



ESPEN Congress Glasgow 2002

A Patient's Journey through Complicated Pancreatitis

Nutritional Management of Acute Pancreatitis: Indications, timing and routes

Matthias Plauth and J Powell-Tuck

A patient's journey through complicated pancreatitis

Chairs:

Dr Matthias Plauth

Dr Jeremy Powell-Tuck

Clinical case - enteral nutrition

Acute Pancreatitis

- 💧 Incidence up to 38 per 1000,000 increasing
- 💧 25% life threatening complications
- 💧 Mortality 6-10%
- 💧 ESPEN guidelines:
Clinical Nutrition 2002 21 173-183
Meier et al ESPEN consensus group

The scenario

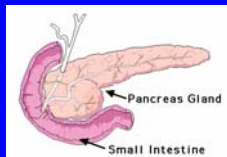
- *Male, 60, Weight 78kg, Height 1.70m, MUAC 32cm*
- *Severe abdominal pain radiating to back over 8 hours. Sweaty, nauseated, faint.*
- *Alcohol 8 units per day, no relevant Past History, Family History, Social History.*
- *Severely tender abdomen*
- *P110/min, BP 90/45, amylase 1750 u/l, WBC 16,000/l, Glucose 11mmol/l, Urea 17mmol/l, albumin 32g/l, Ca 1.9mmol/l, PaO₂ 7.5 kPa.*

Scenario 2

- *Circulatory support: iv fluids and plasma expanders and analgesia*
- *High Dependency Unit*
- *CT extensive pancreatic inflammation with swelling into peri-pancreatic fat*

Exocrine Pancreatic Secretion in Acute Pancreatitis

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Pancreatic secretion (exocrine)

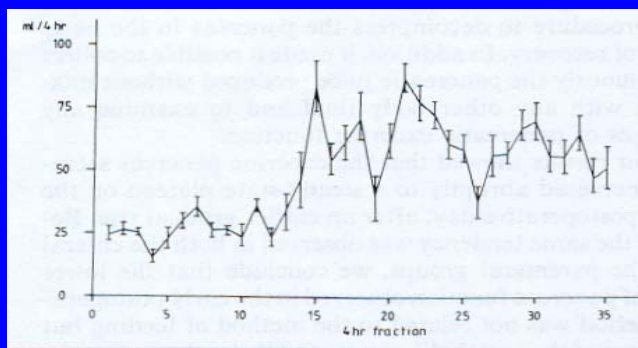
- 1'500 ml/d
- enzymes (e.g. trypsin, chemotrypsin, elastase, lipase etc.)
- cations: Na^+ , K^+ , Ca^{2+} , Mg^{2+} (pH~8.0)
- anions: HCO_3^- , Cl^- , SO_4^{2-} , HPO_4^{2-}
- water



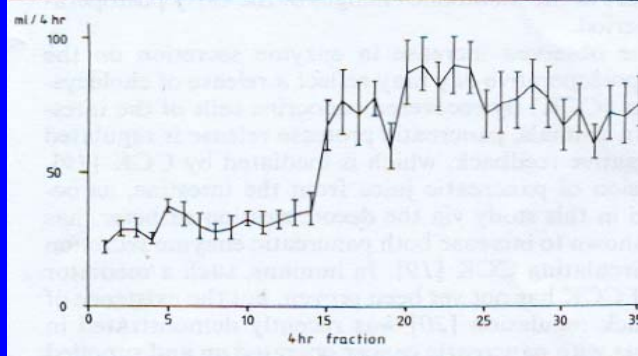
Pancreatic secretion - enteral vs parenteral

- **n = 12, *chronic* pancreatitis**
- **pancreatoduodenectomy**
- **needle-catheter jejunostomy vs TPN**
- **pancreatic juice, 4-h fractions**
- **all indices slowly increasing**
- **on day 3 abrupt rise, thereafter stabilisation**
- **no difference between the groups**

