Surgical Management of Acute Pancreatitis

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Overview

• Biliary pancreatitis – a cost effective algorithm
• Key concepts in surgical management of severe acute pancreatitis
  – Early recognition of severe pancreatitis.
  – Complications of pancreatitis and the ability to diagnose them evolve over time.
  – Enteral nutrition is superior to parenteral nutrition in severe pancreatitis.
  – The value of surgical intervention can be determined 4 weeks into the course of severe pancreatitis and delay only prolongs the duration of disability.
  – The Step-up approach to complicated pancreatitis.
Biliary Pancreatitis – Algorithm Foundations

• Most CBD stones spontaneously pass
  – Routine IOC vs. selective IOC data
  – 6 week follow-up cholangiograms
• ~30% recurrence of AP within 6 weeks
• Same-admission cholecystectomy is less expensive
• Some patients are going to get sick

< 3 Ranson’s Criteria
1. Pain management
2. Bowel rest
3. IVF

Comorbidities preclude surgery

CBD > 6 mm & Bili > 4

Pain persists greater than 72 hrs

Same admission Chole/IOC

≥ 3 Ranson’s Criteria
1. ICU, consider transfer
2. Pain management
3. Enteral feeding
4. Organ support

Biliary Pancreatitis

Algorithm

ERCP

Cholangitis

IV Contrast CT

Normal renal function @ 72 hrs

1. Delayed Intervention
2. Transfer

Home

1. ICU, consider transfer
2. Pain management
3. Enteral feeding
4. Organ support
Early Recognition of Severe Pancreatitis

**TABLE 38.2**

**SEVERITY SCORING SYSTEMS FOR ACUTE PANCREATITIS**

<table>
<thead>
<tr>
<th><strong>RANSON’S CRITERIA</strong></th>
<th><strong>GLASGOW’S CRITERIA</strong></th>
<th><strong>APACHE (0-4 POINTS EACH)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>On admission</strong></td>
<td><strong>Within 48 h</strong></td>
<td></td>
</tr>
<tr>
<td>Age &gt;55 y</td>
<td>Age &gt;55 y</td>
<td>Temperature</td>
</tr>
<tr>
<td>WBC &lt;16 × 10^9/L</td>
<td>Blood urea Nitrogen &gt;5 mg/dL</td>
<td>PaO₂ &lt;60 mmHg (8 kPa)</td>
</tr>
<tr>
<td>LDH &gt;350 U/L</td>
<td>Calcium &lt;8 mg/dL</td>
<td>LDH &gt;600 U/L</td>
</tr>
<tr>
<td>AST &gt;250 U/L</td>
<td>PaO₂ &lt;60 mmHg (8 kPa)</td>
<td>AST &gt;200 U/L</td>
</tr>
<tr>
<td>Glucose &gt;200 mg/dL</td>
<td>Base deficit &gt;4 mEq/L</td>
<td>Albumin &lt;2 g/L</td>
</tr>
<tr>
<td></td>
<td>Fluid sequestration &gt;6 L</td>
<td>Ca &lt;2 mmol/L</td>
</tr>
</tbody>
</table>

**Timing of CT imaging (%)**
- At time of admission: 66 (40)
- After admission: 25 (15)

**Antibiotic use (%)**
- Prophylactic use: 79 (51)
- Non-carbapenem antibiotics: 58 (15)

**Nutrition**
- Average duration without nutrition (days): 2.6 (0.7)
- Enteral feeding (%): 17 (10)
- TPN administration (%): 60 (38)
- Enteral feeding or PO used or considered first (%): 23 (7)

Failure to follow evidence-based best practice guidelines in the treatment of severe acute pancreatitis

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Parameters | Value (n or range)
---|---
Timing of CT imaging (%) | 
At time of admission | 66 (40)
After admission | 25 (15)
Average duration from time of admission (days) | 3 (1-7)
CT with IV contrast at 48-72 hours | 31 (15)
Antibiotic use (%) | 79 (51)
Prophylactic use | 53 (26)
Non-carbapenem antibiotics | 58 (15)
Nutrition | 
Average duration without nutrition (days) | 2.6 (0.7)
Enteral feeding (%) | 17 (10)
TPN administration (%) | 60 (38)
Enteral feeding or PO used or considered first (%) | 23 (7)
INITIAL DISEASE SEVERITY ASSESSMENT AND MANAGEMENT

• Key initial decision-making points include:
  – Determining the level of nursing care and monitoring necessary.
  – Anticipating the required volume of resuscitative fluids.
  – Exploring potential complications in a cost-effective manner.
  – Consideration of transfer to a tertiary care center

ROLE OF IMAGING

• Not required to make the diagnosis
  – Epigastric pain
  – Elevated (3x upper limit) serum amylase/lipase
• No contrast = reduced prognostic information
• Potentially harmful – nephrotoxicity

• IT CAN WAIT
EVOLUTION OF SAP
EARLY PHASE INTERVENTIONS
The use of Prophylactic Antibiotics


