PPI (**Figure**).
Discussion: HGM is found in up to 10% of the general population. Some studies consider that HGM is a common benign finding which can be used as a surrogate marker for thorough esophagus examination. Other data suggest that inlet patches can be associated with reflux and dysphagia symptoms, dysplasia, and malignancy in rare cases. Quick insertion and withdrawal of the scope can lead to missed diagnoses of HGM and its complications. HGM detection rate can serve as an EGD quality indicator. Narrow band imaging can be used to improve the HGM detection rate. Various classifications of surface and vessel patterns are used to identify squamous cell malignancy in the upper esophagus, but they are inapplicable in HGM. Careful examination with histopathological examination of biopsies is recommended for mucosal abnormalities in HGM.



[2272] **Figure 1.** Narrow-band image of the HGM polyp.

S2273

An Unusual Case of Dysphagia: Esophageal Squamous Cell Carcinoma From Untreated Achalasia

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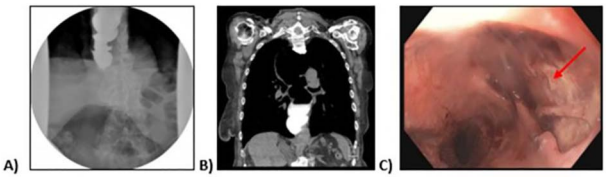
Introduction: Achalasia leads to dysphagia due to impaired relaxation of the lower esophageal sphincter (LES). Evaluation of achalasia involves ruling out extrinsic compression from malignancies of the gastroesophageal junction, which produce similar clinical and radiologic findings. In rare instances, malignancy can be a consequence of achalasia itself. We present a case of esophageal squamous cell carcinoma (ESCC) from untreated achalasia of several decades' duration.
Case Description/Methods: An 81-year-old female presented with progressive dysphagia. She described "trouble" with larger solid foods for years but reported worsening dysphagia to solids 6 months prior with progression to liquid dysphagia 3 months prior. She described the sensation as food getting lodged in the middle of her chest without odynophagia or difficulty initiating a swallow. She also had 100lb weight loss in these 6 months. Patient underwent an esophagram showing marked dilatation of the distal esophagus with tapering distally concerning for achalasia (**Figure** 1A). Computed tomography of the chest showed marked dilatation of the esophagus, most severe proximally, with mass effect upon the mediastinum (**Figure** 1B). Esophagogastroduodenoscopy revealed a 5 cm large, cratered ulcer eroding through the esophagus (**Figure** 1C). Biopsies taken of the ulcer were consistent with ESCC. Patient deferred further treatment of her malignancy and opted for hospice care.
Discussion: Achalasia is assumed to result from inflammatory degeneration of neurons of the esophagus. In addition to morbidity from dysphagia, achalasia increases patient risk of developing esophageal cancer up to 50-fold compared to the general population. Abnormal LES pressure leads to food stasis and promotes lactic acid production and fermentation due to bacterial overgrowth. This causes slow, continuous and chronic inflammation, damaging esophageal mucosa, and predisposing to dysplastic changes. Like our patient, patients with achalasia who develop cancer usually present with advanced disease, typically 20-25 years after symptom onset. Population studies are unclear if endoscopic screening is cost effective or reduces the risk of developing ESCC in patients with achalasia. However preliminary studies using exhaled volatile organic compounds and serum autoantibodies have demonstrated good specificity as noninvasive ways of screening for ESCC in these patients. Timely identification and treatment are needed to prevent progression to malignancy.



[2273] **Figure 1.** A) Esophagram showing marked dilatation of the distal esophagus with slight tapering distally. B) Computed tomography of the chest without contrast showing marked dilatation of the esophagus, most severe proximally, with mass effect upon the mediastinum. C) Esophagogastroduodenoscopy revealing a 5 cm large, cratered ulcer eroding through the esophagus (red arrow).

S2274

Bravo Capsule Aspiration

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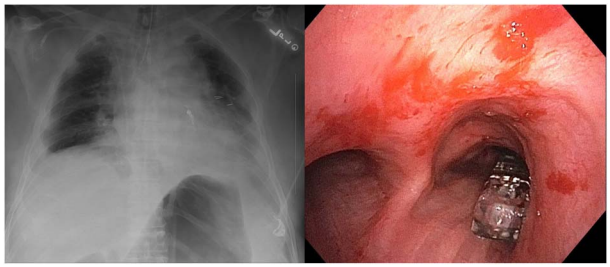
[1]Texas Tech University, Lubbock, TX; [2]Texas Tech University Health Sciences Center, Lubbock, TX.

Introduction: Bravo wireless capsule is a catheter-free pH monitoring system used to diagnose GERD in patients who fail anti-secretory therapy. Several adverse events have been reported in the literature; these include nose or throat discomfort and dislocation from positioned sites.
Case Description/Methods: A 72-year-old man with a history of GERD, prostate cancer, hypothyroidism, obstructive sleep apnea, presented for esophagogastroduodenoscopy (EGD) with Bravo™ placement due to persistent esophageal reflux symptoms despite appropriate therapy. The Bravo™ capsule (Medtronic, Minneapolis, MN) with a delivery system was introduced through the mouth and advanced into the esophagus. The device was placed with visual confirmation; however, the patient had severe a coughing fit. Suction was applied and the delivery system was then withdrawn. Repeat EGD was performed and no Bravo™ was seen in esophagus, stomach, or duodenum. Due to suspicion of dislodgement, a chest x-ray was performed and Bravo™ was seen in the left lung (figure 1, panel A). The patient was admitted to the hospital, and the pulmonology service was consulted for device removal. Bronchoscopy was performed successfully with the extraction of a capsule from the left main bronchus (**Figure** 1, panel B). After 24 hours observation, the patient did not have any symptoms or signs of aspiration pneumonitis and was discharged home.
Discussion: We present a case of an adult patient with aspiration of the capsule into the lungs. This is an unusual complication with pH monitoring techniques(3). Given the limited number of cases of Bravo™ aspiration, there are no definite guidelines or gold-standard treatment up to date. A patent airway and good oxygenation must be maintained. The initial diagnostic evaluation includes chest radiographs, since the Bravo™ capsule is radiopaque(4).Once located, bronchoscopic tools can usually reveal the capsule, as was done with our patient.



[2274] **Figure 1.** Panel A, left: X-ray showing bravo capsule in left lung panel B, right: bronchoscopy showing reveals bravo capsule in left main bronchus.

S2275

Black Esophagus Due to Severe SARS-CoV2 Infection

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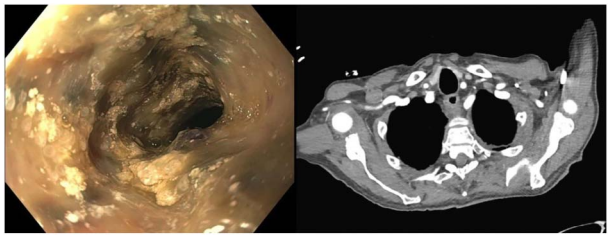
Introduction: Acute esophageal necrosis (AEN), also called 'black esophagus' due to its appearance is a rare clinical disease, recently described in medical literature. The etiology is multifactorial, often in the setting of severe systemic conditions such as sepsis and trauma, and outcomes are poor. Severe SARS-CoV2 infection can lead to overwhelming inflammation and multi-organ failure. Herein, we present a case of black esophagus with severe SARS-CoV2 infection.
Case Description/Methods: A 69-year-old with rheumatoid disease, on immune suppression, was admitted to our hospital with dyspnea, coffee ground emesis and melena. He tested positive for SARS-CoV2 and was found to have acute blood loss anemia. An urgent EGD was performed which revealed a black, necrotic mucosa of the distal 2/3rd of the esophagus, consistent with AEN. Biopsies were avoided due to risk of perforation and subsequent images were negative for any perforation. Management was started with high dose PPI and supportive care in addition to recognized treatment for COVID-19. However, his hospital stay became complicated with progressive clinical decline and development of multi-organ failure. Eventually, he was transitioned to comfort care and passed away shortly after (**Figure**).
Discussion: AEN or black esophagus, as defined by its endoscopic appearance, is a manifestation of ischemic and corrosive injury to the esophagus in the setting of severe systemic disease processes. Diffuse, circumferential, necrotic and friable esophageal mucosa, especially in the distal 2/3rd, is the hallmark. The relatively poor vascular supply of the distal esophagus makes it more susceptible to such injury. Often, a sharp demarcation is seen at the Z-line. Histology shows extensive transmural necrosis. Pathogenesis of AEN is thought to be a combination of a sudden low flow, prothrombotic state from severe systemic illness causing ischemic injury and impaired healing ability. At the same time, increased exposure to gastric content occurs from gastric hypokinesis and increased secretions which exacerbate injury. Typical presentation is upper GI bleed, and management revolves around treatment of underlying etiology and supportive measures with acid suppression and mucosal protection with PPI and sucralfate. NG tubes should be avoided due to risk of perforation, which is the most serious complication. Surgical intervention is reserved for perforation, and balloon dilation can be required in cases of stenosis or strictures.



[2275] **Figure 1.** Diffuse necrotic appearing esophagus with black discoloration on EGD Dilated esophagus with diffuse esophageal wall thickening on CT.

S2276

Cardiac Metastasis From a Primary Esophageal Adenocarcinoma: A Rare Presentation

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Introduction: Esophageal adenocarcinoma with subsequent metastasis is a commonly diagnosed condition.
Case Description/Methods: We report a case of a 72-year-old White man with a history of atrial fibrillation and hypertension who presented with complaints of dysphagia, belching and unexplained weight loss. Upper endoscopy revealed a mass in the distal esophagus extending from 38-42 cm and histopathology then confirmed an adenocarcinoma. A CT chest showed a probable 3.8 cm thrombus in the right atrium. The patient did not present with any cardiopulmonary signs or symptoms. A trans-esophageal echocardiogram was performed which showed a 4.5 x 4.1 cm right atrial mass, rather than a thrombus, which was successfully excised by thoracic surgery. The mass was consistent with metastatic adenocarcinoma, positive for cytokeratin 7/20 and CDX-2 and negative for TTF-1, HER2/neu and PD-L1 negative and felt to be of esophageal origin. No other evidence of distant metastasis were noted. Oncology initiated systemic chemotherapy with Oxaliplatin, Leucovorin, 5-FU and Opdivo for which he received 6 cycles. The patient initially did well but ultimately succumbed to his disease state several months later.
Discussion: This case highlights a rare case of esophageal adenocarcinoma with a large metastasis to the right atrium. The overall incidence of cardiac metastases from an esophageal primary is extremely rare and not well documented in the literature. Most cases are found post-mortem, with the histologic presentation being a squamous cell carcinoma in the vast majority. Our case was diagnosed ante-mortem, without cardiac symptoms on presentation, and was an adenocarcinoma. This is an extremely rare and infrequently documented condition.

S2277

Black Esophagus! A Devastating Sequela of Complete Heart Block

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Introduction: Acute esophageal necrosis (AEN) or black esophagus is a rare condition arising due to ischemic injury of the esophagus. Usually, it involves the distal portion given its relative hypovascular nature compared to other esophageal segments. Here we highlight a patient found to have hemorrhagic shock secondary to black esophagus after initial presentation for complete heart block.
Case Description/Methods: A 75-year-old female presented after a syncopal episode. She was hypotensive on arrival with EKG showing complete heart block. An emergent transvenous pacer was placed given cardiogenic shock with eventual upgrade to permanent pacer. Unfortunately, she decompensated shortly after placement of permanent pacer with new altered mentation. EKG showed an appropriately paced rhythm. Labs revealed sudden anemia with hemoglobin 6.9 g/dL down from 10.1 g/dL. Echocardiogram was negative for pericardial effusion. Pacer site was clean, dry, and intact. Initially, the etiology of her anemia was unclear given lack of overt blood loss. However, the patient began having several bouts of melenic stools with hemodynamic instability requiring vasopressor support. Medication review revealed that the patient had been started on aspirin and clopidogrel the day prior given concerns for acute coronary syndrome. An emergent bedside EGD showed diffuse circumferential panesophageal black mucosa and severely ulcerated stomach and duodenum consistent with ischemic injury. No visible vessel or active bleeding was identified. Unfortunately, the patient continued having melenic stools requiring blood transfusions. However, nuclear medicine bleeding scan could not localize the source of bleed. A goals of care discussion was held with the family who ultimately opted for hospice care.
Discussion: Commonly seen as an incidental finding, black esophagus is an exceedingly rare entity with a prevalence of 0.2%. Its pathophysiology is not well understood, but thought to involve a 2-hit sequence where the initial insult predisposes to injury caused by a second insult. In our patient, her initial insult was clearly cardiogenic shock secondary to complete heart block followed by the second insult likely due to the introduction of antiplatelet agents. Unfortunately, treatment is largely supportive and prognosis is poor with mortality rates ranging from 13-35%. As such, clinicians should consider AEN as part of their differential for GI bleed given the potential for devastating consequences.

S2278

Black Esophagus: A Striking Etiology of Gastrointestinal Bleeding

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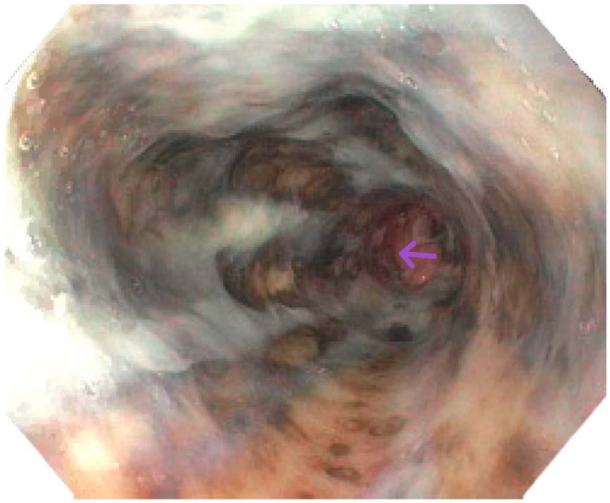
Introduction: Black esophagus, or acute esophageal necrosis (AEN), is an uncommon etiology of upper gastrointestinal bleeding with incidence 0.01%-0.2% and poor prognosis. AEN is characterized by endoscopic findings of diffuse circumferential black discoloration of distal esophageal mucosa with sharp demarcation at the GEJ. The pathophysiology of AEN is unknown, however current hypotheses implicate ischemia, thromboembolic injury, critical illness, and corrosive injury. We describe a case of black esophagus in a patient with hemorrhagic shock.
Case Description/Methods: An 83-year-old woman with hypertension presented to an outside hospital after a fall with lethargy, acute hypoxic respiratory failure, and shock. CT chest revealed right sided hemothorax. The patient was intubated, resuscitated with IV fluids and blood products, initiated on vasopressors, and a chest tube was placed prior to transfer to our institution. Repeat CT chest was concerning for the right thoracostomy tube traveling through the right middle lobe parenchyma and terminating within the mediastinum between the left atrium and the distal esophagus. The chest tube was removed and replaced in the operating room. Double contrast esophogram was without esophageal leak. The patient subsequently developed melena and worsening anemia. EGD demonstrated sharply demarcated circumferential black ulceration of the distal esophagus consistent with black esophagus without obvious signs of perforation. IV PPI and therapy aimed at reversing the underlying shock was pursued. Unfortunately, after a prolonged hospital course with worsening acute respiratory distress syndrome and inability to liberate from the ventilator, the patient's family elected to pursue comfort measures and the patient expired (**Figure**).
Discussion: In this case, AEN was most likely caused by ischemia secondary to hemorrhagic shock. Black esophagus carries a very poor prognosis, usually related to the underlying condition. Timely recognition of AEN and treatment aimed at reversing the underlying etiology can help prevent complications such as infection, esophageal stricture, and perforation. AEN is managed with aggressive IV PPI, NPO, and avoiding passage of nasogastric tubes due to risk of perforation. In rare instances, surgical intervention may be warranted. This case highlights the need to maintain a wide differential diagnosis for gastrointestinal bleeding and the importance of early recognition and treatment of this rare condition to prevent complications.



[2278] **Figure 1.** EGD indicating circumferential black ulceration of the distal esophagus with clear demarcation (arrow).