Pancreatic juice during feeding



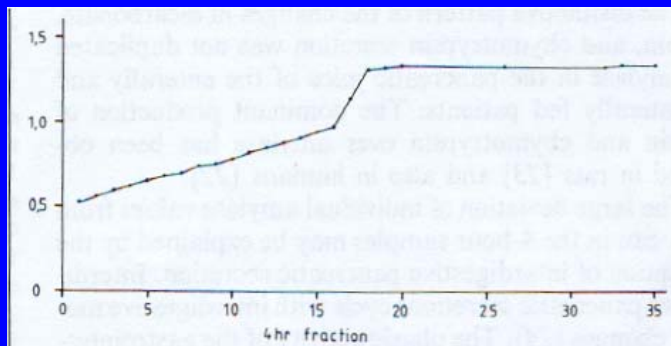
enteral



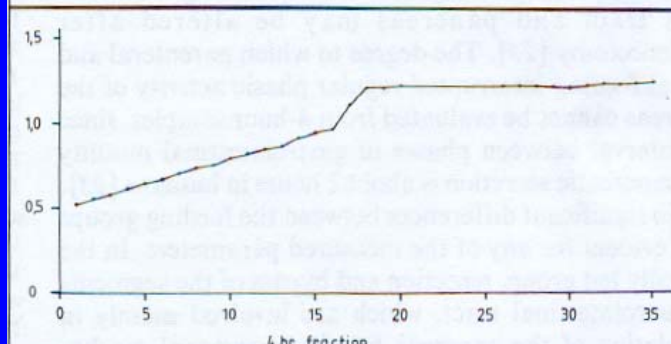
parenteral

Bodoky G et al. *Am J Surg* 1991;161:144-8

Pancreatic bicarbonate concentration



enteral



parenteral

Bodoky G et al. *Am J Surg* 1991;161:144-8

Pancreatic secretion - enteral vs parenteral

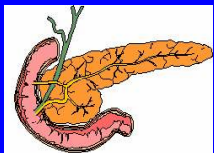
pancreatic stimulation

(lipids, amino acids, carbohydrates)

- gastric > duodenal > jejunal (> intravenous)
- standard diet > elemental diet

Conclusions - enteral feeding

- enteral feeding → stimulation of exocrine secretion
- gastric > duodenal > jejunal
- standard diet > elemental diet
- jejunal elemental feeding = safe and effective



Clinical Trials in Pancreatitis - What does the literature tell us?

- 💧 P.N. vs no nutrition
- 💧 E.N. vs no nutrition
- 💧 P.N. vs E.N.
 - ★ Mild disease
 - ★ Severe disease
- 💧 Must consider
 - ★ Outcome measures
 - ★ Amount of nutrition actually delivered
 - ★ Composition of nutrition used

Early P.N. vs. No nutrition

💧 Sax et al (1987)

- ★ 54 patients, with mild disease (Ranson \approx 1)
- ★ Early PN (within 24 hours) or i.v. fluids only

Outcomes

- 💧 TPN group commenced oral diet 4 days later than controls (p<0.09)
- 💧 LOS in TPN group 6 days longer (p<0.04)
- 💧 More metabolic complications in TPN group
- 💧 No difference in catheter related sepsis
- 💧 Patients with 0 or 1 Ranson's criteria more likely to be eating by day 7 (p<0.05)

Considerations

- ★ Calorie Intake: Hyperglycaemia, Excessive CO₂ production

Early E.N. vs No Nutrition

💧 Powell et al (2000)

- ★ 27 patients, APACHEII >7 and/or Glasgow >3
- ★ 14 conventional therapy, 13 EN + conventional therapy

💧 Outcome

- ★ EN group achieved 21% of nutritional goal over 5 days
- ★ Oral diet reintroduced 1 day earlier in EN group (p=0.66)
- ★ No difference in IL6, sTNFRI or CRP
- ★ Deterioration in gut permeability was not accompanied by a rise in IgG antiendotoxin core antibody

E.N. vs. P.N. in Mild Acute Pancreatitis

💧 Windsor et al (1998)

- ★ 34 patients, 38% with severe disease, predominantly gallstone disease
- ★ Randomised to TPN or EN for 7 days then re-evaluated

Outcome

- 💧 CRP ($p < 0.005$) and APACHEII score ($p < 0.00001$) significantly improved following EN
- 💧 No significant difference in LOS, incidence of sepsis, organ failure and mortality

Consideration

- 💧 PN group received an average of 50% more calories
- 💧 EN group, severe patients fed NJ, mild/moderate fed orally

E.N. vs. P.N. in Mild Acute Pancreatitis

💧 McClave et al (1997)

- ★ 32 Episodes (30 patients over 32 admissions), aetiology predominantly alcohol related
- ★ 16 TPN via central or peripheral line, 16 TEN via NJ tube