EARLY PHASE INTERVENTIONS
The use of Probiotics

- Netherlands trial ceased at interim analysis
  - Not published
  - Treatment group fared significantly worse
NUTRITION FOR SAP

• TPN is out
• Enteral nutrition significantly reduces:
  – infections
  – surgical interventions
  – mortality
• Gastric ileus, peripancreatic fluid collections, necrosis or elevated pancreatic enzymes are not contraindications for enteral feeding

NUTRITION FOR SAP

• Avoid EN with malperfusion
• Deliver EN distal to the ligament of Treitz
  – Avoids reflux into an atonic stomach
  – Reduces pancreatic secretion > 50%
• Elemental formula
  – Exocrine insufficiency
  – Hypertonic solutions
EARLY PHASE INTERVENTIONS

Nutrition


EARLY PHASE INTERVENTIONS - SAP

Adrenal Insufficiency

EARLY PHASE INTERVENTIONS
Adrenal Insufficiency

“Although an increase in adrenocorticotropic hormone levels is suggested to increase corresponding cortisol levels, cortisol levels decreased during the development of necrotizing acute pancreatitis. This phenomenon, along with the continuously decreasing corticosteroid-binding globulin levels, brings up the hypothesis of a relative adrenal insufficiency, which favors acinar cell apoptosis and hence may trigger the development of necrosis in the initial vulnerable phase of acute pancreatitis.”


Indications for Early Operative Intervention

Abdominal compartment syndrome is an early, lethal complication of acute pancreatitis.


<table>
<thead>
<tr>
<th></th>
<th>ACS</th>
<th>Debridement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td>12</td>
<td>99</td>
</tr>
<tr>
<td>Mortality</td>
<td>50%</td>
<td>12%</td>
</tr>
<tr>
<td>Onset of pancreatitis and surgery (days) *</td>
<td>11.7 ± 19.6</td>
<td>40.4 ± 27.6</td>
</tr>
<tr>
<td>Requiring multiple debridements</td>
<td>6 (50%)</td>
<td>59 (60%)</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>53.3 ± 25.2</td>
<td>33.8 ± 30.7</td>
</tr>
</tbody>
</table>
Effects of Decompressive Laparotomy

Patient Outcomes

<table>
<thead>
<tr>
<th>Mortality</th>
<th>6 (50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morbidity</td>
<td></td>
</tr>
<tr>
<td>Pleural Effusion</td>
<td>5 (42%)</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>8 (66%)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>8 (66%)</td>
</tr>
<tr>
<td>C diff</td>
<td>2 (16%)</td>
</tr>
<tr>
<td>DVT/ PE</td>
<td>3 (25%)</td>
</tr>
<tr>
<td>Pseudocyst</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>2 (16%)</td>
</tr>
<tr>
<td>Enterocutaneous fistula</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Pancreatic fistula</td>
<td>1 (8%)</td>
</tr>
</tbody>
</table>

Recovery in Survivors

| Days in ICU | 42.5 ± 13 |
| Days in Hospital | 53.3 ± 25.2 |
| Days on Ventilator | 31.3 ± 11.4 |

Disposition

| SNF  | 2 (33%) |
| LTAC | 3 (50%) |
| Rehab| 1 (17%) |
The need for surgical intervention can be determined 4 weeks into the course of severe pancreatitis and treatment delay only prolongs the duration of disability.

Debridement and External Drainage of Necrosis

LATE PHASE INTERVENTIONS

- Cholecystectomy
- Feeding access
- Symptomatic pseudocyst
  - Endoscopic drainage
  - Percutaneous drainage
  - Surgical drainage
- Biliary Obstruction

- Abscess
  - Endoscopic drainage
  - Surgical drainage

- Enteric fistula
- Hemorrhage
- Diabetes
- Exocrine insufficiency
The Step-Up Approach

• A word of caution....
Disrupted Pancreatic Duct

CT scans showing disrupted pancreatic duct.
Key Concepts

– Early recognition of severe pancreatitis.

– Complications of pancreatitis and the ability to diagnose them evolve over time.

– Enteral nutrition is superior to parenteral nutrition in severe pancreatitis.

– The value of surgical intervention can be determined 4 weeks into the course of severe pancreatitis and delay only prolongs the duration of disability.

– The Step-up approach to complicated pancreatitis.
Summary

• Appropriate early phase assessment and management is essential
  – Minimize organ injury
  – Shorten disease duration
  – Reduce mortality
• Includes
  – Appropriate use of ICU
  – Contrast-enhanced CT can wait
  – Fluid resuscitation, support failing organs
  – Nutrition
  – Adrenal support
  – Prophylaxis – ABX on their way out (stay tuned)
  – Timely identification of complications

Summary

• Late phase management should be personalized
  – Minimally invasive/natural orafice approaches when possible
  – Philosophy of a single, well-timed invasive intervention
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A

B