S2279

Bisphosphonate-Induced Esophageal Stricture: A Situation of Unusual Severity

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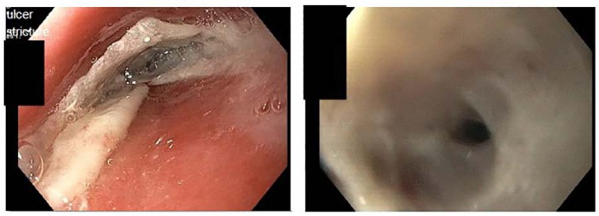
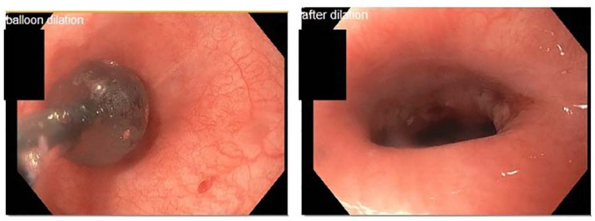
Introduction: Pill-induced esophageal stricture is a rare but well-documented condition associated with various causative agents. Potassium chloride and quinine are the most common causes and are more likely to produce stricture than other agents (such as Bisphosphonates and Tetracyclines). Predisposing factors include older age, male gender, sustained release medication formulation and prior esophageal structural abnormality.
Case Description/Methods: An 80-year-old female with history of osteoporosis taking Alendronate presented with 3 weeks history of progressive solid and liquid dysphagia and endorsed 20 lbs weight loss. The patient reported inability to keep any food down for 3 days prior to presentation and had begun requiring the use of oral suction at bedside due to inability to swallow her own saliva. She appeared clinically stable on exam. He laboratory study showed profound electrolytes abnormality. Esophagogastroduodenoscopy (EGD) showed circumferential mid esophageal ulceration that progressed to a narrow stricture that could not be traversed even with a stricture scope (5.9 mm diameter). Alendronate was discontinued and the patient was treated with liquid formulation omeprazole twice daily. Her diet was slowly advanced from clear liquid to mince. Her hospitalization was prolonged because she developed refeeding syndrome after reinitiating her diet. She was discharged after her electrolytes normalized. Two months after her initial presentation, her dysphagia had completely resolved. A repeat EGD revealed a tapered benign-appearing stricture in the distal esophagus, which was traversed without resistance with a standard gastroscope. Balloon dilation was performed to a diameter of 13 mm without creation of a mucosal rent (**Figure**).
Discussion: This case highlights the severity and potential rapid progression of pill-induced esophageal damage caused by Bisphosphonate therapy. Esophagitis or esophageal mucosa ulceration are common. The mucosal damage is caused by direct contact of the drug with the esophageal mucosa. Reports of stricture formation from Alendronate use are rare. Stricture formation may be caused by chronic inflammation from long-term use. Clinicians should have a low index suspicion in a high-risk patient presenting with classic symptoms of dysphagia. In addition, patients should receive counseling on proper pill ingestion technique to prevent potential damage.



Esophagogastroduodenoscopy (EGD) at initial presentation: Mid esophageal ulceration and non-traversable esophageal stricture with stricture endoscope



Esophagogastroduodenoscopy (EGD) 12 weeks after discontinuing Alendronate: stricture in the distal esophagus. Through-the-scope Balloon dilation to 13mm

[2279] **Figure 1.** See attachment.

S2280

Benign Bronchoesophageal Fistula Recalcitrant to Endoscopic Management

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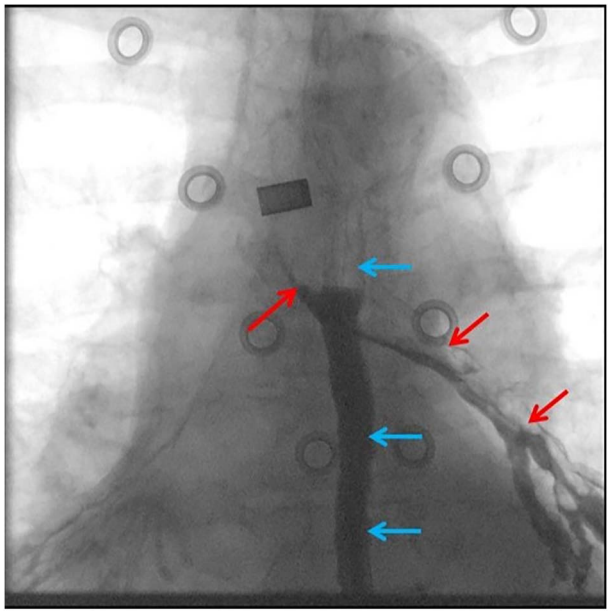
Introduction: The management of bronchoesophageal fistulas (BEFs) can be challenging and often requires a multidisciplinary approach. We present the case of a spontaneous BEF that defied multiple endoscopic attempts at closure.
Case Description/Methods: A 69-year-old malnourished woman with heavy tobacco use and chronic obstructive pulmonary disease presented with cough incited by food intake and pneumonia. Fluoroscopic contrast study highlighted a bronchoesophageal fistula with opacification of the left mainstem bronchus (**Figure**). An initial upper endoscopy demonstrated a small recess but without an obvious fistulous opening at 29 cm from the incisors and without malignancy on biopsy. A subcarinal 2.3 cm broncholith seen on a chest CT performed 2 years prior was now noticeably absent, suggesting broncholith erosion as the cause of the BEF. An attempt at endoscopic closure was recommended by multidisciplinary consensus. Since the fistulous opening was not readily identifiable at initial endoscopy, a combined bronchoscopic-endoscopic procedure was performed with bronchoscopic passage of a guidewire through the fistula tract into the esophagus. Once localized, abrasion of the fistula orifice with argon plasma coagulation followed by over-the-scope clip (OTSC) closure was performed. Symptom and radiographic recurrence at 2 weeks from migration of the OTSC resulted in uneventful endoscopic removal of the OTSC. Subsequent placement of a fully covered self-expandable metal stent with endoscopic suture fixation resulted in intolerable chest pain despite narcotic administration and incomplete sealing of the fistula on radiographic imaging, necessitating stent removal one week later. A third attempt at endoscopic suture closure of the fistula was unsuccessful. A PEG-J feeding tube was placed for enteral nutrition as well as a retrograde pigtail drainage catheter fitted through the PEG to manage secretions at and above the BEF. Definitive surgical repair will be considered once her nutritional status is optimized.
Discussion: Despite publications of successful endoscopic closure of benign BEFs, a significant proportion of these cases do not respond to endoscopic interventions and are not likely to be reported in the literature (reporting bias). Benign BEFs should be managed in a multidisciplinary fashion and alternative treatment strategies pursued when endoscopic therapies are deemed unsuitable or fail at closing the fistula.



[2280] **Figure 1.** Esophagram highlighting bronchoesophageal fistula. Esophagus (blue arrows); left mainstem bronchi (red arrows).

S2281

Black Esophagus (Gurvits Syndrome): A Rare Case of Acute Esophageal Necrosis in a Young Adult

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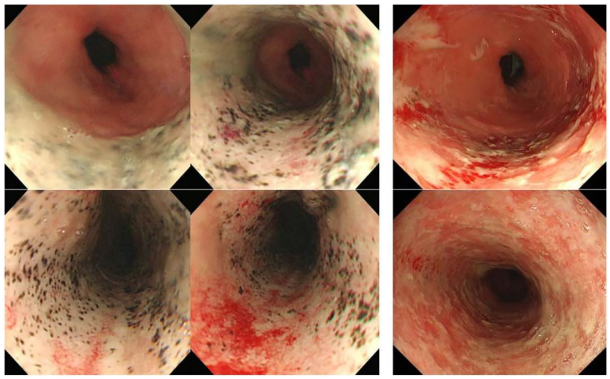
Introduction: Acute esophageal necrosis (AEN), often referred to as 'black esophagus' is a poorly described disease process in medical literature. A literature review showed the estimated prevalence of AEN is low with a large autopsy series in the United States reporting 0.2% in 3000 cases (1). It affects men 4 times more than women with peak incidence in the sixth decade of life (1). The pathogenesis entails distal esophageal ischemia resulting from hypo-perfusion secondary to hemodynamic instability. There is associated corrosive injury from gastric contents with impaired mucosal barrier systems and reparative mechanisms typically in malnourished and debilitated states. Clinical symptoms include upper GI bleeding, epigastric pain, and dysphagia (2). AEN is characterized by diffuse circumferential black mucosal discoloration in the distal esophagus that abruptly stops at the gastroesophageal junction. Treatment includes correcting coexisting co-morbidities, restoring hemodynamic stability, and acid suppression (3).
Case Description/Methods: A 39-year-old-male with poorly controlled DM (Hb A1c 14.3) was admitted with DKA and sepsis to the medical intensive care unit. The Patient was found obtunded at home. On arrival, the patient was slightly hypotensive at 80/50, with GCS of 3. Initial laboratory findings revealed a β hydroxybutyrate level of 12.46 mmol/L, FSG of 1159 and PH of 7.0. The Patient was intubated and sedated, given fluid boluses and commenced on an insulin infusion following DKA protocol. The patient was noted to have melena, 4 (4) days after admission. An upper GI endoscopy done revealed circumferential inflammation with black necrotic appearing esophageal mucosa present in the distal 2 thirds of the esophagus ending at the level of the esophageal-gastric junction. The patient was commenced on high dose proton pump inhibitors, antimicrobials, good glycemic control, fluid resuscitation and enteral diet as tolerated. The patient's overall condition improved (**Figure**).
Discussion: Etiologies leading of AEN include infections, broad-spectrum antibiotics use, gastric volvulus, paraoesophageal hernias, hyperglycemia, DKA, and malignancy (6). Endoscopy finding include circumferential black discolorations with a sharp transition to normal appearing mucosa at the gastro-esophageal junction. In our patient, the underlying etiology is most likely hyperglycemia and DKA due to uncontrolled DM type 2. Initial management involves controlling the hyperglycemia with insulin and providing adequate fluid hydration.



[2281] **Figure 1.** A rare case of black esophagus in a young adult.

S2282

Black Esophagus Manifesting as Upper Gastrointestinal Bleeding in Diabetic Ketoacidosis: A Case Report

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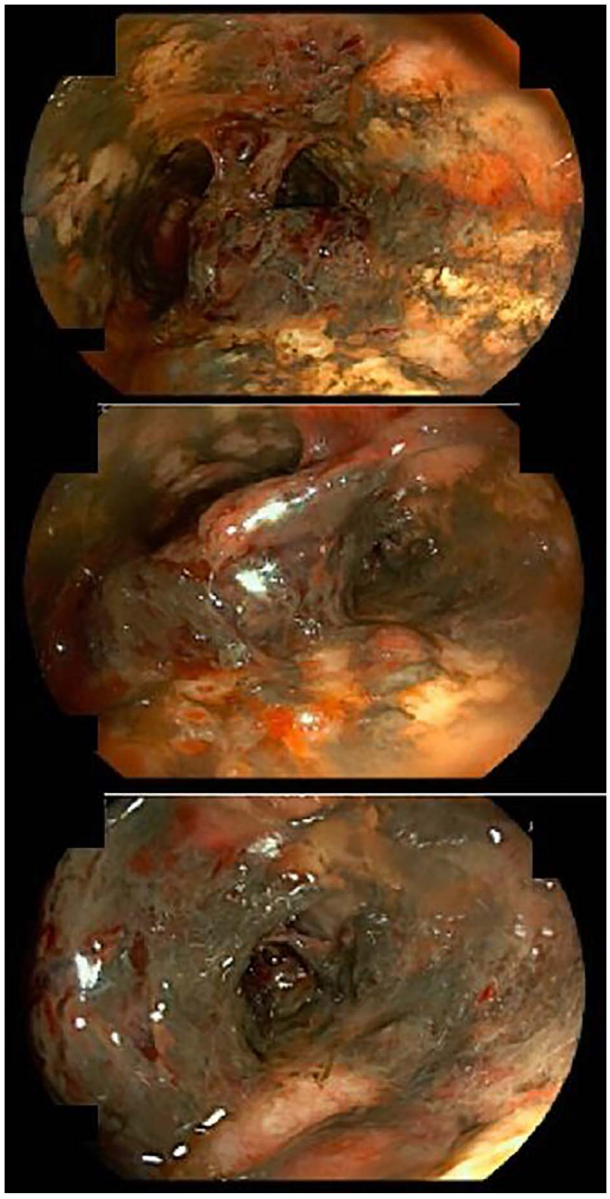
Introduction: Acute esophageal necrosis, or black esophagus, is a rare clinical entity manifesting as upper gastrointestinal bleeding and complicating various conditions. However, black esophagus in the setting of diabetic ketoacidosis (DKA) has been rarely reported. We present a case of a 36-year-old male with black esophagus presenting as hematemesis complicating an episode of DKA.
Case Description/Methods: A 36-year-old male with uncontrolled type 1 diabetes mellitus complicated by end-stage renal disease and hypertension presented to the emergency department with abdominal pain, nausea, and vomiting. Patient reported worsening abdominal pain and associated blood-tinged emesis. On presentation, patient was hemodynamically stable. Physical exam included an abdomen that was diffusely tender to palpation without peritoneal signs. Initial labs remarkable for serum glucose 1491, anion gap 41, bicarbonate 9, and hemoglobin 7.5. Patient was admitted to Critical Care for insulin drip and intravenous fluid resuscitation for DKA. Later, patient had an episode of hematemesis resulting in tachycardia, hypotension, and drop in hemoglobin to 5.6. Patient was further resuscitated with blood transfusions with improvement in hemodynamics and hemoglobin to 8.9. Continuous pantoprazole infusion was initiated. Upper endoscopy demonstrated severe, ulcerative necrotizing circumferential esophagitis in the middle and lower third esophagus and a medium size blood clot without evidence of active bleeding. No biopsies were taken due to concern for possible false lumen; CT chest with contrast demonstrated no signs of esophageal perforation. Following EGD, patient had several small self-limiting episodes of hematemesis and melena, while maintaining hemodynamics. He was continued on pantoprazole infusion and placed on strict nothing by mouth (NPO) precautions for 3 days with gradual advancement of diet. He received 6 days of empiric antimicrobial therapy with ampicillin-sulbactam and fluconazole. Patient reported no further episodes of hematemesis. Hemoglobin stabilized around 8.0 (**Figure**).
Discussion: DKA is a rare but life-threatening cause of acute esophageal necrosis which may develop due to a combination of tissue hypoperfusion, impaired mucosal defenses, and gastric reflux. Upper gastrointestinal bleeding in the setting of DKA should raise suspicion for black esophagus which is a potential cause of mortality. Early diagnosis and treatment of underlying etiology are the key factors in management.



[2282] **Figure 1.** Severe, ulcerative necrotizing circumferential esophagitis in the middle and lower third esophagus and a medium size blood clot without evidence of active bleeding.

S2283

Aspiration Pneumonia: An Atypical Case Presentation of Esophageal Malignancy

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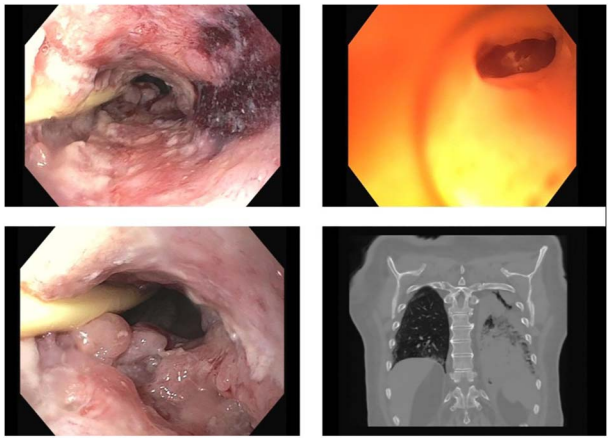
Introduction: Esophageal malignancy is the most common cause of tracheoesophageal fistula (TEF) in adults. TEFs develops in 5-15% of patients with esophageal malignancy, often being found late in the disease course. TEFs are often a result of cellular damage from radiation therapy. Patients often present with symptoms including coughing, pneumonia, hemoptysis, hypoxic respiratory distress, and aspiration. The symptoms of cough, aspiration, and pneumonia remain consistent with expected symptoms of esophageal radiation, and thus, can lead to delay in diagnosis of tracheoesophageal fistula.
Case Description/Methods: The patient was a 75-year-old male with a history of non-Hodgkin's lymphoma status post radiation, and chronic dysphagia was admitted to the medical intensive care unit for acute hypoxic respiratory failure requiring non-invasive mechanical ventilation. Labs were remarkable for white blood cell count of 17.9, hemoglobin 10.5, platelets 400, and all electrolytes were within normal limits. Total bilirubin, transaminases, alkaline phosphatase, and lipase were unremarkable. Computed tomography (CT) chest w/o contrast noted multifocal aspiration pneumonia, most severe at the left lung base. CT abdomen w/o contrast showed irregular thickening of the mid to distal esophagus suspicious for a neoplastic etiology, for which GI was consulted for an esophagogastroduodenoscopy (EGD). Subsequently he developed pulseless electrical activity-arrest requiring intubation. At this point, it was conducive for the patient to undergo EGD, which found invasive squamous cell carcinoma of the esophagus with tracheal fistulation. Due to poor prognosis, the palliative care team was consulted at which point the patient elected for hospice with comfort measures only (**Figure**).
Discussion: Despite improvement in detection techniques, the incidence of esophageal malignancy in the United States continues to rise. Esophageal cancer is the 6th leading cause of cancer related death in men with a 5-year survival rate of 15-25%. It is important that these patients are diagnosed early in the disease course. Unfortunately, due to the rapidly progressive nature of the disease and the frequent lack of clinical symptoms during early stages, esophageal carcinoma is especially difficult to detect. Although TEFs are typically found late in the disease course, it is critical to recognize that complications associated with esophageal fistulas can be the presenting findings of esophageal malignancy.



