

Nutrition Therapy In Severe Acute Pancreatitis





Reduce Stress with EN
(Gut Integrity)


Increase Stress with EN
(Pancreatic Stimulation)



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General Management

- Wide range of clinical severity
Mild self-limited process most common
Catastrophic disease, severe complications less frequent
- Initial supportive management regardless of severity
IV fluid volume resuscitation (↓Hct by 10%, urine 0.5ml/kg/hr)
Analgesia – Meperidine or morphine (SO effect no different)
Correct electrolytes
- Determine disease severity (necrosis, MOF are key issues)
Ranson's Criteria (≥ 3) CRP levels (>150)
APACHE II score (≥ 8) Balthazar CT grade (>5)
Atlanta Classific (signs + organ failure or panc complications)



General Management

- Seek etiology, rule out gallstone pancreatitis (ERCP timing?)
Low ETOH intake ALT $> 3x$ normal
Age > 60 yrs H/O gallstones
Women Dilated CBD
- Monitor and manage complications
Shock Pseudocyst
MOF Ascites
Sepsis
- Primary therapy:
Obtain enteral access
Initiate enteral feeds



Physiologic Benefit of Providing EN

- Maintain gut integrity (Less bacterial challenge, endotoxemia)
- Set tone for systemic immunity (Innate, acquired responses)
- Attenuate stress response, disease severity (CRP, glucose, TAC)
- Faster resolution of disease process (Duration SIRS, Nutrit Rx, LOS)

Outcome Benefits from Providing EN

- Infection ↓ by 57%^{1,3} (EN vs PN, p=0.002)
- Hospital LOS ↓ by 3.94 Days^{1,3} (EN vs PN, p=0.0001)
- Organ Failure (MOFS) ↓ by 56%^{1,3} (EN vs PN, p<0.05)
- Need for Surg Intervention ↓ by 63%^{2,3} (EN vs PN, p<0.05)
- Post-op mortality ↓ by 60%^{1,3} (EN vs PN, p<0.05)

¹ McClave (JPEN 2006;30:143) ² Marik (BMJ 2004;328:1407)
³ Jafri, Galandiuk, McClave (DDW 2008 Abstract)

EN vs No Nutrition Rx

Post-op for Complications of Acute Pancreatitis

Mortality ↓ by 74%

Study or sub-category	EN (n/N)	STD (n/N)	RR (random) 95% CI	Weight %	RR (random) 95% CI	Year
Fujita 2000	1/11	5/18	0.33 (0.04, 2.45)	53.19	0.33 (0.04, 2.45)	2000
Fujita 2001	1/21	5/21	0.25 (0.03, 1.87)	46.81	0.25 (0.03, 1.87)	2001
Total (95% CI)	2	10	0.24 (0.04, 1.09)	100.00	0.24 (0.04, 1.09)	

Total events: 2 (EN vs STD), 10 (STD vs EN)
 Test for heterogeneity: Chi=0.51, df=1 (P=0.74), I²=0%
 Test for overall effect: Z=1.88 (P=0.06)


p = 0.06

McClave SA, Chang WK, Heyland DK, Dhaliwal R (JPEN 2006)

Consequences of Providing EN

Three potentially adverse scenarios result from EN provision to patients with acute severe pancreatitis:

- Silent Stimulation of Secretion in 100%¹
- Uncomplicated exacerbation of sx in 21.0%^{2,3}
- Exacerbation of disease process in 4.3%^{2,3}




Warning: Early advance to oral diet will increase late complications (abdominal abscess)

¹ O'Keefe (Gastro 2003;122:A34)
² McClave (JPEN 1997;21:14)
³ Levy (Gut 1997;40:262)

Ranson (Surg 1977;82:99)

Pancreatic Rest: What Does it Mean?



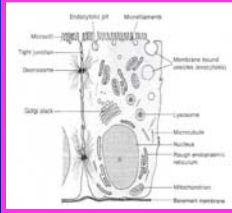
Basal versus subclinical output Poor management strategy
 Pancreas rest/gut use compatible Clinical guidance by symptoms
 May evolve as important clinical monitor

Who Needs Nutrition Rx?


