

# Nutritional Support in Severe Acute Pancreatitis

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# AP: Pathological & clinical Events

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**Interstitial pancreatitis**

**Pain, fever**

**Local compl. – ileus, fluid  
collection**

**Necrosis**

**Systemic compl. – organ  
failure**

**Infected necrosis**

**Sepsis**

**Pseudocyst**

**Lump**

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# Mx of AP is essentially supportive

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- 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

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## 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

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- 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

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## *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. PO<sub>2</sub> < 60 mm Hg

Three or more indicate severe prognosis

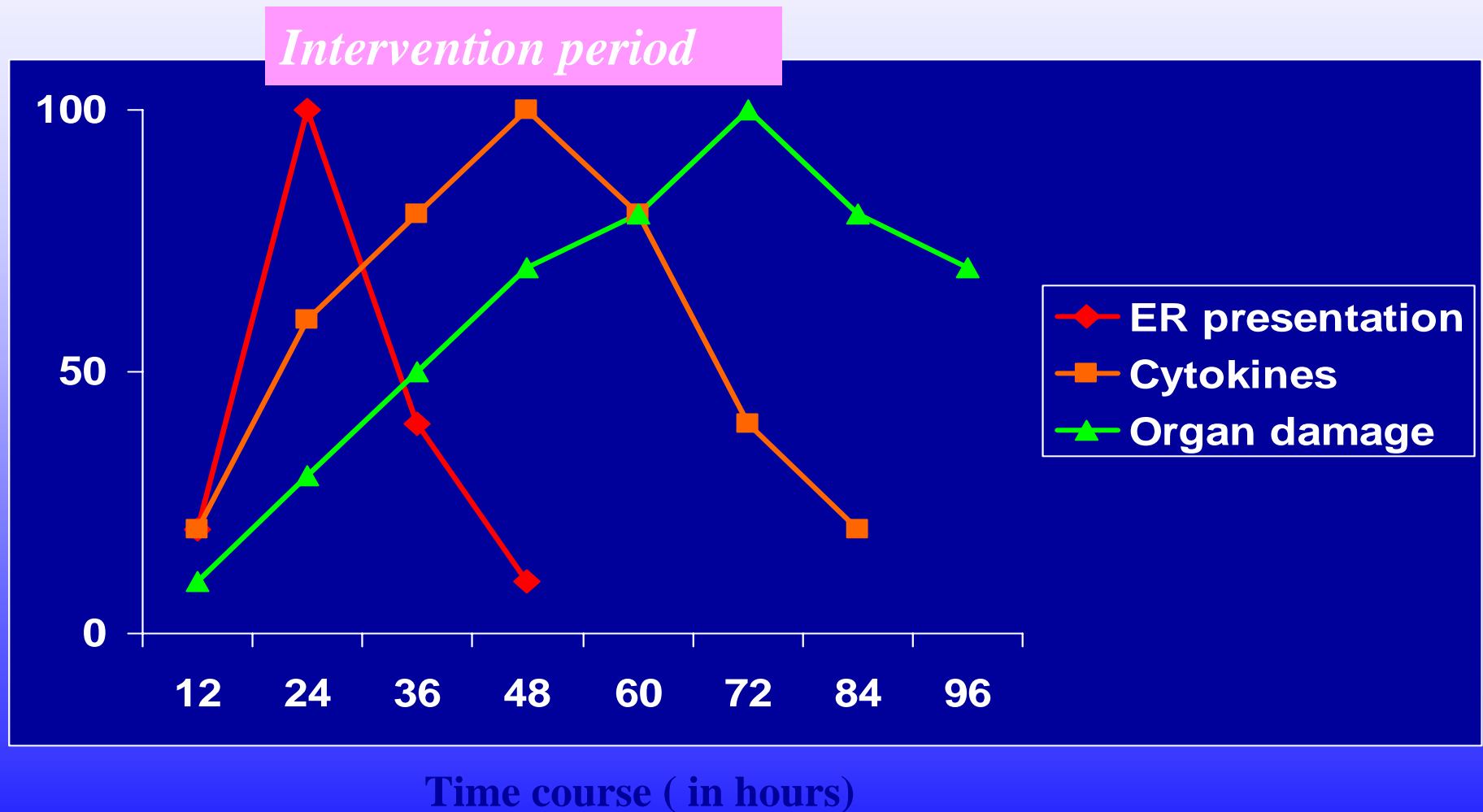
*Ranson et al.*

# Acute Pancreatitis: Severity Criteria

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- APACHE II - score  $> 8$  severe pancreatitis
- CT Severity index - score  $> 7$  severe pancreatitis
- Clinical criteria - organ failure

# Acute Pancreatitis : Time course of pathogenesis





# Release of cytokines result in SIRS & SIRS is indicative of severity

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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

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- 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)

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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

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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

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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)

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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**

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Animals: Greater severity – greater permeability

Patients with SAP – 4 fold increase in perm'lity

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

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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

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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

*(Cravo M et al. Clin Nutr 1989)*

Early EN improved gut function and food tolerance *(Eatock et al 2000, 2005)*

# Tolerance - a key factor in Mx

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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 Nasojejunal feeding in SAP (AJG 2005)

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50 consecutive pts with SAP randomised:

	Nasogastric (27)	Nasojejunal (22)
Hosp stay(d)	16	15
ICU stay (d)	7	8

No difference in pain resolution, analgesic requirement, reduction in APACHE and CRP

# Acute Pancreatitis: TPN (ASPEN)

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## Indications:

- When the intake inadequate for  $> 1$  week
- EN exacerbates symptoms
- Severe disease, complicated course

# Acute Pancreatitis: TPN

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- 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

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- 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

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- 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

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## 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

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## 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
- Intragastic vs Intrajejunal feeding
- Problems of multicentre trials