[2283] **Figure 1.** Upper left: Proximal esophagus with evidence of necrosis Upper right: TEF of mid esophagus Lower left: partially obstructive squamous cell carcinoma of the mid esophagus Lower right: CT scan revealing advanced multifocal aspiration pneumonia of the left lung.

S2284

Black Esophagus as Cause of UGIB After a Complicated Urologic Procedure

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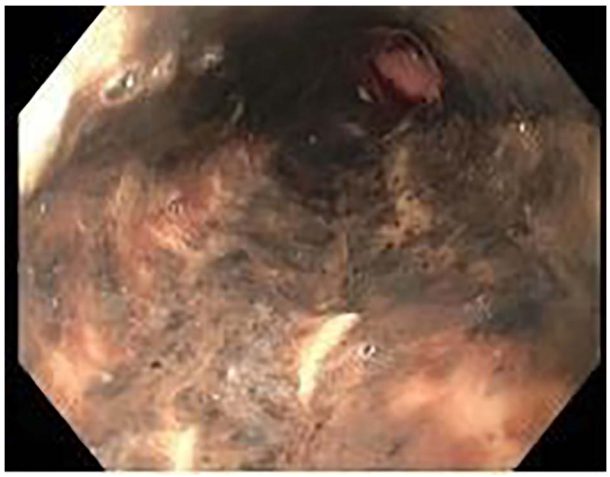
Introduction: We report a case of upper endoscopy performed for a patient with coffee-ground emesis after a complicated urologic procedure. It showed diffuse black discoloration in mid-distal esophagus consistent with acute esophageal necrosis (AEN).
Case Description/Methods: This is a 68-year-old male with diabetes mellitus (DM), chronic kidney disease, hypertension (HTN) and bladder cancer. He was admitted to intensive care after transurethral resection of bladder tumor (TURBT) was complicated by bladder perforation that required open laparotomy and bladder repair. Patient remained intubated for 48 hours. During the postoperative period, he developed ileus with nausea, vomiting and abdominal distention. He subsequently developed coffee-ground emesis and chest pain. He was not on acid suppressing medication. Upper endoscopy was performed to investigate etiology of upper gastrointestinal bleeding (UGIB), which showed diffuse areas of black discoloration in mid-distal esophagus suggestive for esophageal necrosis (**Figure**). Pathology showed tissue necrosis consistent with AEN. Patient was promptly treated with a proton-pump inhibitor and sucralfate. Symptoms rapidly improved without recurrence of bleeding or complication.
Discussion: AEN, also known as "black esophagus" or necrotizing esophagitis, is a rare syndrome characterized by circumferential black mucosa at the distal esophagus and stops at the gastroesophageal junction. The prevalence is about 0.2% and 4 times more likely in men than women. Risk factors include DM, malignancy, HTN, alcohol abuse and coronary artery disease. The etiology is likely esophageal ischemia from a low-flow state followed by a backflow injury from chemical contents of gastric secretions. Majority of patients present with UGIB, followed by dysphagia and epigastric/chest pain. Symptoms can develop rapidly following an inciting event. With adequate resuscitation and medical therapy (proton pump inhibitors and sucralfate), patients can recover rapidly. Complications may include stricture, perforation, mediastinitis, and death. Prognosis is poor due to underlying critical illness, but mortality specific to AEN is much lower. Endoscopic appearance is suggestive, but biopsy is recommended to establish the diagnosis and exclude other diagnoses (e.g. melanoma and acanthosis nigricans). Repeat endoscopic evaluation is important to assess mucosal healing and determine duration of antacid therapy. Endoscopic balloon dilation may be necessary for stricture from AEN.



[2284] **Figure 1.** Diffuse circumferential black discoloration in lower esophagus.

S2285

Case Series of SMARCA4-Deficient Undifferentiated Esophageal Carcinoma

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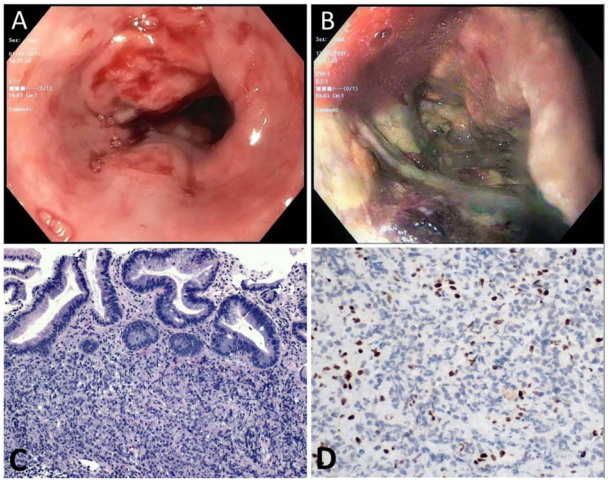
UConn Health, Farmington, CT.

Introduction: Undifferentiated esophageal carcinomas (UEC) are rare with aggressive behavior and dismal prognosis. An extremely rare subset is the SMARCA4-deficient UEC which has only been reported in 14 cases to-date. We present 2 patients with SMARCA4-deficient UEC.
Case Description/Methods: Case 1: A 39 y/o man presented with fever, nausea, abdominal pain, and weight loss. No significant social history. His grandfather had esophageal cancer in his 60s. Exam was significant for RUQ tenderness and hepatomegaly. Labs were unremarkable. Abdominal CT showed distal esophageal mass with hepatic metastasis. EGD revealed large, ulcerating distal esophageal mass (**Figure**

A). He passed away 1.5 months after initial presentation. Case 2: A 64 y/o man with history of hiatal hernia and reflux disease, presented with persistent heartburn. He had history of smoking and alcohol abuse. Labs were unremarkable. Abdominal CT showed distal esophageal mass with hepatic metastases. EGD revealed necrotic, distal esophageal ulcer (**Figure** B). He passed away 3 months after initial presentation. Pathology findings (esophageal tumor biopsy) in both cases showed undifferentiated tumor cells in solid sheets (**Figure** C) and adjacent mucosa consistent with Barrett's esophagus (BE). SMARCA4 was lost within the tumor cells (**Figure** D).

Discussion: The SMARCA4 gene encodes the BRG1 protein which has a tumor suppressor role. Loss of SMARCA4 gene has been associated with undifferentiated highly aggressive tumors .SMARCA4-deficient UEC is extremely rare and has been predominantly reported in elderly men. While our 64 y/o male patient fits the commonly reported demographics with risk factors for esophageal carcinoma, our 39 y/o patient did not have any potential risk factors and is the youngest reported patient. Additionally, the positive family history in the younger patient highlights the possibility of a germline mutation, which has been previously described in literature. Histologically, the observed BE in the background of tumor cells in our cases, was also observed in most reported cases. The presence of BE and the distal esophageal location in these tumors suggest the possibility of this tumor arising from progressive de-differentiation of BE. Our patients had evidence of metastatic disease on presentation, rapidly progressed and passed away within 1.5-3 months. The rapid mortality rate and the limited utility of SMARCA4 immunostaining could explain the underreporting of this disease.



[2285] **Figure 1.** A: EGD in case 1, showing a large, non-obstructing, circumferential, ulcerating mass in the lower third of the esophagus. B: EGD in case 2, showing a fungating, circumferential, necrotic, distal esophageal ulcer with stigmata of recent bleeding. C: Both tumor biopsies showed undifferentiated tumor cells consisting of epithelioid cells arranged in solid sheets with adjacent intestinal metaplasia (low magnification, H&E). D: Loss of SMARCA4/BRG1 within the tumor cells, while retained within inflammatory cells (internal control).

S2286

Cocaine-Induced Esophageal Necrosis: A Rare Cause of Esophageal Stricturing

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Introduction: Acute esophageal necrosis (AEN) is a rare condition characterized by a distinct black appearance of the esophagus on esophagogastroduodenoscopy (EGD), usually starting at the distal esophagus and abruptly stopping at the gastroesophageal junction (GEJ). Since patients with AEN typically present with vague upper gastrointestinal symptoms, AEN is not initially high on the list of differentials.
Case Description/Methods: We present a case of a 60-year-old male with coffee ground emesis and abdominal pain. His history is significant for multiple esophageal strictures requiring numerous dilations. The patient complains of associated severe and worsening dysphagia over the last 9 months as well. On this presentation, the patient was found to be in diabetic ketoacidosis and atrial fibrillation with rapid ventricular rate. Laboratory investigations were significant for leukocytosis and an acute kidney injury. Drug screen was positive for cocaine. CT abdomen and pelvis revealed severe gastroparesis but no other acute findings. A workup for infectious etiology and other causes was negative. Two days later once stabilized, the patient underwent EGD with biopsy which revealed white and black mucosa from the distal to mid-esophagus, grade-D esophagitis. The patient was diagnosed with cocaine-induced esophageal necrosis and managed symptomatically along with instruction to cease cocaine use (**Figure**).
Discussion: Cases of AEN associated with cocaine use are quite rare, with only 5 reported cases in the literature. The mechanism of cocaine-induced AEN is not completely understood, however it has been thought that the vasoconstrictive properties of cocaine can exacerbate and contribute to esophageal ischemia. EGD with biopsy is the gold standard for diagnosis of AEN. Treatment of underlying conditions, cessation of offending agents like cocaine, and compliance with follow-up are the mainstays of treatment. This case is significant as it highlights not only an uncommon cause of ischemia but of esophageal stricturing.

[2286] **Figure 1.** White and black mucosa from the distal to mid-esophagus, grade-D esophagitis, concerning for cocaine-induced esophageal necrosis.

S2287

Case Series: The Changing Paradigm in Management of Spontaneous Esophageal Perforation

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Introduction: Despite advances in medical knowledge, esophageal perforation remains a condition with high morbidity and mortality. Prognostic factors include: etiology and location of esophageal injury; presence of underlying esophageal disease; interval between perforation and intervention; and method of treatment. Here, we present 2 cases of spontaneous esophageal perforation that were managed differently but both resulted in favorable outcomes.
Case Description/Methods: Case 1: 26-year-old female experienced excruciating chest pain following a bout of intractable nausea and vomiting. Physical examination revealed tenderness to palpation in epigastrium and minimal amounts of crepitus in the neck. CT Thorax revealed small volume pneumomediastinum (**Figure** A). The patient was managed conservatively with intravenous (IV) fluid hydration, IV

antibiotics, and nothing by mouth. Repeat imaging was performed 10 days after initial CT which revealed interval resolution of pneumomediastinum. Patient was started on clear liquids and diet was advanced thereafter. Case 2: 20-year-old male presented to emergency department (ED) with intractable nausea and vomiting after cocaine inhalation. Patient subsequently developed substernal chest pain with shortness of breath. Physical examination was notable for subcutaneous emphysema in the neck, shoulders, and back. Emergent CT revealed extensive pneumomediastinum with extension of air into the chest, back, and neck (**Figure** B). Gastrograffin esophagram revealed extravasation of contrast at GE junction. The patient underwent primary closure of esophageal perforation. The patient was monitored closely on the inpatient service until his symptoms improved and he was discharged on hospital day 14.

Discussion: The optimal management of esophageal perforation remains debatable, particularly for small well-contained perforations. With advances in minimally invasive techniques, the need for surgical exploration appears to be diminishing. Neither patient in this case series suffered from underlying esophageal disease. Both patients had an injury to the distal esophagus that was addressed within 24 hours of presentation; however, one patient was managed conservatively whereas the other patient was managed surgically. While the outcome for both cases was favorable, the morbidity involved with surgical intervention was higher. Perhaps, a minimally invasive approach should be considered in all non-emergent cases prior to surgical intervention in an effort to further decrease morbidity.

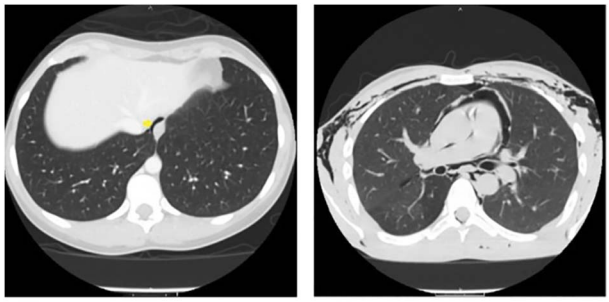

Figure 1A Figure 1B

[2287] **Figure 1.** A. CT thorax revealing free air around distal esophagus (see yellow arrow) B. CT thorax demonstrating extensive air throughout the mediastinum, extending into the pericardial sac and soft tissues of chest.

S2288

De Novo Esophageal Small Cell Neuroendocrine Carcinoma in a Patient With Achalasia: A Novel Case Report

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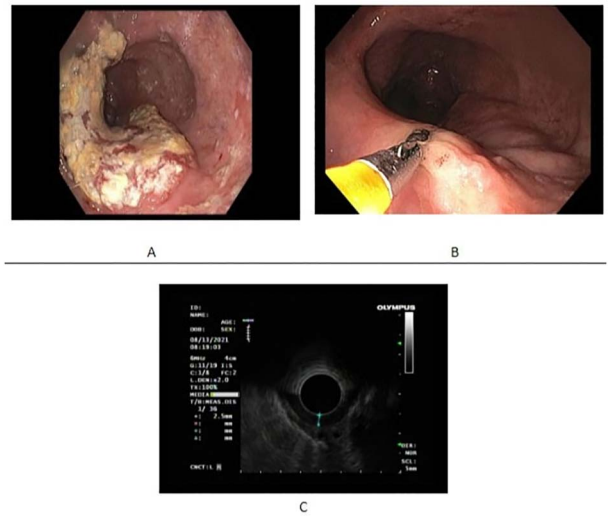
Introduction: Neuroendocrine carcinoma (NEC) of the esophagus is a rare and highly aggressive disease with a reported incidence between 0.4% and 2% among all esophageal malignancies. The small cell subtype comprises > 95% of cases. Achalasia is a well-known condition associated with > 50 times higher risk of presenting with esophageal cancer than the general population. We present a novel case of small-cell NEC of the esophagus in a patient with longstanding achalasia who was treated using chemotherapy alone.

Case Description/Methods: An 81-year-old female with a history of longstanding achalasia presented for evaluation of progressive solid-food dysphagia for 2 months. In addition to abnormally dilated distal esophagus consistent with achalasia, EGD showed a partially obstructive fungating mass in the mid-esophagus (**Figure** A). Mucosal biopsies demonstrated neoplastic cells with necrosis. Immunohistochemistry was positive for CK7, chromogranin, synaptophysin, CD 56, and TTF1 (patchy) with a very high Ki-67 proliferation index (approaching 90-100%); and negative for other markers including P40, CK5/6, CK20, CDX-2. The overall findings were consistent with high-grade neuroendocrine tumor, a small cell subtype. A Chest CT scan revealed dilated distal esophagus with mass thickening along the left lateral side of the esophagus with an extension outside the esophagus along the left side of the trachea. The patient received 8 cycles of platinum plus etoposide chemotherapy. Four months later, the PET scan showed no evidence of hypermetabolic activity. The repeat endoscopy showed macroscopic resolution of the tumor (**Figure** B), with histology showing some foci of high-grade dysplasia. Endosonography showed an esophageal wall thickness of 2.5 mm post-treatment (**Figure** C). The patient's dysphagia resolved completely, and she continued with her lifelong dietary modifications for the achalasia disease.

Discussion: Neuroendocrine carcinoma (NEC) of the esophagus is rare. The therapeutic strategy has not been well defined due to the small number of cases reported in the literature. Achalasia is associated with an increased risk for malignancy, usually a squamous cell type. To our knowledge, small cell NEC in the setting of achalasia has not been reported previously in the literature. Due to a paucity of cases of esophageal NEC, more studies are needed to understand the biological features of this aggressive cancer and its diagnostic and therapeutic approaches.