Correlation to Disease Severity

	Intestinal Permeability ¹ (% Urine Excretion PEG)
Controls	0.009
Mild	0.008
Severe (no MOF)	0.040 *
Severe (MOF)	0.160 *

	Outcome and Dz Severity	%Severe	Outcome
McClave ²	19%		none
Windsor ³	38%		↓ SIRS
Abou-Assi ⁴	35%		↓ dz durat
Kalfarentos ⁵	100%		↓ sepsis
			↓ complics



¹ J Gastro Surg 1999;3:252 ² JPEN 1997;21:14 ³ Gut 1998;42:431
⁴ AJG 2002;97:2255 ⁵ BJS 1997;84:1665 * p<0.001



Who Needs Nutrition Rx ?

	Mild/Moderate	Severe
APACHE II	≤ 8	≥ 9
Rans Crit	≤ 2	≥ 3

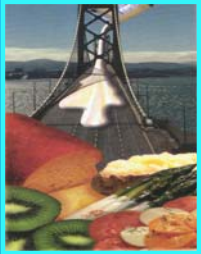
	no necrosis	necrosis
CT scan		
Complics/Mortality	6% / 0%	38% / 19%
PO diet in 7d	81%	0%
Management	supportive	EN/PN

Not exclsions: Necrosis, pseudocyst, ascites, surgery
 Exclusions: Intolerance (obstruction, ischemia)

Question: Should mild / moderate be treated (EN) ?

Sax (Amer J Surg 1987;153:117) Wilson (Brit J Surg 1990;77:1260)
 Agarwal (Amer J Gastro 1991;86:1385)


Formula Selection



	Study Pts	Controls
• Small peptide/MCT formula (n=30) ¹		
Hosp LOS	23.0d*	27.0d
• Fish oil formula (n=28) ²		
Hosp LOS	13.1d*	19.3d
Durat EN	10.6d*	17.6d
Complics	42%	64%
• Arginine/fish oil formula (n=15) ³		
ICU LOS	8.6d	34.8d
Hosp LOS	27.2d	38.4d
• Clinical Significance		
Below Lig Treitz – Tolerate STD		
Gastric – Content is tolerance factor		
Pharmaconutrit – Fears of SIRS		

¹Tiengou (JPEN 2006;30:1) ²Lasztity (Clin Nutr 2005;24:198) ³Hallay (Hepatogastroent 2001;48:1488) *p<0.05

Gastric vs Jejunal Feeding



- Time to initiation of EN signif less for gastric feeds ¹
 Gastric initiated mean 16 hrs (range 12-20 hrs) earlier
 Eventually post-pyloric feeds "catch up" (time to goal, % goal)
- Track record of intragastric feeding in acute pancreatitis is good!

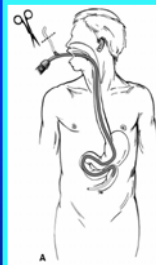
McClave Louisville Study ²
 One patient jejunal-gastric displacement - SIRS
 Responded immediately to replacement back to jejunum

Eatock Glasgow Study ³
 70.4% Tolerated >75% goal kcal within 48 hrs
 Pain in 2 pts - No Δ infus rate, CRP, AII scores, analgesia

Kumar Indian Study ⁴
 One patient each group experienced pain (no Δ amylase)

¹Crit Care 2003;7:R46 ²JPEN 1997;21:14 ³AJG 2005;100:432 ⁴J Clin Gastr 2006;40:431

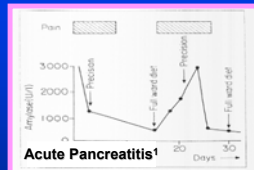
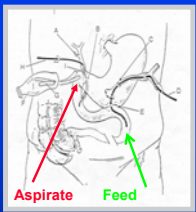
What Factors Affect Tolerance?



- Level of infusion
- Content
- Duration of ileus
- Institutional experience and expertise
Windsor¹ (partial intolerance 30%)
Schneider² (complete in 48%)
- Individual variation – Unexpected intolerance
One pt gastric feeding in Louisville study³ vs none in Eatock⁴
Two pts jejunal feeding below Lig of Treitz (McClave, O'Keefe)⁵

¹ Gut 1998;42:431 ² BritJSurg 2000;87:362 ³ JPEN 1997;21:14
⁴ Gastro 2001;120:A469 ⁵ Clin Gastr Hep 2003;1:315

Change in Content


Acute Pancreatitis¹ Isolated duodenal fistula²

	Volume	Bicarb	Amylase	Lipase
Vivonex	+27%	-24%	-62%	+4461%
Criticare	0%	-21%	-25%	+1317%
Osmolite	-7%	-65%	-84%	+21,283% *

