Nutritional Support in Severe Acute Pancreatitis

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<table>
<thead>
<tr>
<th>Pathological &amp; Clinical Events</th>
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<tbody>
<tr>
<td>Interstitial pancreatitis</td>
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<tr>
<td>Pain, fever</td>
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<tr>
<td>Local compl. – ileus, fluid collection</td>
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<tr>
<td>Necrosis</td>
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<td>Systemic compl. – organ failure</td>
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<tr>
<td>Infected necrosis</td>
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<tr>
<td>Sepsis</td>
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<td>Pseudocyst</td>
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<tr>
<td>Lump</td>
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</table>
Mx of AP is essentially supportive

- IV fluids aggressively (5 -10 L in 1st 24 hr)
- NPO till hemodynamic instability
- NG aspiration and acid suppression
- Prophylactic antibiotics ?
- **Specific**: Remove CBD stones endoscopically & Start enteral feeding (TPN initially in a few) within 48 - 72 hrs
Nutritional Support in Acute Pancreatitis

Requirement:

• 2000-2500 kcal/day
• Calorie : N = 100:1
• Protein 1.5 – 2.0 gm/kg
• Lipid (25-30 % calories) – 1.5 g/kg/day
• Recommended daily dose of vitamins
• Repletion of Ca, Zn, Mg
Acute Pancreatitis: Outcome

• Depends on severity of disease and early intervention
• Severe disease - Mortality is 30-40%
• Mild disease - Mortality is <5%
• So, crucial to decide if disease is severe
### Ranson’s criteria of Severity of AP

**At Admission**
- Age > 55 years
- Glucose > 200 mg%
- WBC > 16000
- S. LDH > 700 IU
- S. AST > 250 IU

**Within First 48 hours**
- Hematocrit drop > 10 %
- Serum Ca < 8 mg %
- Base deficit > 4 mEq/L
- BUN increase > 5 mg%
- Fluid loss > 6 L
- Art. PO2 < 60 mm Hg

Three or more indicate severe prognosis

*Ranson et al.*
Acute Pancreatitis: Severity Criteria

- APACHE II - score > 8 severe pancreatitis
- CT Severity index - score > 7 severe pancreatitis
- Clinical criteria - organ failure
Acute Pancreatitis: Time course of pathogenesis

**Intervention period**

- ER presentation
- Cytokines
- Organ damage

**Time course (in hours)**

- 12, 24, 36, 48, 60, 72, 84, 96
Release of cytokines result in SIRS & SIRS is indicative of severity

SIRS is dependent on:

- Inflammation of the pancreas: stone, ethanol
- Stimulation of exocrine secretion: max with fat, min with Carbohydrates
- Gut permeability increased
Effect of EN on Pancreatic Secretion

- Oral, intragastric and intraduodenal feeding produce a significant stimulation of pancreatic secretion (yet not clinically relevant)

- Intrajejunal feeding produce less stimulation

- Elemental formulae (individual amino acids and low fat) produce less stimulation
Enteral Nutrition: an opportunity for early intervention (48 - 72 hrs)

- EN decreases inflammation and SIRS
- Decreases ileus
- Decreases infectious complications
- Decreases LOH
Early EN (36 hr) improves outcome of critically ill patients: 15 RCTs & 2 meta

- Reduce infection by 55%
- Reduce LOH by 2.2 days
- Reduce mortality by 48%

Five separate studies:
- Delay in EN caused significant calorie deficit, increase in ventilation time, LOH, inf and complications
Enteral vs Parenteral Nutrition: 6 RCTs

In all, randomisation done within 48 hrs:
  5 showed significant impact in--
  decreasing inf and overall complications
  shortening LOH and duration of illness
  & faster resolution of SIRS
  but
  one study did not impact --- ?why
Enteral vs Parenteral Nutrition: 6 RCTs (contd)