[2288] **Figure 1.** (A) EGD image shows a fungating mass in the mid esophagus, along with an abnormally dilated esophageal lumen from long-standing achalasia, (B) Repeat EGD shows resolution of the mid esophageal tumor post-treatment with chemotherapy, (C) An endoscopic ultrasound image shows an esophageal wall thickness of 2.5 mm post-treatment with chemotherapy.

S2289

Cool Stuff! Cryoablation Used to Treat Tissue Ingrowth in an Esophageal Stent

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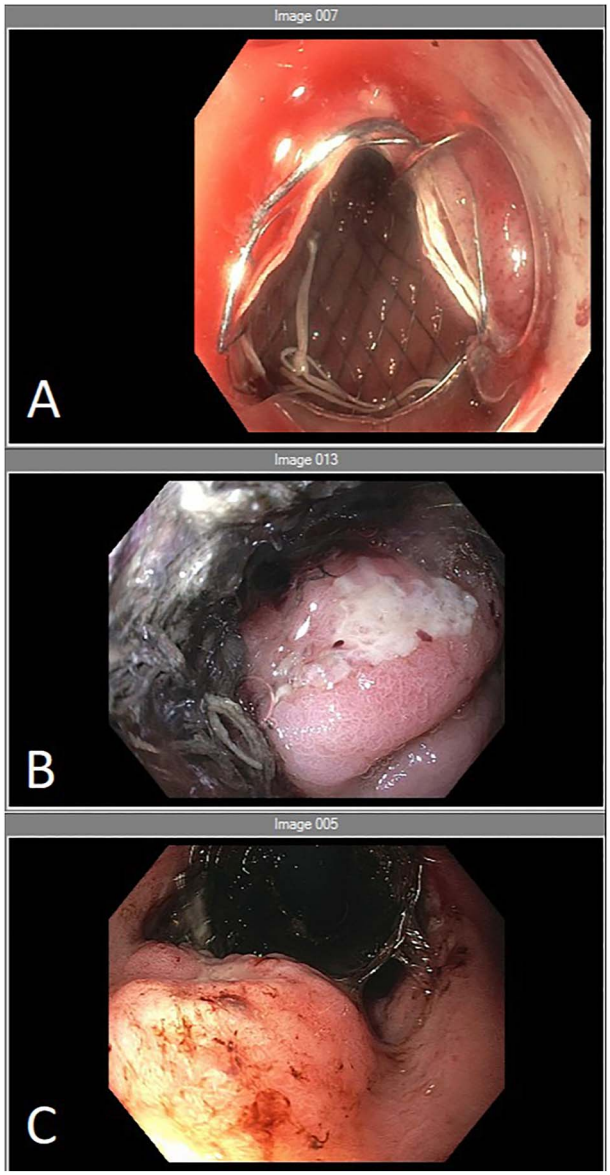
Introduction: Gastroesophageal cancers commonly develop complications due to the mass effect with the most common complication being esophageal obstruction or dysphagia if not the presenting symptom. Palliative treatment of the dysphagia includes esophageal stent or dilation balloons. One of the most frequent complication of esophageal stenting is tissue ingrowth. Literature shows an incidence of 4%-47% with higher incidence in non-covered stents. This is a case of cryoablation used to treat esophageal stent ingrowth from gastric cancer with proximal extension into the distal esophagus.
Case Description/Methods: An 89-year-old male presented to his primary care provider with progressive difficulty swallowing solid and liquids. He was only able to eat small bits of food and drink sips. He was referred to gastroenterology (GI)for an EGD which revealed adenocarcinoma with extension into the GE junction causing the esophageal obstruction. He was referred to interventional GI for esophageal stent placement. There was a friable tumor and distal esophageal narrowing. The appearance of the tumor, edema, thickened folds, and poor distension of the stomach was suspicious for gastric adenocarcinoma (linitis plastica). A partially covered esophageal stent (20 mm x 10 cm) was placed and secured in place in the distal esophagus. 2 months later, the patient returned due to hematemesis and anemia concerning for tumor bleed. On EGD, the uncovered proximal end of the stent had extensive tissue ingrowth. There did not appear to be neoplastic tissue. The distal portion was free from ingrowth. Liquid Nitrogen Spray Cryoablation (20 sec x 2 cycles) was performed on the proximal tissue ingrowth. 2 weeks later, the patient had a repeat EGD to reassess the site. The tissue ingrowth over the proximal end of the stent improved compared to the prior EGD (**Figure**). The distal end continued to be free from ingrowth. The scope was easily able to pass through the stent as well and no active bleeding was seen.
Discussion: Dysphagia and obstruction from gastroesophageal cancers can be treated with esophageal stenting, however there may be re-narrowing or bleeding from tissue ingrowth. This could be addressed with stent removal and re-stenting; however, this case demonstrates the successful use of cryoablation for stent ingrowth. Cryoablation may be a useful option for stent ingrowth and is being actively studied currently.



[2289] **Figure 1.** A) Stent initially placed. B) Stent with tissue ingrowth 2 months later. C) Stent with the lumen intact 2 weeks later.

S2290

Complete Esophageal Obstruction: A Rare Complication of Zollinger-Ellison Syndrome (ZES)

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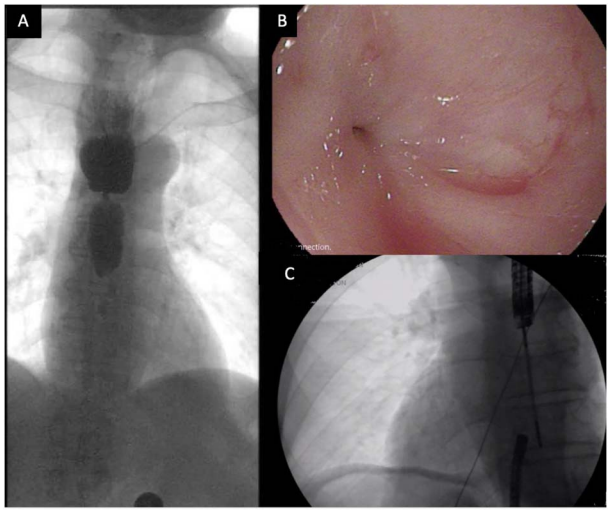
Introduction: Patients diagnosed with ZES typically have minimal esophageal morbidity given advancements in anti-secretory medications. This case presents a rarely documented sequala of modern-day patients with ZES.
Case Description/Methods: A 73-year-old man with history of HIV on HAART and ZES presented with worsening dysphagia to both solids and liquids. In the 2 year interval since his original presentation, his medical therapy was quickly maximized to omeprazole 180 mg/day and famotidine 80 mg/day. He also underwent tumor resection with distal gastrectomy, resection of D1, roux-en-Y hepaticojejunostomy, and truncal vagotomy. During that time his gastrin levels normalized from 1941 to 87. Despite these measures, he had undergone 21 EGDs and 7 esophageal stents for dysphagia secondary to refractory esophageal strictures. He lost 48 lbs over 2 years despite extensive attempts at both enteral and total parental nutrition. In January 2022, he presented with inability to swallow his own secretions and profound weakness from malnutrition. An esophagram was performed (figure 1a) revealing complete esophageal obstruction. An EGD with esophageal lumen restoration was attempted using combined retrograde and anterograde recanalization with 2 operators, 2 EGD scopes, and an EUS needle (figure 1c). Unfortunately, the 2 blind loops appeared to be approximately 6 cm apart in different alignments making lumen restoration unfeasible. The patient was most recently evaluated for esophageal reconstruction by jejunal interposition but was not a candidate due to poor nutritional status.
Discussion: ZES is characterized by severe ulcerative disease due to gastric acid hypersecretion via neuroendocrine tumors. Our case is unique because this patient developed complete esophageal obstruction (CEO) despite management with maximal acid suppressive therapy, surgical resection, multiple EGDs with dilations, and numerous esophageal stents. CEO is a rare occurrence characterized by lumen obliteration leading to the inability to tolerate own secretions and most recorded cases are due to radiation-therapy for treatment of head and neck cancers. Given the low incidence, there is no single established method for endoscopic lumen restoration. However recombined retrograde and anterograde recanalization and dilation (CARD) has been shown to be successful for strictures less than 3 cm.



[2290] **Figure 1.** (A) Barium swallow study revealing a high-grade stricture in mid thoracic esophagus followed by another high-grade stricture with complete lumen obstruction. (B) EGD showing blind pouch approximately 35 cm from incisors. (C) Fluoroscopic imaging displaying attempt at combined anterograde and retrograde decannulation and dilation.

S2291

Complete Esophageal Obstruction Secondary to Variceal Banding

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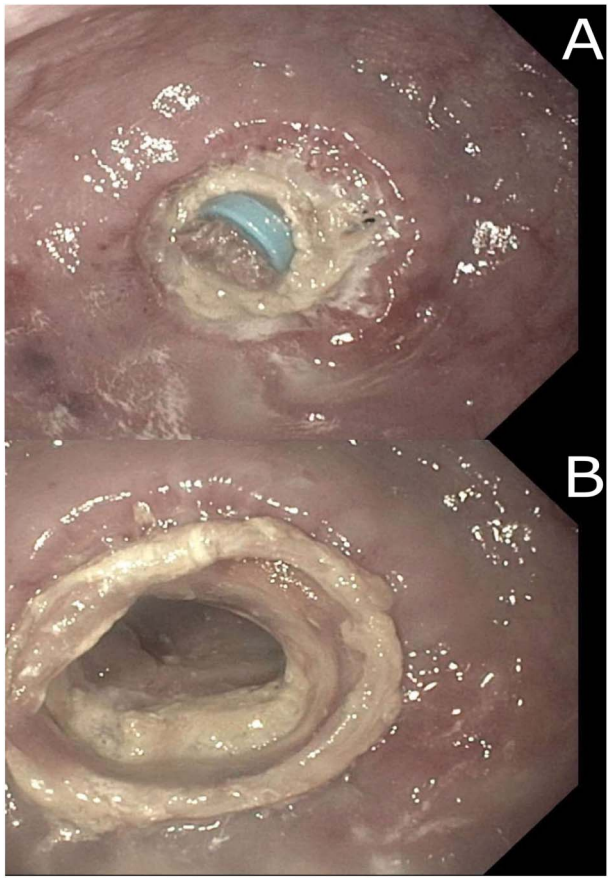
Introduction: One effective strategy for primary and secondary prophylaxis of esophageal varices is variceal banding. Known complications include bleeding, ulceration, dysphagia, and stricture. Rarely, variceal banding can cause complete esophageal obstruction and has been described in only 14 cases to date. We present a cirrhotic patient with complete esophageal obstruction from a banded varix.
Case Description/Methods: A 78-year-old female with NASH cirrhosis and esophageal stricture was transferred to our facility for intractable nausea and vomiting after outside hospital EGD for hematemesis. The EGD found 3 columns of grade 2-3 esophageal varices and variceal band ligation was performed. Her symptoms persisted despite use of octreotide, proton pump inhibitors, and antiemetics. Vital signs and physical examination were unremarkable aside from epigastric tenderness with ascites. Labs demonstrated acute on chronic kidney injury and chronic normocytic anemia with normal coagulation profile. Barium esophagogram showed distal esophageal obstruction. Repeat EGD (8 days post initial EGD) found a banded varix completely obstructing the distal esophageal lumen with surrounding necrotic tissue (Figure 1-A). The esophageal lumen was restored after band removal with rat-toothed forceps. Two benign-appearing circumferential and ulcerated strictures were distal to the obstruction (Figure 1-B) and a nasojejunal tube was passed without resistance. The patient's hospitalization was complicated by ascites and new diagnosis of hepatocellular carcinoma. Repeat EGD (1 week post band removal) was performed to place esophageal stents for persistent regurgitation and a TIPS procedure was performed. The patient discharged on hospital day 19 tolerating a dysphagia diet.
Discussion: Dysphagia after variceal banding is typically from dysmotility and esophageal spasm. Symptoms usually resolve once the banded varix sloughs off within 2-3 days after band ligation. Thus, complete esophageal obstruction by a banded varix is extremely rare. Conservative management with nil-per-os and TPN or IV fluids has been used successfully although esophageal strictures can form. Band removal is recommended by some groups to produce immediate symptomatic relief and reduce length of stay. However, strictures can still form, and iatrogenic esophageal intraluminal dissection has been described. Whether band removal improves outcomes is still a matter of debate, but dysphagia after variceal banding should raise suspicion for esophageal obstruction.



[2291] **Figure 1.** A. Complete obstruction of the distal esophageal lumen by a banded varix. B. Two circumferential and ulcerated strictures distal to the obstruction.

S2292

Dysphagia and Esophageal Mass: Cancer or Actinomycosis?

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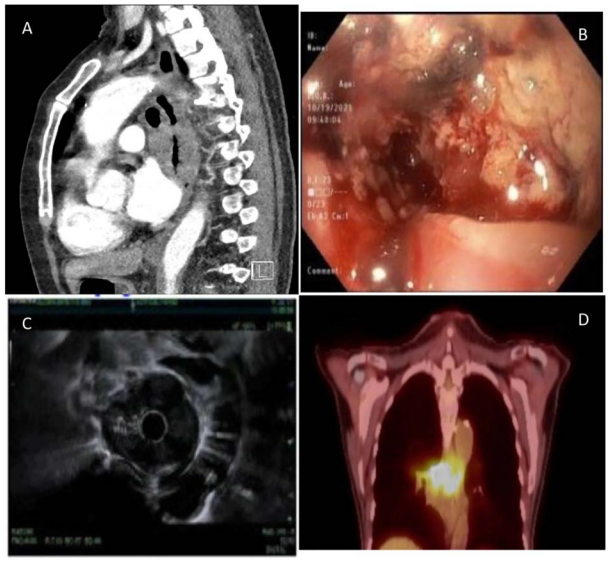
Introduction: Esophageal actinomycosis is a rare type of esophageal infection and presents as erosions or ulcers under endoscopy. Here we present a 63-year-old woman who complains of dysphagia, with biopsy showing actinomyces infection but repeat biopsy revealed squamous cell carcinoma.
Case Description/Methods: A 63-year-old Chinese female with a history of gastritis presented with solid food dysphagia and epigastric pain for over a month. The pain was not improved after proton pump inhibitors but was relieved by self-induced vomiting. Review of systems showed 10lb weight loss over a month with a recent history of self-resolved hematemesis. Prior esophagogastroduodenoscopy (EGD) and colonoscopy were normal 3 years ago. CT of the chest demonstrated a 1.7 cm circumferential mass in the mid-esophagus with luminal narrowing (Figure 1A). EGD discovered a friable soft circumferential mass 26-29 cm from the incisors that are not actively bleeding but covered with blood clots (**Figure** 1B). Biopsy showed esophageal mucosal ulceration and actinomyces infection. The patient was started on amoxicillin to treat actinomyces infection. Meanwhile, the patient underwent a repeat EGD for rebiopsy given concerns for malignancy, which resulted in poorly differentiated squamous cell carcinoma. Endoscopic ultrasonography (EUS) was performed for staging but was limited staged uT3N1Mx as the mass could not be traversed by echoendoscopy (**Figure** 1C). Later PET-CT illustrated locally advanced disease with atrium involvement (**Figure** 1D). The patient underwent neoadjuvant chemotherapy with carboplatin-taxol and radiation followed by esophagogastrectomy for curative intent.
Discussion: Actinomyces are facultatively anaerobic, Gram-negative bacilli. They commensally live within the oral cavity and gastrointestinal tract. Most esophageal actinomyces (EA) infection was previously described to resemble esophagitis or esophageal ulcers, with the endoscopic description being extensive necrotic areas. EA typically presents with dysphagia and odynophagia, particularly in immunocompromised patients or with malignancies. Actinomyces species capitalize on tissue injury or mucosal breach to invade adjacent structures and spreads regardless of anatomical barrier, thus mimicking malignancy. In our case, the local tissue damage caused by neoplastic disease or irradiation predisposed the actinomyces infection. Clinicians need to have a high index of suspicion and clinical knowledge regarding its unusual presentations and ability to mimic malignancy.



[2292] **Figure 1.** A. CT of the chest demonstrated a 1.7 cm mass present in the mid-esophagus with lumen narrowing. B. A friable mass without active bleeding but covered with blood clots on endoscopy finding. C. Limited staged uT3N1Mx under EUS D. PET-CT showed locally advanced disease with atrium involvement.