(* p<0.05) ¹Parekh (S African J Surg 1993;31:57) ²Grant (JPEN 1987;11:302)

Tolerance

Effect of Duration of Ileus



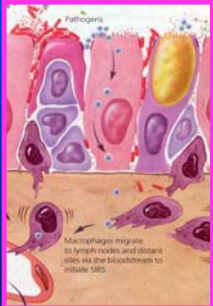
- Prospective non-randomized series of 102 acute pancreatitis pts¹

Subset	Duration of Ileus	Achieve Tolerance EN
Group 1 (n=11)	≥ 6 days	0% (PN)
Group 2 (n=8)	≤ 5 days	50%
Group 3 (n=83)	≤ 2 days	92%

¹ Cravo (Clin Nutr Suppl 1989;8:14)

Role of Probiotics Effect of Comensal Bacteria

- *Pseudomonas Aeruginosa*
Worst org for gut sepsis
Most rapid severe defect
- Bact orgs after shock induce gut cytokine release (TNF, IL-6)
Bact OG pathogenic orgs exaggerates response
- Can restoring comensal bacteria reduce this effect in pancreatitis?
Alverdy (CCM 2003;31:598)



Macrophages migrate to lymph nodes and distant sites via the bloodstream to initiate SIRS.

Role of Probiotics Effect of Comensal Bacteria

- Olah 2002 Pancreatitis Study (Lactobacillus)

	EN live (n=22)	EN heat-killed (n=23)	
Infected necrosis/abscess	4.5%	30.4%	p=0.023
Hosp LOS	13.7d	21.4d	p=NS

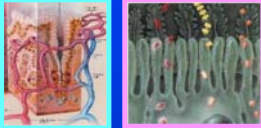
- Olah 2007 Pancreatitis Study (Four Lactobacillus strains)

	EN+probios (n=33)	EN alone (n=29)	
SIRS and MOF	24.2%	48.3%	p<0.05
Complicated cases	27.3%	51.7%	p<0.05

Brit J Surg 2002;89:1103 Hepatogastroent 2007;54:590-594

Probiotics Cause Death !

Dutch Multi-Center Trial
Six organisms
Four weeks Rx
Pts 15 yrs older (biliary)



	Probiotic (n=152)	Controls (n=144)
(* p ≤ 0.05) († p = 0.08)		
MOF	22%	10% *
Surgical Intervention	18%	10% *
ICU LOS	6.6d	3.0d †
Septic Complications	30%	28%
Bowel Ischemia	6% (9 pts)	0% *
Mortality	16%	6% *

(6 out of 9 pts with ischemic bowel on pressor agents)
Besselink (Lancet 2008;371:651)

Use of PN vs STD (No Rx): Issue of Timing


- Early PN may be a liability
- Very early PN (24hrs) harmful ¹

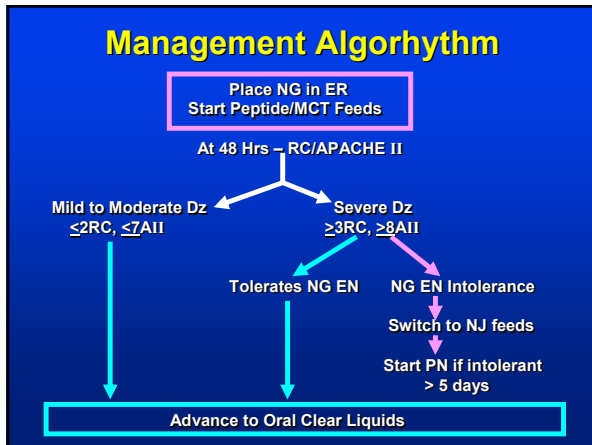
(54 Pts)	Controls	Early PN
LOH	10 days	16 days *
Cath sepsis	1.5%	10.5% *

- Later PN (4-5d) beneficial ²

(64 Pts)	STD	PN	PN/GLN
Mortality	43%	14.3%*	0.0%*
Complics	21	11*	4*
Hosp LOS	39.1d	28.6d*	25.3d*

¹ Sax (Amer J Surg 1987;153:117)
² Xian-Li (Clin Nutrit Supp 2004;1:43) *p<0.05





Conclusions