One study did not impact --- ?why
Only 14% patients in this study were SAP and overall Ranson’s score in them was 1.1

vs

Other 5 studies:
Ranson’s score 3.5 and SAP was present in 35 -100% patients
Severity influences the gut permeability and the outcome of EN

Animals: Greater severity – greater permeability

Patients with SAP – 4 fold increase in perm’l’ity

PRCTs, EN vs PN -- benefit from EN in severe cases only:

APACHE II score >10, Ranson’s >3 - high rates of complications (38%) and mortality (19%) and 0% chance to tolerate oral feeds in 7 days. It is this group that will benefit max with early EN
Delay in initiation of early EN results in loss of benefit from it

In contrast to the 6 RCTs, one PRCT randomised after 4 days of hospitalisation
Even though they were severely ill and they had Ranson’s criteria 4.7-5, no benefit
Delay in starting EN results in prolonged ileus and intolerance to EN

one RCT of 102 patients
NE tube feeding started within 2 days-- 90% success in achieving tolerance
NE started only by 5 days -- 50% tolerance
NE started after 6 days or more -- 0% tolerance

Early EN improved gut function and food tolerance (Eatock et al 2000, 2005)
Tolerance - a key factor in Mx

EN produces
(1) asx stimulation of exocrine enz, 100%
(2) Excacerabation of sx- 21%
(3) Excacerbation of disease and SIRS – 4%
   (increase in WBC and fever)

Factors affecting tolerance:
Level of feeding, content of the formula, osmolarity of the feed, duration of ileus, institutional experience and expertise
Nasogastric feeding is as good as Nasojejunual feeding in SAP (AJG 2005)

50 consecutive pts with SAP randomised:

<table>
<thead>
<tr>
<th>Nasogastric</th>
<th>Nasojejunual</th>
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<tbody>
<tr>
<td>(27)</td>
<td>(22)</td>
</tr>
<tr>
<td>Hosp stay (d)</td>
<td>16</td>
</tr>
<tr>
<td>ICU stay (d)</td>
<td>7</td>
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No difference in pain resolution, analgesic requirement, reduction in APACHE and CRP
Acute Pancreatitis: TPN (ASPEN)

Indications:

• When the intake inadequate for > 1 week

• EN exacerbates symptoms

• Severe disease, complicated course
Acute Pancreatitis: TPN

• Started earlier than 5 days is a liability rather than help; adds to problems, viz
• intestinal permeability increased
• ileus prolonged
• decreased tolerance to subsequent feeding
• causes hyperglycemia and triglyceridemia—hence close monitoring reqd
• Longer LOH and catheter sepsis(Sax et al)
Acute Pancreatitis:
Xian-Li study using TPN from 5th d

- Showed benefit: mortality reduced from 43.5% to 14.3%
- Complications reduced from 21% to 11%
- LOH reduced from 39 d to 28 d
- Glutamine added to TPN further benefitted
- Details missing and hence some reservation
Acute Pancreatitis:
Refeeding after initial Rx

- In severe cases, refeeding by 48 hrs using CHO and small peptide formulas
- Mild pain /discomfort should not deter you from continuing the feeding
- Mild ileus should also not deter you
- CLD vs low fat solid diet-- no difference in tolerance and no effect on LOH in mild cases

(Clin Gastro Hepatol 2007;5:946-951)
Severe Acute Pancreatitis: Nutritional Support

Conclusions

• Till haemodynamic stability is achieved, iv supplementation
• Thereafter, enteral feeding--within 48 hr
• High carbohydrate, low fat formulas
• Route of EN- intrajejunal vs intragastric
• Rarely, TPN, but avoid till 5 days
Acute Pancreatitis: Nutritional Support

Problems & Need of Studies in Research

• Lack of large prospective clinical trials based on disease severity
• No ideal method for early prediction of organ failure (Ranson’s-48 hrs., APACHE-II-24 hrs.)
• How soon EN is soon enough
• Intragastric vs Intrajejunal feeding
• Problems of multicentre trials