S2293

Dysphagia in Statin-Induced Necrotizing Myopathy: An Uncommon Cause of Dysphagia in Adults

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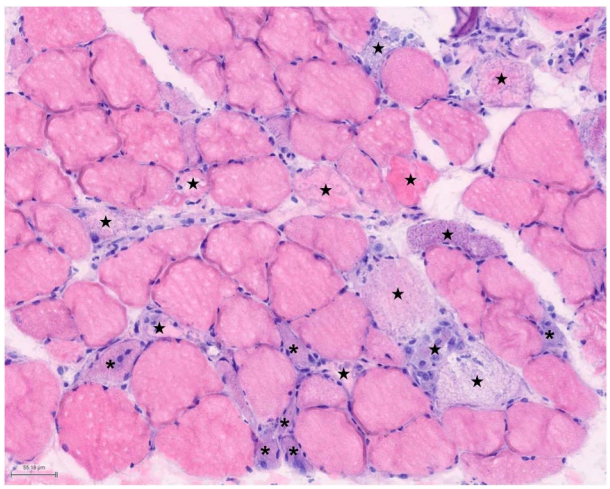
Introduction: Dysphagia due to statin induced myopathy is a rare condition. Statin generally is well tolerated and commonly used to reduce cardiovascular risk. However, myositis, a common complication of statin therapy, can cause disruption in the mechanism of muscles participating in swallowing. Here, we present a rare case of statin induced rhabdomyolysis and myositis causing dysphagia.
Case Description/Methods: A 58-year-old male with metabolic syndrome on statin therapy, was admitted for progressive solid food dysphagia, weakness, and myalgia. Initial vital signs were within normal limits. Physical exam was significant for profound weakness in all extremities. Initial labs were significant for an elevated creatine kinase (CK) of 19,387 U/L suggestive of rhabdomyolysis. CK continued to remain elevated despite aggressive fluid resuscitation. Statin therapy was subsequently held. Additional work up included a muscle biopsy which demonstrated severe necrotizing myopathy. Given the muscle biopsy findings in setting of statin use, 3-Hydroxy-3-Methylglutaryl-Coenzyme A Reductase (HMGCR) IgG antibodies were checked and found to be significantly elevated at above 550 CU (normal less than 20 CU). Patient was then diagnosed with Anti-HMG-CoA Reductase Positive Immune Mediated Necrotizing Myopathy (anti-HMGCR positive IMNM). Patient was then started on immunosuppressive therapy. However, patient's dysphagia continued to worsen. Given ongoing dysphagia and inability to fulfill all nutritional needs, patient underwent percutaneous endoscopic gastrostomy tube placement. Patient's condition stabilized after treatment with immunosuppressive therapy.
Discussion: IMNM is a type of auto-immune myopathy that is debilitating due to characteristics of severe muscle weakness and possible muscle necrosis. Biopsy of patients with necrotizing myositis will show myofiber necrosis. The distinguishing feature of HMG-CoA reductase IMNM is the presence of statin therapy. The duration of statin therapy does not appear to affect the development of IMNM. Prior studies have shown that about 6 percent of patients with biopsy proven IMNM also found to have positive anti-HMGCR antibodies. Of those patients with positive antibodies on muscle biopsy, 80 percent had history of statin therapy. Physicians should recognize signs of anti-HMGCR IMNM, such as progressive dysphagia early on in disease process, so the appropriate treatment can be initiated to prevent significant morbidity.



[2293] **Figure 1.** Muscle biopsy showing numerous pale necrotic myofibers (stars) and basophilic regenerating myofibers (asterisks) in varying stages of necrosis and regeneration. Image courtesy of Dr. Mari Perez-Rosendahl MD, University of Califorina, Irvine.

S2294

Endoscopic Management of Esophageal Cancer in a Patient with Decompensated Cirrhosis: The Importance of Multidisciplinary Collaboration and Peri-Procedure Planning in Complex Clinical Scenarios

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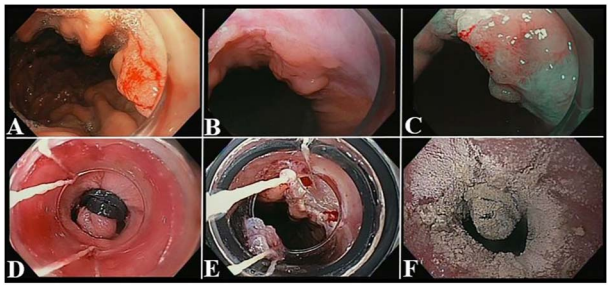
Introduction: Endoscopic therapy is effective for management of early esophageal cancer (EC), however serious complications such as bleeding and perforation can occur. Patient selection, optimization of co-morbidities and peri-procedure management help mitigate risk and improve patient outcomes. We present a patient with decompensated cirrhosis who required complex peri-procedure planning prior to endoscopic treatment of early EC.
Case Description/Methods: A 71-year male with decompensated cirrhosis (portal hypertension, esophageal varices, ascites) and recent DVT on apixaban was found to have a 1cm raised focal lesion at the GEJ; biopsies revealed high-grade dysplasia (HGD). He was referred for endoscopic mucosal resection (EMR). After extensive discussion with hematology, patient was admitted for anticoagulation management with intravenous (IV) heparin. EGD confirmed an 8mm nodule at the GEJ (**Figure** 1A,B,C). Grade 3 non-bleeding esophageal varices were noted at the GEJ and in the distal esophagus, prohibiting safe EMR. Biopsies again showed HGD. After multidisciplinary tumor board discussion, a transjugular portosystemic shunt (TIPS) was performed to decompress the portal system and reduce bleeding risk from the planned EMR. Doppler ultrasound a few weeks later confirmed patent TIPS. Repeat diagnostic EGD showed decompression of varices. EUS revealed a mucosal lesion with no lymphadenopathy. Biopsy revealed intramucosal adenocarcinoma. Based on this evaluation and after detailed discussion with the patient, EMR was planned with appropriate anticoagulation management. En-bloc multiband mucosectomy was performed (Figure 1D,E). Intraprocedural bleeding was controlled with band ligation and hemostatic spray (**Figure** 1F). Patient remained inpatient for observation on octreotide and IV pantoprazole drip without further bleeding. Apixaban 2.5mg was resumed on day 3 and he was discharged home on acid suppression. Pathology confirmed well-differentiated adenocarcinoma, pT1a. Tumor board discussion recommended continued endotherapy (cryotherapy) to the residual dysplastic Barrett's mucosa which he is tolerating well.
Discussion: Endoscopic treatment is effective for the management of early EC. However, when complex scenarios present in an elderly frail patient, multidisciplinary collaborative management and stepwise risk-mitigation strategies need to be in place to minimize morbidity and maximize success (Table). Tumor board and shared decision making are key patient centric strategies that reflect best practice.



[2294] **Figure 1.** A: Nodular distal esophageal lesion; B: Lesion in high-definition white light endoscopy (HDWLE); C: Lesion in narrow band imaging (NBI), D: Band placed at the base of the lesion, E: EMR defect, F: Hemostatic spray was used to achieve hemostasis of an area of focal bleeding after EMR.

Table 1. Risk Mitigation Strategies in Complex Endoscopy Practice – Best Practice Principles

Pre-procedure consultation (nonemergent diagnostic/elective procedures)
Pre-procedure planning (labs, imaging)
Optimization of treatment for co-morbidities
Anesthesia consultation
Detailed high-risk informed consent
Shared decision making
Multidisciplinary GI tumor board discussion
Medical record documentation
Guideline-based anti-thrombotic management
Appropriate procedure back-up and support (IR, surgery, radiology, critical care)

S2295

Epidermoid Metaplasia in the Proximal Esophagus

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Introduction: Esophageal epidermoid metaplasia is a rare condition characterized by orthokeratotic hyperkeratosis and the development of a prominent granular layer within the esophageal squamous epithelium, resulting in the formation of well-demarcated white plaques resembling the epidermis of the skin.
Case Description/Methods: A 65-year-old female presented with a 2-year history of intermittent dysphagia to solids and pills. Her dysphagia was sensed in the suprasternal notch. She denied symptoms of acid reflux or weight loss. Her past medical history included vulvar lichen planus and hypertension. Her medications included topical steroids and metoprolol. She denied a history of smoking or alcohol use, and family history was unremarkable for gastrointestinal illnesses. An esophagogastroduodenoscopy (EGD) was performed, which revealed a circumferential area of whitish mucosa adjacent to an inlet patch in the upper third of the esophagus with mild stenosis. This was biopsied and dilated with 36 and 39 French bougies. Biopsies of the abnormal-appearing mucosa were read as normal squamous tissue. She was started on omeprazole 20 mg twice daily but reported no improvement. An EGD was repeated 2 months later, which revealed little change endoscopically with biopsies again being read as normal. As the patient remained symptomatic on proton pump inhibitor therapy, she was started on viscous budesonide 1.5 mg twice daily for 3 months which resulted in significant improvement of dysphagia. At one year follow up, off budesonide, she reported mild recurrence of dysphagia, but not nearly as bad as it had previously been. Repeat EGD revealed similar whitish mucosa in the upper esophagus and the inlet patch. Biopsies of the upper esophagus now revealed epidermoid metaplasia. She declined further treatment with budesonide as her symptoms were manageable.
Discussion: Epidermoid metaplasia is an uncommon finding in the esophagus. While the pathophysiology of this condition is unknown, the majority of patients with this condition are middle aged or elderly, drink alcohol and/or use tobacco, and report symptoms of dysphagia. It is most commonly found in the middle to distal esophagus; however, in our patient, the finding was located in the proximal esophagus. Due to a possible association with esophageal squamous dysplasia and carcinoma in adjacent mucosa, patients with this condition should undergo short interval follow up with directed biopsies at the endoscopic areas of leukoplakia as well as surrounding mucosa.

S2296

Endoscopic Management Using OverStitch for Esophageal Perforation

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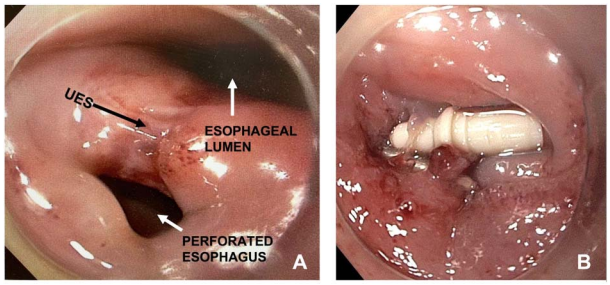
Introduction: Morbidity and mortality rates of esophageal perforation are high. Treatment includes endoscopic, surgical, and conservative approaches. The OverStitch™ Endoscopic Suturing System (OESS) is a novel technique which has proved efficacious in treating an esophageal perforation.
Case Description/Methods: A 91-year-old woman with past history of hypertension was transferred to our hospital with a retropharyngeal and mediastinum fluid collection concerning for esophageal perforation. The patient presented with shortness of breath and cough and was found to have right-sided pleural effusion. After chest tube placement, patient complained of dysphagia and reported aspiration. Computed tomography of the chest revealed a retropharyngeal abscess which was suspicious for esophageal perforation. Surgery performed an immediate left neck incision and drainage and placed a gastrostomy tube. A follow-up esophagram showed persistent leakage and gastroenterology was consult. Esophagogastroduodenoscopy revealed a 1cm perforation at the cricopharyngeal plane just above the upper esophageal sphincter. An OESS was performed, and she was kept n.p.o. with gastrostomy tube feeding. At a 17 day follow up, a repeat esophagram showed no evidence of contrast extravasation and the patient was doing well.
Discussion: Esophageal perforation is a life-treathening condition and is a surgical emergency. Mortality rate can approach 60% with delays in treatment and can be reduced to 10-25% with immediate treatment. Death is cause by severe mediastinitis, empyema, or sepsis. The standard treatment is still controversial. Surgery remains mainstay of the treatment. In hemodynamically unstable patients, emergency airway should be established followed by primary closure and wide drainage. Non-operative management include volume resuscitation, respiratory supportive, and n.p.o. status. Endoscopic treatment include clips, stent, and suturing. The success of the repair depend on the extent of the nonviable tissue. In our patient, she has persistent leakage after drainage and underwent OverStitch closure. This case demonstrates the utility and efficacy of endoscopic suturing using OverStitch device to treat complicated esophageal perforation.



[2296] **Figure 1.** (A) EGD shows an esophageal perforation at the upper esophageal sphincter (UES) level (B) EGD shows an OverStitch suture in place.

S2297

Dysphagia From a Pyogenic Granuloma: Could It Be?

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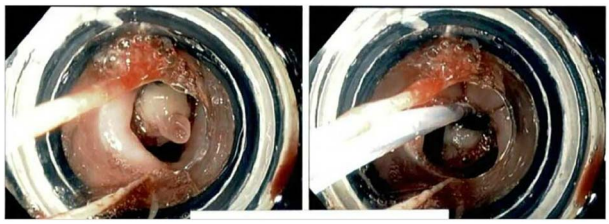
Introduction: Pyogenic granuloma is a benign inflammatory vascular lesion, mainly found in the oral mucosa and skin. Of the few cases of pyogenic granuloma within the gastrointestinal tract that have been reported, the esophagus was the main site in these cases. These patients were diagnosed with pyogenic granuloma after they underwent upper endoscopy and biopsy. Endoscopic resection is a favorable treatment option for esophageal pyogenic granuloma. We are presenting an interesting and rare case of a patient with a history of EoE who developed an esophageal pyogenic granuloma.
Case Description/Methods: A 63-year-old female with a prior history of reported EoE, abnormal LFTs, presents to the Endoscopy unit after being referred for a diagnostic EGD due to having dysphagia symptoms. Patient undergoes transoral Upper Endoscopy with a cold biopsy of the esophagus/GEJ lesion and stomach. Patient is found to have an inflammatory appearing raised polypoid lesion, 6mm in size at the GEJ, superficial exudate, structurally, likely the cause of intermittent mild dysphagia symptoms. Cold biopsy is taken of the lesion for a histopath evaluation. Patient was recommended to follow up pathology of the lesion at GI clinic and repeat EGD in 6-8 weeks with BID dosing of PPI therapy to minimize reflux esophagitis. EUS of lesion or endoscopic removal can be Considered after biopsy results. The biopsy at the GE junction resulted in a pyogenic granuloma. Patient subsequently underwent an Esophagogastroduodenoscopy with endoscopic mucosal resection of esophageal nodule, 7 mm nodule in the lower esophagus at the GE junction (**Figure**). The Endoscopic ultrasound showed the nodule being heterogenous arising from the mucosa and penetrating into the submucosa. There was no involvement of the muscularis propria. Patient was discharged after having a successful procedure.
Discussion: Pyogenic granulomas are a form of hemangioma and commonly occur in the oral cavity and skin. GI pyogenic granulomas are reported in the literature with fewer than 10 cases found in the esophagus. This report presents a 63 year old patient with EoE who developed a pyogenic granuloma of the esophagus, likely secondary to trauma from severe acid-reflux with her history of EoE. Mainstay treatment for pyogenic granulomas is endoscopic resection; however, removal of potential traumatic factors is also important such as food allergies.



[2297] **Figure 1.** 7 mm nodule in the lower esophagus at the GE junction. This was resected with endoscopic mucosal resection after the endoscopic ultrasound. This was banded with one band with Duette device.