Outcome

- ★ Nutritional Intake: EN 71%, PN 85% by day 4 (NS)
- ★ No deaths, no difference between groups in serial pain scores, days to normalisation of amylase, days to diet by mouth or nosocomial infections
- ★ PN group had higher incidence of hyperglycaemia in first 5 days ($p < 0.02$)
- ★ PN 4x more expensive than EN ($p < 0.005$)

E.N. vs. P.N. in Mild Acute Pancreatitis

💧 Olah et al (2002)

- ★ 89 Patients, aetiology predominantly alcohol related, 19% severe disease
- ★ First phase of study: 48 PN, 41 EN (NJ)

Outcome

- ★ Lower rate of septic complications in EN group ($p=0.08$)
- ★ In severe disease, EN group had lower incidence of MOF (NS)

Considerations

- ★ Uncooperative patients and patients intolerant of enteral feed were excluded from the randomisation

E.N. vs. P.N. in Severe Acute Pancreatitis

💧 Kalfarentzos et al (1997)

- ★ 38 Patients, predominantly gallstone related
- ★ Imrie classification >3, or APACHEII >8
- ★ 18 EN via NJ, 20 PN via CVC

Outcome

- ★ No difference in ICU support, LOS, protein and calorie intake or nitrogen balance
- ★ Increased incidence of infectious complications in PN group ($p < 0.01$)

Considerations

- ★ 90% success rate for NJ placement
- ★ Lipid in both PN and EN was MCT/LCT

Scenario 3

- ⦿ *Jejunal feeding*
- ⦿ *NJ tube placed endoscopically*
- ⦿ *Nutrition team invited to review*

A Patient's journey through complicated pancreatitis

**What type of jejunal feed
would you choose for this patient?**

Human studies - Jejunal feeding

- ◆ **Vidon N et al. Gut 1978; 19: 194-8**

Effect of continuous jejunal perfusion of elemental and complex nutritional solutions on pancreatic enzyme secretion in human subjects.

- Volunteers
(elemental diet vs food homogenate)

- ◆ **Keith RG. Surg Gynecol Obstet 1980 Sep; 151(3): 337-43**

Effect of a low fat elemental diet on pancreatic secretion during pancreatitis.

- 3 patients with chronic pancreatitis
(elemental diet vs regular feedings)

- ◆ **Grant JP et al. JPEN 1987; 11:302-4**

Effect of enteral nutrition on pancreatic secretions.

- 1 patient duodenal fistula

Human studies- Jejunal feeding

- ◆ **Bodoky G et al. Am J Surg 1991; 161: 144-8**
Effect of enteral nutrition on exocrine pancreatic function.
 - 12 patients post-op. chronic pancreatitis
(7 semi-elemental diet vs 5 with TPN)
- ◆ **Duerksen DR et al. Nutrition 2000; 16:47-49**
Does jejunal feeding with a polymeric immune-enhancing formula increase pancreatic exocrine output as compared with TPN? A case report.
 - 43-y-old woman post-op. pancreatoduodenectomy
- ◆ **Duerksen DR et al. JPEN 2002 May-Jun; 26(3): 205-8**
A comparison of the effect of elemental and immune-enhancing polymeric jejunal feeding on exocrine pancreatic function.
 - 10 patients underwent partial pancreatectomy, randomized
(5 elemental diet + 5 immune-enhancing polymeric diet)

FUTURE STUDIES

Prospective, randomized controlled trials

Sample

- Large (multicentre studies?)
- Patients severe acute pancreatitis
- Stratified patients for
 - disease severity
 - aetiology of pancreatitis
 - nutritional status

Study groups

- elemental vs polymeric
- standard ?
- immune-enhance ?

Outcome measures

- degree of pancreatic secretions, days of ICU stay, days of hospital stay, days to oral intake, days to normal seric enzyme levels, tolerance to enteral nutrition and mortality

Nutritional Requirements

According to 2002 ESPEN Guidelines on Nutrition in Acute Pancreatitis

Energy	25 - 35 Kcal / kg BW / day	
Protein	1.2 – 1.5 g / kg BW / day	
CHO	3 – 6 g / kg BW / day	(Gluc <10 mmol/L)
Fat	< 2 g / kg BW / day	(TRG <12 mmol/L)

THE CHOICE OF FEEDING FORMULA

Beliefs

Studies

- Elemental or semi-elemental form. - low fat, MCT, LCT↓, a.a, short chain peptides → less pancreatic stimulation for product absorption.