S2298

Dysphagia Lusoria Secondary to an Aberrant Left Subclavian Artery

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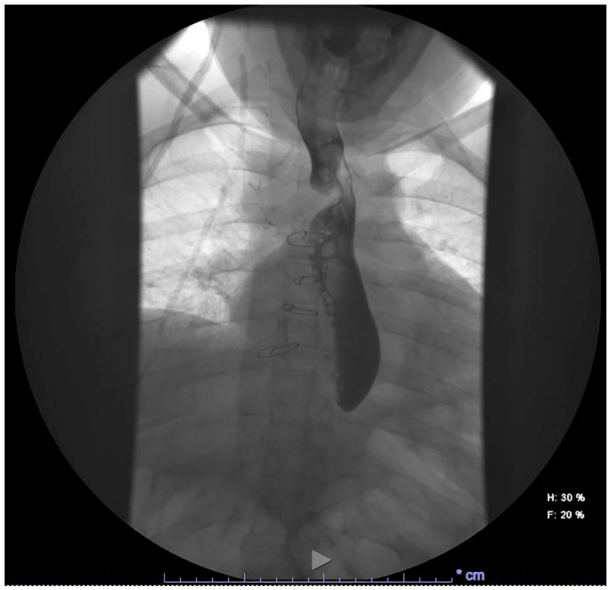
Introduction: Dysphagia lusoria, also known as Bayford-Autenrieth dysphagia, is a rare condition with prevalence of approximately 0.5%. First reported by David Bayford in 1790, it is defined as dysphagia secondary to extrinsic compression of the esophagus as a result of congenital abnormality of the aortic arch and its branches. We report a case of Dysphagia lusoria in a patient with congenital heart syndrome.
Case Description/Methods: A 36-year-old woman with history of Dysphagia lusoria secondary to an aberrant left subclavian artery (SCA), congenital heart syndrome with known right sided thoracic aorta, tricuspid atresia and stenosis, hypoplastic right ventricle, and aberrant left SCA presented to the hospital with worsening dysphagia. She reported vomiting with any solid foods and only tolerating pureed foods

or liquids. She reported a history of progressive dysphagia since 2018, when she underwent an esophagogastroduodenoscopy (EGD) that showed subtle pallor in the upper esophagus concerning for partial obstruction due to aberrant subclavian artery. She also underwent a manometry that was normal. On hospital admission, she underwent an x-ray upper gastrointestinal series that showed unchanged vascular impression of the upper esophagus with mild esophageal dysmotility, consistent with her diagnosis of Dysphagia lusoria (**Figure**). Cardiology and vascular surgery were consulted and deemed the patient a poor surgical candidate due to her prior operations for congenital disease and fontan physiology. Management was deferred to gastroenterology, who recommended small meals and chewing well and proton pump inhibitor therapy for associated heart burn. The patient reported symptomatic improvement with dietary modification.

Discussion: The most common alteration in Dysphagia lusoria is an aberrant right subclavian artery. Most patients are asymptomatic; symptoms usually include dysphagia, regurgitation, chest discomfort, weight loss, and Horner syndrome. Diagnosis is best achieved by barium esophagram, which often shows extrinsic compression above the aortic arch. EGD can further show extrinsic compression of the posterior wall of the esophagus. Mildly symptomatic patients are recommended to chew thoroughly, sip liquids, and avoid exacerbating foods. Surgical intervention with the goal of removing the aberrant vessel and reconstructing a more functional vascular system is rarely performed but reserved for severe cases. The significant risk of morbidity and mortality with surgery needs to be weighed in these patients.



[2298] **Figure 1.** X-ray upper gastrointestinal series showing vascular impression of the upper esophagus secondary to aberrant left subclavian artery.

S2299

Dysphagia, Rings and Furrows, Oh My! A Rare Cause of Benign Esophageal Stenosis

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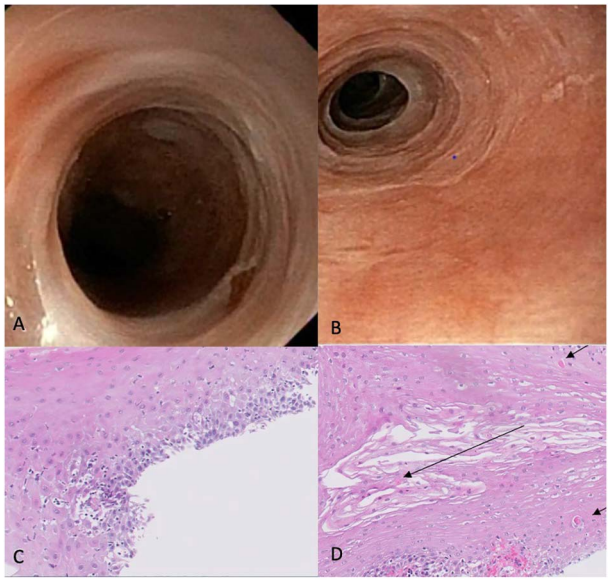
Introduction: Lichen planus is a chronic, inflammatory autoimmune disease found in 0.5-2.0% of the population (predominantly females age 44 to 79) that can affect the skin, nails and mucosal membranes. Lichen planus is a rare cause of esophagitis and esophageal stricture and stenosis.

Case Description/Methods: A 52-year-old female with a history of reflux presented with progressive dysphagia to solids for 18 months with slow transit, odynophagia and pills getting stuck. She had a 20-pound weight loss over the last 3-4 months. She also had reflux symptoms with regurgitation of food. EGD at outside hospital reportedly showed esophageal stenosis requiring dilation and biopsies of esophagus. She was previously on a proton pump inhibitor but now unable to swallow pills. Physical exam was unremarkable with no rashes or oral lesions. Stenosis in the lower esophagus $<$ 1cm in length was found on EGD with mucosal changes suspicious for eosinophilic esophagitis (EoE). Pathology showed lymphocytes and eosinophils not meeting criteria for EoE (**Figure**). Repeat EGD off of lansoprazole demonstrated benign stenosis in the distal esophagus that was dilated and mucosal changes suspicious for EoE. Biopsies demonstrated basilar lymphocytosis and apoptotic keratinocytes concerning for lichenoid esophagitis. She underwent multiple endoscopic dilations for recurrent, benign esophageal stenosis eventually complicated by deep mucosal tear requiring esophageal stenting. Stent was removed and she was started on swallowed budesonide to treat lichen planus of the esophagus. During repeat EGD, she underwent endoscopic, intralesional triamcinolone injections with 5mg injected into esophageal stricture.

Discussion: Esophageal involvement in lichen planus is rare and can occur without dermatologic or oral involvement. Endoscopic findings include mucosal sloughing and tearing; pseudomembranes; hyperkeratosis; trachealization; and stenosis/stricture. Microscopic findings include band-like lichenoid lymphocytic infiltrate involving the superficial lamina propria and basal epithelium and eosinophilic apoptotic keratinocytes (Civatte bodies) in the basal layer. While there are not clear guidelines on diagnostic criteria or management of esophageal lichen planus, treatment includes topical and systemic corticosteroids. Endoscopic dilation is the mainstay of treatment for esophageal strictures and stenosis. Intralesional, endoscopic steroid injection is an option for recurrent, benign esophageal stenosis that can increase the interval between dilations.



[2299] **Figure 1.** A. Mucosal rings, keratinization and sloughing of esophageal mucosa seen on endoscopically. B. Esophageal stenosis seen endoscopically. C. Esophageal biopsy pathology-basilar lymphocytosis and basal cell hyperplasia. D. Esophageal biopsy pathology- necrotic, esosinophilic keratinocytes (Civatte bodies).

S2300

Dysphagia in the Setting of Absent Esophageal Contractility: A Case for Ruling out Eosinophilic Esophagitis

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Introduction: Eosinophilic esophagitis (EoE) is associated with hyper-and hypocontractile motility disorders. Hypotheses exist that suggest causal mechanisms in both directions. This is key as treatment of one entity may improve the other. We present a patient with absent esophageal contractility and symptoms of reflux, dysphagia, and regurgitation which resolved upon treatment of EoE.
Case Description/Methods: A 24-year-old male presented with reflux, dysphagia, and regurgitation. Symptoms were progressive, resulting in a 20-pound weight loss despite proton pump inhibitor and empiric H. pylori treatment. Gastric emptying study was unremarkable, and initial EGD with distal esophageal biopsies were unremarkable with no eosinophils. He presented to our clinic with persistent symptoms and underwent esophageal manometry, notable for absent contractility with low integrated relaxation pressure. Repeat EGD showed a 2-cm segment esophageal mucosal change above the gastroesophageal junction and biopsies with up to 60 eosinophils per high-power field (HPF) consistent with EoE. He began a budesonide slurry with dramatic improvement in symptoms, and complete resolution of symptoms with dairy elimination. Subsequent esophageal biopsies demonstrated less than 15 eosinophils per HPF in all samples. At present, 2.5 years after initial dairy elimination diet, patient maintains dairy avoidance and remains completely asymptomatic.
Discussion: Eosinophilic esophagitis is associated with motility disorders. Mechanisms have been proposed to explain this, including theories that EoE may cause the release ofmyoactive and neuroactive eosinophil secretory products which impact peristalsis and lower esophageal sphincter relaxation, induce tissue remodeling, or disrupt esophageal intramural neurons. Others suggest an inverse relationship wherein stasis from a motility disorder leads to irritation, with cytokine release attracting eosinophils. Thus, guidelines for EoE management recommend ruling out underlying motility disorders. We present a case where symptoms and signs of dysmotility resolved with EoE treatment. This supports the view that evaluation for EoE should be considered in the setting of motility disorders. Clinicians should have an awareness of the association between EoE and motility disorders when evaluating either entity, as EoE requires a high index of suspicion and assurance of adequate biopsies for diagnosis. Several biopsies from 2 or more esophageal levels are recommended to increase sensitivity of testing.

S2301

Dysphagia: An Unusual Primary Presentation of Non-Small Cell Lung Cancer

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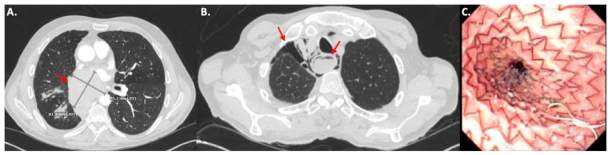
Introduction: Respiratory symptoms predominate in patients with lung malignancies. Dysphagia as a presenting symptom is rare with only about 1%-2% of patients presenting with dysphagia as their cardinal symptom. We describe a rare case of a 56-year-old male presenting with only dysphagia in the setting of extrinsic esophageal compression secondary to non-small cell lung cancer.
Case Description/Methods: A 56-year-old male with past medical history of hypertension, chronic obstructive pulmonary disease, and chronic tobacco use presented to the emergency department with complaint of persistent emesis for the past 3 months. The patient described the emesis as occurring minutes after eating a meal. He also admitted to loss of appetite, unintentional weight loss, and dysphagia to solids. On admission, the patient was normotensive and tachycardic to a heart rate of 108. CT chest was performed and revealed an 8.0 x 7.5 cm right mediastinal mass with obliteration of the right main pulmonary artery and right main bronchus along with multiple irregular and nodular opacities in the right lung and left lower lobe concerning for metastases. Pulmonology was consulted and performed a bronchoscopy which showed a large obstructing endobronchial lesion of the right mainstem bronchus; biopsies of the lesion were sent. The patient was diagnosed with metastatic non-small cell lung cancer. The patient's hospital course was complicated by intractable emesis and development of shock. Repeat CT was performed and was remarkable for a moderate volume pneumomediastinum and a small to moderate size right pneumothorax. Gastroenterology was consulted for concerns of esophageal perforation vs. invasion. Esophagogastroduodenoscopy was performed and showed severe extrinsic stenosis 30-32 cm from the incisors. The area of stenosis measured 2 cm in length and was dilated. A 23mm x 120mm EndoMAXX fully covered stent was placed at the 26 cm to 38 cm region of the esophagus. Following stabilization, the patient was able to tolerate mechanical soft diet and thin liquids (**Figure**).
Discussion: Dysphagia associated with lung cancer can occur via 3 mechanisms: mediastinal extrinsic esophageal compression, upper esophageal compression by lymph nodes, and radiation induced esophageal stenosis. Patients may experience decreased quality of life due to poor oral intake, malnutrition, and increased risk for infection. Lung malignancy associated dysphagia can be improved by both surgical and non-surgical interventions such as dilatation or esophageal stenting.



[2301] **Figure 1.** (A) Initial CT Chest findings of a right 8.0 x 7.5 cm mediastinal mass (B) Repeat CT Chest remarkable for a moderate volume pneumomediastinum and a small to moderate size right pneumothorax and (C) EGD imaging of a 23mm x 120mm EndoMAXX fully covered stent placed at the area of severe esophageal stenosis.

S2302

Dysphagia Lusoria as a Rare Cause of Dysphagia Due to ARSA and KD With Esophageal Compression

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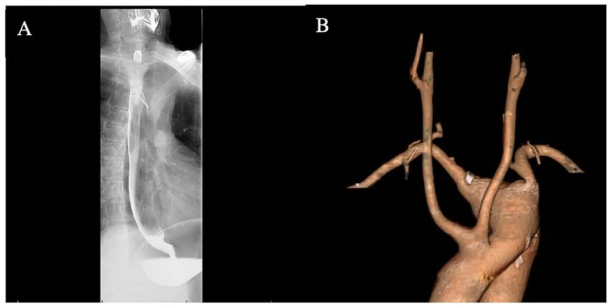
Introduction: Dysphagia lusoria (DL) is a rare cause of dysphagia in which abnormal vasculature, most often an aberrant right subclavian artery (ARSA) with a retroesophageal course, leads to esophageal compression. We report a case of DL caused by an ARSA and Kommerell diverticulum (KD).
Case Description/Methods: A 64-year-old male with a history of Celiac disease, Sjogren's syndrome, gastroesophageal reflux disease, and rheumatoid arthritis presented with weight loss and worsening solid food dysphagia. Current medications included naproxen and omeprazole. Esophagogastroduodenoscopy (EGD) showed no lesions but a slight narrowing of the proximal esophagus, for which mild dilation was performed. Six months later the patient presented for persistent dysphagia. An esophagus barium swallow found a 5 cm long narrowing of the esophagus, the narrowest portion measuring 0.9 cm (Figure 1A). No mucosal abnormalities, gastroesophageal reflux, or hiatal hernia were detected. Chest computed tomography angiogram (CTA) revealed an ARSA which emerged from a fusiform aneurysmal dilation of the left aortic arch and followed a retroesophageal course. This vasculature resulted in compression and displacement of the esophagus (Figure 1B). The left subclavian artery also arose from the dilation, and a common origin of the right and left common carotid arteries was observed. The patient was diagnosed with DL, caused by an ARSA and KD. As EGD with dilation would not alleviate this source of external compression, the patient was referred to vascular surgery for definitive management.
Discussion: KD is a remnant of the fourth aortic arch which forms a dilation at the point of which an abnormal subclavian artery arises, and is noted in about 15% of patients with an ARSA. DL diagnosis is complicated by the fact that many vascular abnormalities do not result in dysphagia. While CTA confirms the presence of abnormal vasculature, a thorough workup of esophageal function including assessments like EGD and barium esophagram are necessary to confirm DL diagnosis. Typically for DL patients, diet modifications and endoscopic or medical interventions like PPI use should be utilized before surgery, as targeting abdominal vasculature may not prove beneficial. This case is distinguished by the presence of a KD, which makes surgical intervention the best treatment option to relieve a clear source of external compression and avoid possible KD rupture or dissection.



[2302] **Figure 1.** (A) Barium esophagram showing a narrowing of the cervical and thoracic esophagus. (B) 3-dimensional CT showing aneurysmal Kommerell diverticulum (KD) and emerging aberrant right subclavian artery (ARSA), which followed a retroesophageal course.

S2303

Endoscopic Balloon Dilation of Recurrent Peptic Stricture in a Patient With Portal Hypertension

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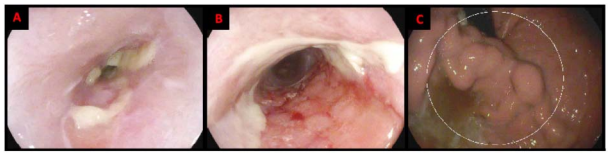
Introduction: Variceal hemorrhage is a devastating complication and a major cause of mortality in patients with portal hypertension. Unfortunately, one third of patients with varices develop bleeding in their lifetime. This case depicts a rarely reported intervention that physicians may be hesitant to pursue.
Case Description/Methods: A 61-year-old male with history significant for atrial fibrillation (afib), alcoholic cirrhosis complicated by gastric and esophageal varices, and GERD presented with dysphagia. He previously underwent endoscopic variceal band ligation (EVL) in 2009 for primary prevention of esophageal varices and placed on daily nadolol. His GERD was controlled with twice daily PPI and as-needed H2 antagonist. Despite this, he developed strictures secondary to severe erosive esophagitis. He was then started on apixaban for afib and transitioned from nadolol to carvedilol. His MELD-Na is 8 and had a reported distant history of hepatic encephalopathy. He presented to the esophageal motility clinic with progressive dysphagia to both solids and liquids. An EGD was scheduled which revealed a partially obstructive ulcerative stricture spanning 29 - 34 cm from incisors. The stricture was injected with 4 ml of triamcinolone acetonide distributed in 1 cm increments across 4 quadrants. Then the stricture was dilated with a 10-12 mm cre balloon under fluoroscopic guidance. Dilation caused shallow mucosal tears with scant blood but otherwise no significant bleeding or complication. The scope was traversed into the stomach with retroflexion revealing moderate gastric varices in the cardia. After the procedure was completed, the patient had complete resolvent of symptoms and tolerated oral nutrition (**Figure**).
Discussion: This case describes a cirrhotic patient with portal hypertension requiring frequent endoscopic balloon dilations for severe dysphagia secondary to recurrent peptic strictures. Extensive literature review did not reveal any documented cases describing this scenario. The presence of gastric varices in this patient is indicative of active portal hypertension. This in combination with the patient's anticoagulation places a theoretical high risk of bleeding during the procedure. Although this case demonstrates that it is safe to perform serial dilations in patients with portal hypertension if they have undergone EVL and do not have active esophageal varices.



[2303] **Figure 1.** A) EGD showed ulcerative peptic stricture located in the mid-esophagus. (B) There was scant bleeding after dilation, otherwise no significant bleeding or complication. (C) Retroflexion was performed in the stomach and revealed moderate gastric varies in the cardia.

S2304

Esophagobronchial Fistula After a Laparoscopic Partial Fundoplication, Mimicking as Empyema

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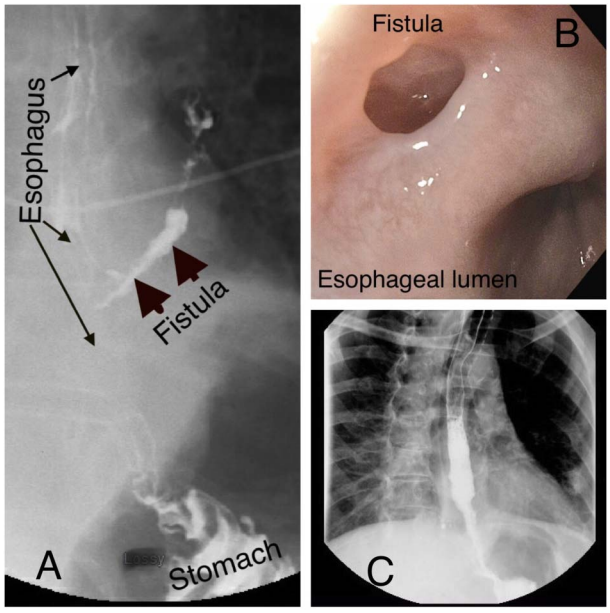
Introduction: Laparoscopic fundoplication is often indicated in cases of paraesophageal hiatal hernia (HH) and chronic GERD that are refractory to medical management. Esophagobronchial (EB) fistula is a rare postoperative complication of fundoplication and is very challenging to diagnose and manage. We present an uncommon case of EB fistula, eventually managed with esophageal stent placement.[1]
Case Description/Methods: A 69-year-old female with a history of paraesophageal HH and chronic GERD symptoms refractory to medical management underwent HH repair with laparoscopic 270-degree fundoplication. Her postoperative outpatient course was complicated by presumed aspiration pneumonia and was treated. She presented 2 weeks post-procedure with persistent left-sided pleuritic chest pain, cough, and dyspnea which progressively got worse since discharge. Labs showed WBC 26 cells/mm3, CRP 37mg/L. Chest CT scan showed loculated empyema (16 x 12 x 13 cm) in the left lung base, small gas/fluid collection (1x1 cm) posterior to the distal esophagus, and compressive atelectasis. She received piperacillin and metronidazole. Thoracotomy and empyema drainage were performed. An Esophagoscopy revealed a small fistulous opening in the distal esophagus (5-6mm in size), about 4cm proximal to the GE junction. An 18mm x 10cm fully covered Wallflex Boston Scientific esophageal stent was deployed, with the distal end below the GE junction. To prevent migration, it was secured using the Apollo Endo Stitch device. The patient was safely discharged home on Pantoprazole. The chest tube was removed and she was discharged home. On follow-up 3 months later, she had no recurrent pneumonia, cough, chest pain, or fever. A repeat endoscopy with the removal of the esophageal stent was performed. On esophagogastroduodenoscopy, the fistulous opening appeared to have closed. Post-procedure gastrograffin esophagram demonstrated no leak. She continued to do well 2 months post-removal of the esophageal stent (**Figure**).
Discussion: This case report highlights a rare complication of the EB fistula that has been associated with a HH repair and fundoplication. A high clinical index of suspicion, early diagnosis, and management are needed in patients who develop recurrent cough and pneumonia with empyema soon after partial fundoplication. These patients can be successfully managed by placement of fully covered esophageal stent insertion along with drainage of empyema if present with chest tube insertion.



[2304] **Figure 1.** Esophagobronchial fistula (A and B); Gastrograffin esophagram performed 3 months after the esophageal stent placement (C).

S2305

Esophageal Obstruction Due to Resorbable Hiatal Hernia Mesh: A Rare Surgical Complication Requiring Endoscopic Repair

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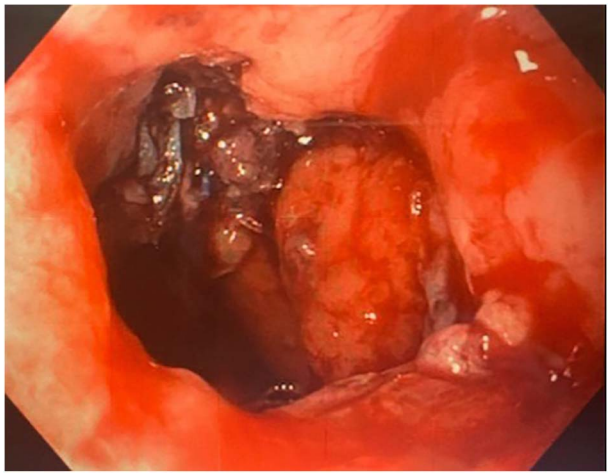
Introduction: Antireflux surgery restores the anatomical barrier, and may be a last resort option for patients with refractory GERD or PPI intolerance. Mesh reinforcement in antireflux surgery may cause complications including mesh migration, bleeding, esophageal perforation, and post-fundoplication stenosis. Intraluminal penetration of prosthetic surgical mesh is an extremely rare complication. This case report documents the diagnosis and endoscopic treatment of a patient with surgical mesh obstructing her distal esophageal lumen.
Case Description/Methods: A 73-year-old woman with a history of GERD due to large hiatal hernia underwent antireflux surgery with Toupet Fundoplication and robotic hiatal hernia repair with Phasix mesh. Shortly thereafter, she developed a perforation and stricture requiring emergency stent placement and a 2-month hospital stay. After returning home, the patient began experiencing dysphagia, regurgitation, substernal chest pain, and weight loss. She underwent an esophagram which showed delayed passage of contrast to the stomach. Upper endoscopy was performed, revealing a large piece of mesh partially obstructing the distal esophageal lumen. This was confirmed to be the Phasix mesh previously placed for her hiatal hernia repair, and the portion causing obstruction was trimmed with endoscopic suture cutters and a flexible grasper. After this procedure, the patient made a complete recovery and made no further complaints of dysphagia, chest pain, or regurgitation (**Figure**).
Discussion: Patients with refractory GERD or those intolerant to PPI therapy may be candidates for antireflux surgery. Mesh reinforcement of hiatal hernias greater than 5cm has been shown to decrease rates of recurrence compared to surgical suturing alone. Mesh migration is a rare complication, and most cases document permanent mesh migration through the esophageal wall. Higher erosion rates have been observed in patients with recurrent hiatal hernia repair. One study identified 50 cases of mesh migration between 1998 to 2019, with the most common erosion sites being the esophagus (50%) stomach (25%) and GE junction (23%). PTFE and polypropylene mesh were found to have the highest migration rates. Our patient experienced mesh erosion into the esophagus causing obstruction, an extremely rare complication. Providers should maintain a high index of suspicion in patients with a history of hiatal hernia repair and mesh placement who present with dysphagia or symptoms of obstruction due to the potential for mesh obstruction.



[2305] **Figure 1.** Phasix Mesh Seen Obstructing the Esophageal Lumen at the 10 O'clock Position.

S2306

Esophageal Neuroendocrine Carcinoma Presenting After Definitive Chemoradiation of Squamous Cell Carcinoma in the Same Location

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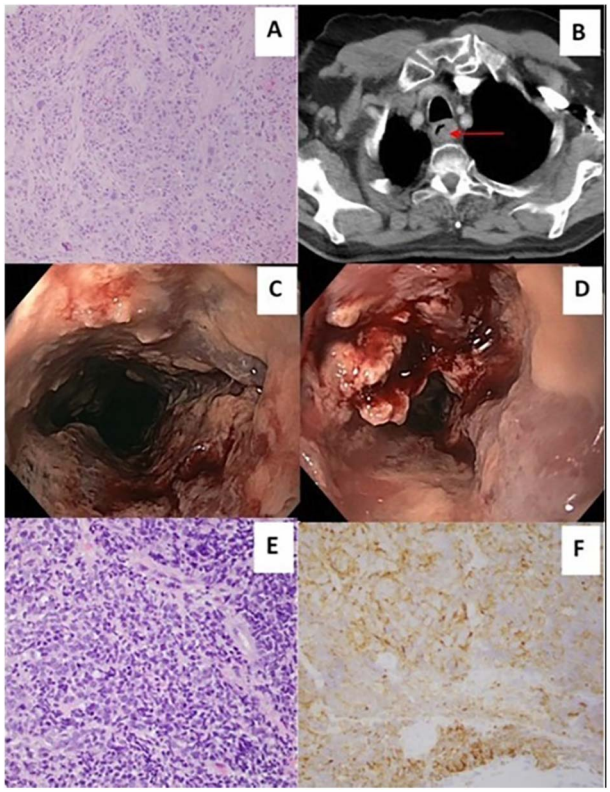
Introduction: Esophageal neuroendocrine carcinoma (ENEC) is an extremely rare and highly aggressive malignancy that carries a poor prognosis. We present a rare case of ENEC presenting years after chemoradiation of squamous cell carcinoma (SCC) in the same location.
Case Description/Methods: An 85-year-old male presented for oncology follow-up with difficulty swallowing. The patient had a past medical history significant for SCC of the upper esophagus (**Figure** A), for which he received chemoradiation with subsequent 3-year remission confirmed by serial imaging and endoscopy. Given his new-onset dysphagia, a CT of the neck and chest with contrast (**Figure** B) was completed and showed soft tissue thickening in the upper esophagus at the location of prior SCC. The patient underwent EGD, which showed severe friable and ulcerated mucosa in the upper third of the esophagus (**Figure** C, D). Biopsy revealed high-grade malignancy consistent with poorly differentiated neuroendocrine carcinoma, small cell type (**Figure** E). Immunohistochemistry staining was positive for synaptophysin (Image F), pan-CK AE1/3, TTF1, and CD56. The Ki-67 mitotic proliferation index was 80-90%. He underwent chemotherapy with etoposide and carboplatin, but unfortunately had progression of his disease evident on subsequent CT imaging. He was found to have metastatic lesions in the scalp on head CT and passed away in hospice 14 months after diagnosis.
Discussion: To our knowledge, occurrence of ENEC in a site of prior esophageal SCC is a rarity. It could represent a case of radiation-induced malignancy (RIM) based on the temporal relation to his previous SCC treatment. Approximately 8% of second solid cancers may be related to radiation treatment, developing years after initial diagnosis and treatment of the first cancer. Unfortunately, management of ENEC is challenging because treatment strategies have not been well established due to the small number of cases reported in the literature. Patients and providers should discuss the possibility of developing secondary cancer from radiotherapy, and patients who have received radiation should be followed closely for RIM.



[2306] **Figure 1.** (A) H&E stain showing moderately differentiated SCC. (B) CT chest showing soft tissue thickening (red arrow) in the proximal third of the esophagus compatible with recurrent tumor. (C, D) EGD showing friable, hemorrhagic, and ulcerated mucosa in the upper third of the esophagus. (E) Sheets of neuroendocrine carcinoma showing small blue cells with scant cytoplasm and nuclear molding. (F) Synaptophysin immunohistochemical stain showing diffuse cytoplasmic staining confirming neuroendocrine nature of the tumor.

S2307

Esophageal Hemorrhage After Transesophageal Echocardiography in a Patient With Undiagnosed Eosinophilic Esophagitis

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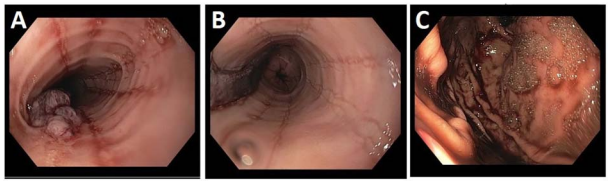
Introduction: Eosinophilic esophagitis (EoE) is characterized by infiltration of the esophageal epithelium by eosinophils. The burden of disease is likely underreported, with a prevalence of 57 cases per 100,000. Patients experience gastroesophageal reflux, dysphagia, and recurrent food impactions, with spontaneous rupture being a rare but serious complication. Characteristic endoscopic findings include stacked circular rings, strictures, and linear furrows. Esophageal biopsy must demonstrate ≥ 15 eosinophils per high-power field. Transesophageal echocardiography (TEE) allows for detailed evaluation of cardiac structure and function and is performed via the blind passage of a probe into the esophagus and stomach. Patients with esophageal abnormalities are at increased risk for esophageal injury during TEE.
Case Description/Methods: A 24-year-old man with a history of aortic valve replacement on warfarin presented with melena one day after undergoing TEE. Initial laboratory results showed INR 1.9 and hemoglobin 8.7 g/dL. Anticoagulation was stopped and intravenous proton pump inhibitor was initiated. Upper endoscopy showed a ringed esophagus and circumferential folds in the middle and lower thirds of the esophagus. Also noted was a linear esophageal hematoma extending from the middle to the lower third of the esophagus, with hematin in the stomach. These findings were concerning for esophageal trauma secondary to the TEE done prior to admission in the setting of underlying eosinophilic esophagitis. Esophageal biopsies demonstrated 70 eosinophils per HPF in the mid esophagus and 30 eosinophils per HPF in the distal esophagus, confirming the diagnosis of eosinophilic esophagitis. On further questioning, the patient recounted several occasions over the past few years during which he experienced dysphagia with solid foods (**Figure**).
Discussion: Mucosal tears and lacerations have been reported in EoE patients, suggesting increased fragility of the esophageal mucosa in the setting of eosinophilic infiltration, chronic inflammation, and subsequent remodeling. Although the development of significant esophageal injury in the setting of EoE as well as post TEE have been described independently, there have been no reports of upper gastrointestinal bleeding due to esophageal trauma after TEE in eosinophilic esophagitis. This case highlights the need for a careful assessment for possible EoE in patients undergoing TEE due to the risk of procedure-related esophageal injury.



[2307] **Figure 1.** A: Ringed esophagus and circumferential folds in the mid and distal esophagus. B: Linear hematoma extending to the lower esophageal sphincter. C: Hematin in the stomach.

S2308

Epidermolysis Bullosa: A Rare Cause of Upper Esophageal Stenosis

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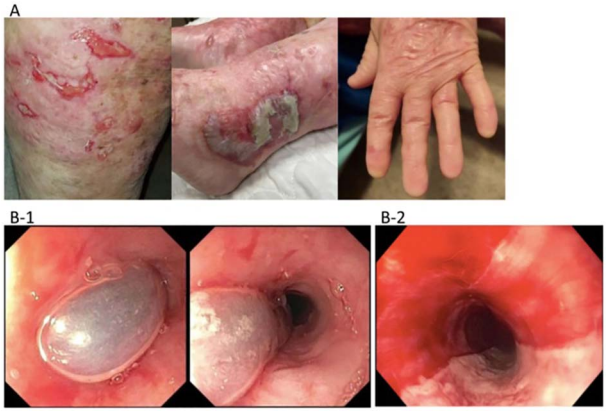
Introduction: Epidermolysis bullosa is a rare heterogeneous group of genetic disorders of the stratified squamous epithelium, characterized by skin blistering and scarring. Dystrophic epidermolysis bullosa involves genetic mutations in COL7A1 and can result in fragility of both dermal and mucosal epithelium. Blisters and desquamation may occur spontaneously or from trauma. These patients frequently develop esophageal manifestations of their disease including esophageal blisters, stenosis and bullae formation
Case Description/Methods: We present a case of a 59-year-old woman with dystrophic epidermolysis bullosa with several overt findings of her chronic condition on skin exam (**Figure** A) who presented with odynophagia and dysphagia. She had prior contrasted CT neck imaging at an Emergency Room with no findings to explain her symptoms and had been started on high dose H2RA therapy. An upper endoscopy for dysphagia found an upper esophageal stricture that was dilated with Savary dilation to 8 mm with mild improvement in symptoms (mucosal biopsies were found to be normal). Repeat upper endoscopy for repeat dilation revealed an upper esophageal stricture, a large mucosal bulla, and denuded sloughed mucosa (**Figure** B-1/2). The stricture measured 8mm in diameter. Dilation was performed with passage of a standard gastroscope, resulting in moderate mucosal tear and improved diameter of stenosis. The patient could advance her diet to a soft diet and is planned for outpatient follow up. Her odynophagia symptoms persisted however, and was treated with viscous lidocaine, magic mouthwash and proton pump inhibition
Discussion: Our case illustrates the development of esophageal mucosal blistering and upper esophageal stenosis in patients with dystrophic epidermolysis bullosa. This likely stems from mechanical irritation from food intake and results in cycles of wound healing and scarring that eventually lead to stenosis and dysphagia. While strictures may occur anywhere in the esophagus, they are predominantly in the upper esophagus in this patient population and may require dilation. Endoscopists should familiarize themselves with esophageal manifestations of this rare disease and its tendency to cause upper esophageal stenosis.