Evidence-based

There isn't enough outcome data to make firm recommendations regarding the specific type of diet.

Scenario 4

- *The patient is vomiting and in pain.*

Aspiration of n/g tube 4-6hrly

- gastric phase of pancreatic stimulation is activated by gastric distension
- N/J tubes can become displaced into stomach (McClave et al 1997)

Large amounts of gastric aspirates alone are not an indication for stopping n/j feed - only if they contain feed or other signs/symptoms are present

Aspirating N/J tube 4-6hrly

- 💧 If large volumes obtained may indicate non absorption/ worsening ileus - but can you do it?
- 💧 Could confirm n/j is still in jejunum by aspiration of fluid with pH 6 or above. (Methany 1993)

Monitor patient for pain, abdominal distension, nausea.

- 30% of patients in this group develop pain & bloating. Most can be resolved by temporarily stopping/reducing rate of feed.

(Windsor et al 1998, Braga et al 2002)

- Often caused by trying to start/advance feed too quickly
- Can be initiated by sight and smell of food (Haynes-Jones 1986)

Listening for bowel sounds

- 💧 Do most nurses listen to bowel sounds regularly and can they interpret what they hear?
- 💧 How reliable as a measure of gastrointestinal function is the presence/absence of bowel sounds?

Pancreatitis Journey: the story so far

- *Male, 60, Weight 78kg, Height 1.70m, MUAC 32cm*
- *Acute severe pancreatitis*
- *Resuscitation*
- *Naso-jejunal feeding*
- *Feeding poorly tolerated with pain, vomiting, and patient intolerance so that parenteral nutrition is now preferred option.*

Standardised Parenteral Nutrition Regimens

Advantages

- ★ Commercially available licensed products
- ★ Additions can be made within validated stability limits
- ★ Use of pre-compounded base bags reduces preparation times, wastage and costs (Maswoswe et al, 1987)
- ★ A limited range of regimens can meet most patients requirements (Pichard et al, 2000)
- ★ Limiting available regimens reduces prescribing errors (Petros & Shank, 1986)

Disadvantages

- ★ Still require aseptic manipulation to be 'complete'
- ★ Limited availability of novel substrates as components of commercially available bags
- ★ Tendency to make the patient fit the bag
- ★ Not suitable for all patients

Scenario 5

- 💧 *A dedicated skin-tunnelled central venous catheter is inserted.*
- 💧 *Pyrexia persists*
- 💧 *Drainage of sterile fluid collection under ultrasound*
- 💧 *Day 16: N input 18gN/day, urine losses 24gN/d*
- 💧 *? Line infection*

Incidence

- 💧 Incidence of CR-BSI 20% - Ryder (1995)
- 💧 6,000 patients/year in UK acquire CR-BSI - Fletcher et al (1999)
- 💧 Most studies look at incidence of CR-BSI in patients who have CVC's for many reasons - not just PN.

Removal of catheter

- 💧 Removal on the basis of clinical suspicion alone - tip cultures negative in 70-80% of cases. Ryan et al (1984)
- 💧 catheter may be contaminated during removal
- 💧 exposes patient to the risks of re-insertion
- 💧 feeding time may be lost

Exchange over guidewire

- 💧 3 studies showing no difference in infection rates when compared with removal and re-insertion. Armstrong et al (1986)
 - Synder et al (1988)
 - Michel et al (1988)
- 💧 technique also advocated by Hayley et al (1992)

Stop feed, take cultures etc.

- Quantitative blood cultures comparing colony counts from catheter and peripheral shown to be useful Capdevilla et al (1992)
- 10-15 fold increase of same organism from catheter thought to be predictive of CR-BSI
- Difficult to get quantitative counts in some centres
- Takes 24hrs to get results

Others

- 💧 Acridine Orange Leukocyte Cytospin (AOLC) test - Rushforth (1993) Only useful in neonates
- 💧 AOLC + endoluminal brush - Kite (1997).

Summary

Still no reliable, easily used test that doesn't involve removing catheter.

- 💧 Don't automatically assume catheter is source of sepsis
- 💧 Be guided by clinical condition of patient
- 💧 If exit site is suppurating- remove catheter
- 💧 Develop local protocols