[2308] **Figure 1.** A: Chronic skin changes of dystrophic epidermolysis bullosa. B1: Esophageal bullae and blistering. B2: Denuded esophageal mucosa.

S2309

Esophageal Adenocarcinoma Causing Paraneoplastic Dermatomyositis: Preventing Delayed Diagnosis Is Key

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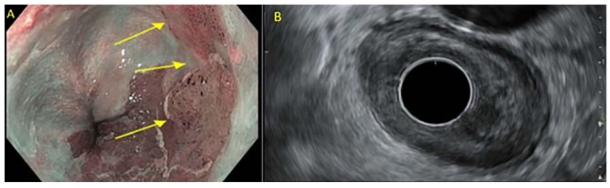
Introduction: Esophageal malignancies usually present with dysphagia and unintentional weight loss. Other symptoms include regurgitation, aspiration events or cough, and voice changes from invasion of adjacent structures. Paraneoplastic syndromes are a rare sequela of esophageal adenocarcinoma.
Case Description/Methods: A 76-year-old male with a history of colorectal cancer in remission, who was diagnosed with periorbital cellulitis and treated with antibiotics, presented a few months later with symptom progression. He reported facial swelling, dysphagia, odynophagia, painful oral ulcers and diffuse arthralgias. Labs revealed total bilirubin of 1.8, ALP 92, AST 270, ALT 63, ANA 1:640, ESR 10, CRP 112, Ferritin 635 and normal C3, C4 levels. Scl-Antibody, Rheumatoid factor, HIV and Monospot tests were negative. EGD showed mild esophagitis and benign-appearing stenosis. He was discharged on a prednisone course. A month later, his symptoms continued to progressively worsen and finally a diagnosis of vocal cord asymmetry led to re-admission. On exam, Gottron's papules were found. Labs showed high CK levels and muscle biopsy confirmed dermatomyositis. CT scan revealed thickening of distal esophagus. Esophageal adenocarcinoma was diagnosed by distal esophageal nodule biopsy on a second EGD (Figure 1A). Subsequent EUS showed the lesion extending to the submucosa (Figure 1B). Dermatomyositis was attributed to paraneoplastic syndrome in the setting of the malignancy. The paraneoplastic syndrome was initially treated by IVIG and IV steroids. He subsequently underwent esophagectomy and chemotherapy with cisplatin and 5-FU.
Discussion: Inflammatory myopathies, especially dermatomyositis, may develop in the setting of malignancy. Gastric, cervical, ovarian, lung, and pancreatic adenocarcinomas are common in patients with inflammatory myopathy. However, esophageal adenocarcinomas rarely present with dermatomyositis. Dysphagia is associated with esophageal malignancy, but when dermatomyositis is recognized first, dysphagia may be attributed to upper esophageal and oropharyngeal muscles weakness, leading to delayed diagnosis. Clinicians need to have high suspicion in such cases. Even though no guidelines exist, patients with new onset dermatomyositis need investigation for underlying malignancy. Dysphagia, older age, evidence of capillary damage on muscle biopsy and cutaneous necrosis in the setting of dermatomyositis are factors associated with underlying malignancy. As such, these patients need timely diagnostic work-up.



[2309] **Figure 1.** A: Nodularity seen in lower esophagus; B: EUS findings.

S2310

Esophageal Manifestations of Paraneoplastic Pemphigus Vulgaris Associated With Gastric Neuroendocrine Tumor

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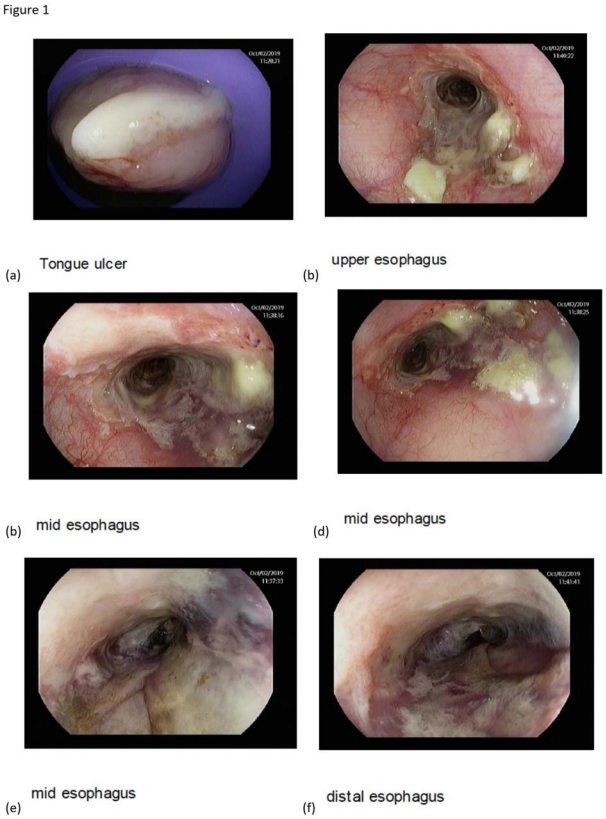
Introduction: While pemphigus vulgaris (PV) typically affects the epidermis and oral mucosa, esophageal manifestations are uncommon. The primary symptoms accompanying this manifestation are dysphagia, odynophagia, and hematemesis. In this case report we examine the occurrence of esophageal pemphigus vulgaris associated with a gastric neuroendocrine tumor and note the endoscopic findings of esophagitis dessicans superficialis (EDS) within the esophagus.
Case Description/Methods: A 63-year-old female with a history of P-ANCA vasculitis presented for evaluation of dyspnea, hypotension, fatigue, rash, and dysphagia. The patient was thought to have an infectious cause of these signs and symptoms, however given a lack of response to antibiotic and antifungal therapy within 48 hours the differential was broadened to include rheumatologic disease. The patient was treated with intravenous methylprednisolone and continued to experience dysphagia. Esophagogastroduodenoscopy was performed (**Figure**) and demonstrated a tongue ulceration and extensive desquamation in the distal esophagus appearing similar to a pseudomembrane. Extensive subepithelial hemorrhages were observed in the esophagus, however the gastric and duodenal mucosa were intact.

Esophageal and gastric biopsies demonstrated staining for IgG reactive to desmoglein 3 consistent with PV. In addition, a well-differentiated neuroendocrine tumor (NET) in the stomach. The patient was subsequently treated with octreotide for her neuroendocrine tumor, as well as solumedrol and dapsone for her skin lesions. She also received a loading dose of rituximab. She received a second dose of rituximab 21 days after the loading dose and the corticosteroids were tapered as her symptoms of dysphagia gradually improved with immunosuppressive therapy.

Discussion: Esophagitis dessicans superficialis has been described as sloughing of the superficial esophageal mucosa and is similar in appearance to the Nikolsky sign of external squamous epithelium seen with immunobullous diseases. Our patient presented with undiagnosed PV and had both esophageal and skin involvement with the concomitant gastric NET. The ultimate diagnosis of PV was confirmed based on the presence of antibodies to desmoglein 3 and it remains unknown if the gastric NET had any role in the development of PV. Clinicians should have a low threshold for endoscopic examination of patients for whom there is suspicion of immunobullous disease to facilitate rapid diagnosis and initiation of appropriate therapy.



[2310] **Figure 1.** Endoscopic images demonstrating tongue ulceration and extensive desquamation in the distal esophagus appearing similar to a pseudomembrane in addition to subepithelial hemorrhages.

S2311

Esophageal Perforation - The Importance of PPIs

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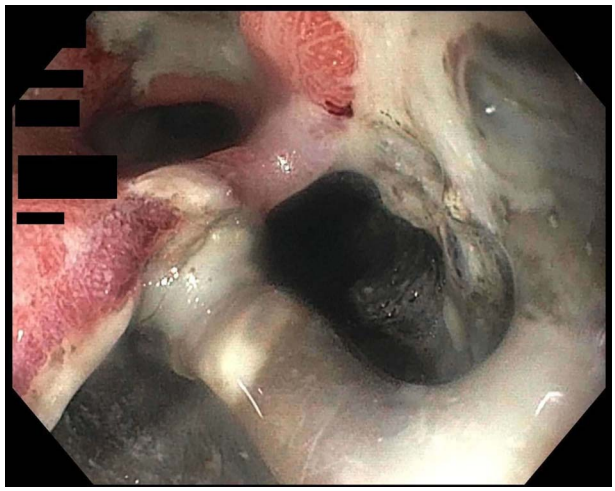
Introduction: Reflux esophagitis is a highly prevalent condition characterized by mucosal irritation in the distal esophagus. The condition is readily treatable, however severe complications can arise if left untreated such as perforation which can be life threatening. We present a case of known, but untreated, severe esophagitis which resulted in perforation and subsequent severe stenosis with ongoing complications.

Case Description/Methods: A 54-year-old homeless man with medical history of severe alcohol use and untreated gastroesophageal reflux. He initially presented to the hospital after being found down with reported hematemesis. CT on admission showed esophageal thickening. GI performed an esophagogastroduodenoscopy (EGD) showing LA Grade D erosive esophagitis. He was discharged with oral ppi twice daily, recommended alcohol cessation, and advised to undergo a repeat EGD in approximately 8 weeks to assess healing and evaluate underlying mucosa. Six months later, he had a nearly identical presentation, and an EGD showed severe esophagitis and deep esophageal ulcers. He was stabilized and discharged with similar recommendations. Three months later he presented again to the hospital with hematemesis and acute anemia. He had been non-compliant with medications and GI again performed an EGD which demonstrated LA Grade D erosive esophagitis with large mid-esophageal deep perforation resulting in a bifurcation as seen in Figure 1. Cardiothoracic surgery was consulted and recommended conservative management as imaging showed the perforation was contained. Patient was stabilized and discharged home with GI follow up. Over the next year patient presented to the emergency department on several occasions with dysphagia. He has since undergone serial EGDs with repeat balloon dilations for severe stenosis at the area of prior perforation.

Discussion: While reflux esophagitis with ulceration is relatively common, severe esophagitis leading to perforation is a rare and serious complication. This case highlights an easily treatable condition with severe, life-threatening consequences in the setting of non-compliance. Fortunately, our patient improved but now has residual sequela requiring frequent treatment as the patient had limited resources to obtain medications and was consistently non-compliant.



[2311] **Figure 1.** Endoscopic view of mid-esophageal perforation and surrounding necrotic tissue.

S2312

Esophageal Stricture Secondary to Mycophenolate Mofetil-Induced Injury

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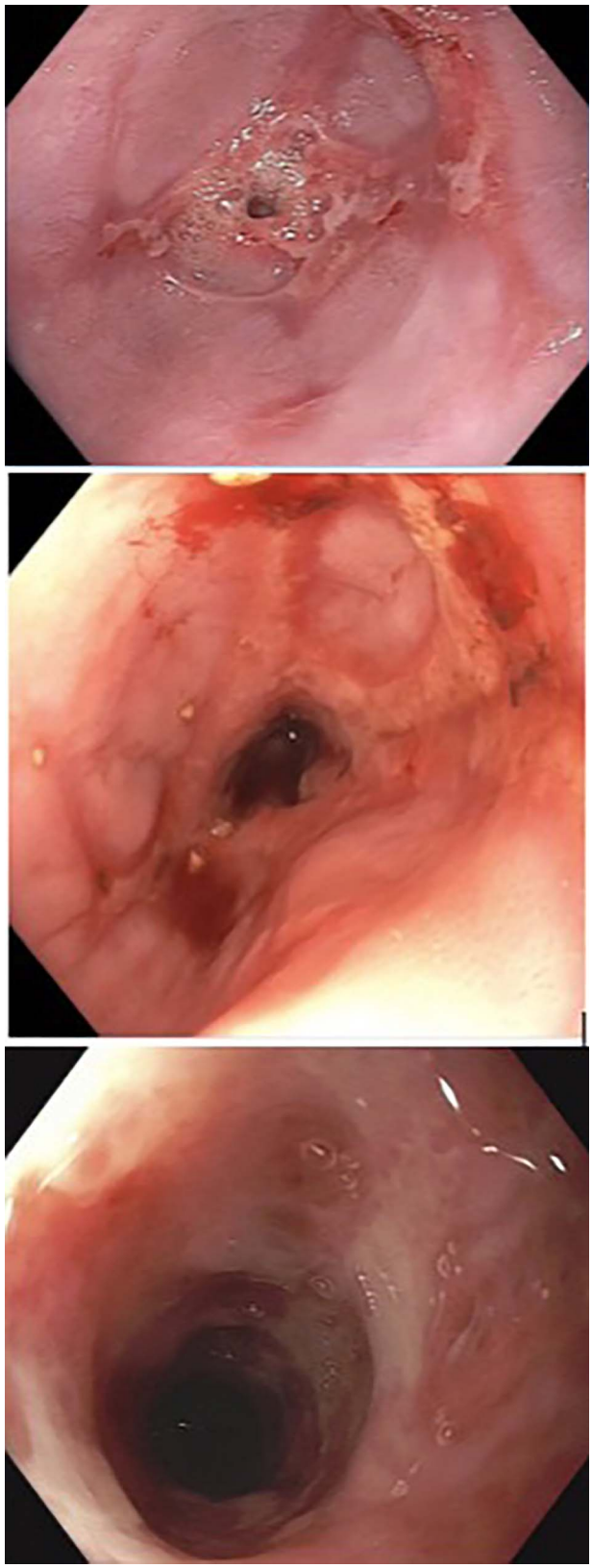
Introduction: Immunosuppressant medications like mycophenolate mofetil (MMF) have recently garnered more attention in the literature due to gastrointestinal toxicity. There are increasing case reports of transplant patients on MMF who develop inflammation or ulcers throughout the GI tract. It is theorized that the inflammation is due to MMF toxicity from metabolite formation. Although there has been increasing evidence of MMF induced injury to the GI tract, there are few reports of esophageal involvement, which is presented below.
Case Description/Methods: This case involves a 40 year-old patient with Type I diabetes mellitus complicated by gastroparesis, renal and pancreatic transplants on immunosuppression with MMF, who developed progressively worsening dysphagia, weight loss, nausea, and vomiting. The patient initially presented to an outside gastroenterologist due to complaints of nausea and hematemesis. An EGD was completed with evidence of ulcerative esophagitis with biopsies negative for bacterial, fungal and viral stains. He was started on a proton pump inhibitor (PPI) for treatment of presumed reflux esophagitis. After no improvement with several months of therapy, he presented to our gastroenterology clinic for evaluation. Upon questioning, he specifically complained of progressive difficulty with swallowing after starting MMF. The patient underwent EGD and showed a severe distal esophageal stricture, which was not able to be traversed with the regular upper endoscope (**Figure**). Biopsies were taken and revealed acute erosive esophagitis. Immunohistochemical staining was negative for HSV and CMV. Given our high suspicion for MMF-induced esophageal injury, his medication was changed to liquid formulation. The patient underwent repeat serial endoscopies with dilation every 2 weeks for the next 2 months. After transitioning to liquid formulation, each subsequent endoscopy showed improvement in the ulcerated stricture. The patient was last dilated to 45 French in which he reported marked improvement of his dysphagia.
Discussion: This case demonstrates a patient who developed a severe esophageal stricture from MMF induced injury with resolution of symptoms after multiple dilations and transition to a liquid formulation of MMF. Though the exact physiologic mechanisms are not well understood, gastroenterologists should be suspicious in patients on mycophenolate who present with dysphagia and stricture that is not explained by infection, malignancy, reflux, or other medications.



[2312] **Figure 1.** A. Initial non-traversable esophageal stricture B. Esophageal stricture status post multiple dilations C. Improving ulcerative stricture after switching to liquid formulation of MMF and multiple dilations.