Acute and Chronic Pancreatitis

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GOALS

Acute pancreatitis: Early management from initial evaluation through stabilization

Chronic pancreatitis: Operative options and who gets what operation
Acute Pancreatitis: The Basics

Acute pancreatitis is an inflammatory condition characterized by intrapancreatic activation of proteolytic enzymes.

It is usually mild and self-limited. Mortality of acute pancreatitis among all comers is 1-5%.

Necrosis complicates pancreatitis in approx. 15-20% of cases. Mortality among patients with necrotizing pancreatitis is 10-40%. Lower rates are noted in the setting of sterile necrosis (5-10%) vs. infected necrosis (30-40%)
28yF presents to the ED with epigastric abdominal pain. Pain started yesterday, was at its worst last night, and is currently slightly improved. She has no PMH.

Afebrile, hemodynamically stable
Benign exam

WBC 8, Hgb 15, Tbili 1.0
Amylase 2400, Lipase 1500

How do we secure a diagnosis?

What is your preferred singular imaging test for this patient? (CT, US, MRCP)?
Diagnosis of acute pancreatitis

The diagnosis of acute pancreatitis requires 2 of the following:

1. CLINICAL--Abdominal pain consistent with pancreatitis

2. LABORATORY--Elevation of amylase/lipase to 3-5 times above the upper limit of normal

3. RADIOGRAPHIC--Imaging evidence of pancreatitis (US, CT, or MR)
Rationales for early CT in pancreatitis

1. Make the diagnosis of acute pancreatitis
2. To identify pancreatic necrosis
3. To see how “bad” the pancreatitis is
4. To see if there is “anything to do”
Rationale for early CT in pancreatitis

1. Make the diagnosis of acute pancreatitis

The diagnosis of pancreatitis does not require CT

2. To identify pancreatic necrosis

Necrosis often takes days to evidence, and the eventual extent of necrosis is frequently underestimated on CT

3. To see how “bad” the pancreatitis is

There is not a strong correlation between the extent of organ failure and the morphologic appearance of pancreatitis on CT

4. To see if there is “anything to do”

Rarely is there “anything to do” in the early phase

Better indications: Diagnostic uncertainty, evaluation of associated issue (perforation), failure to respond initially
Early CT
Underestimation of extent of pancreatitis
Early CT

Underestimation of extent of pancreatitis
Symptoms improve. Amy/Lip are near normal by PAD3.

You recommend cholecystectomy.
She wants to leave and pay her bills.

What do you tell her?
28yM presents to the ED with abdominal pain. Pain worsened into this morning after a drinking binge last night.

Afebrile, HR 140, SBP 85
WBC 21, Hgb 17, Plt 600
Creat 1.8
Amylase 9000, Lipase 7000
Distended abdomen

Noncontrast CT suggests pancreatitis

*How bad is his pancreatitis? (Mild, moderate, severe) Can we predict?*
**Scoring systems for pancreatitis**

<table>
<thead>
<tr>
<th>Clinical severity scores</th>
<th>Imaging severity scores</th>
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<tbody>
<tr>
<td>Ranson criteria</td>
<td>Balthazar</td>
</tr>
<tr>
<td>Glasgow/Imrie score</td>
<td>CT severity index (CTSI)</td>
</tr>
<tr>
<td>APACHE II</td>
<td>MOP/EP/EPIC/MRSI/MCTSI</td>
</tr>
<tr>
<td>BISAP</td>
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Most clinical systems have good NPV (up to 95%) but poor PPV. Overall the clinical severity scores are relatively equivalent.

No radiographic score has proven to be superior to clinical scores.

Only Japanese guidelines (not ACG or IAP) recommend using scoring systems in evaluation of pancreatitis.

Best marker at admission and 48 hrs: SIRS
Box 3  Grades of severity

- **Mild acute pancreatitis**
  - No organ failure
  - No local or systemic complications

- **Moderately severe acute pancreatitis**
  - Organ failure that resolves within 48 h (transient organ failure) and/or
  - Local or systemic complications without persistent organ failure

- **Severe acute pancreatitis**
  - Persistent organ failure (>48 h)
    - Single organ failure
    - Multiple organ failure
28yM presents to the ED with abdominal pain. Pain started this morning after a drinking binge last night.

Afebrile, HR 120, SBP 95
WBC 21, Hgb 17, Plt 600
Creat 1.6
Amylase 9000, Lipase 7000
Distended abdomen

Noncontrast CT suggests pancreatitis

What is your plan?
AGGRESSIVE FLUID RESUSCITATION

Analgesics

NPO (bowel rest)
Now PAD7

T 102, HR 121, SBP 110
Intubated but stable

WBC 24, Hgb 13, Creat 1.1
Abdominal distension is improved—moderate

CT shows “large peripancreatic fluid collections, extensive pancreatic necrosis, no evidence of infected necrosis”
Should we operate?

If yes, what operation?
Non-Operative Management of Severe Acute Pancreatitis

A. Nutrition
   TPN vs TEN
   When to start

B. Antibiotics (yes/no)
   What agent

C. Interval re-imaging
   Routine re-imaging (yes/no)
   When
Now PAD14

T 99.2, HR 95, SBP 110
Extubated, 2L
Rickety but OK

WBC 9, Hgb 13, Creat 1.1
Moderately distended abdomen
Tolerating TEN and oral intake

*How about a repeat CT?*
What now?
What Now?

A. Antibiotics only

B. Percutaneous drainage

C. Minimally invasive debridement (laparoscopic, retroperitoneal, endoscopic)

D. Open debridement
Concept: Can infected necrosis be managed with control of the infectious issue thus delaying or eliminating the need for necrosectomy

Randomized pts with suspected/confirmed infected necrosis to undergo open necrosectomy vs percutaneous drainage followed by minimally invasive debridement if necessary

Mortality was similar (19% vs 16%) but step-up approach had significantly lower rates of major complications. There was also a reduction in long-term complications (diabetes, incisional hernia)

35% of patients were treated with percutaneous drainage only
What Now?

A. Antibiotics only

B. Percutaneous drainage

C. Minimally invasive debridement (laparoscopic, retroperitoneal, endoscopic)

D. Open debridement
Acute pancreatitis
Management Summary

Secure Diagnosis

Predict Severity (SIRS)

Aggressively hydrate

Image as indicated
~ 72 hrs if scenario suggests moderate/severe pancreatitis

Ride the wave
Critical Care
Decide on nutrition (TEN strongly preferred)
Decide on antibiotics (generally not needed)

Intervene only when necessary
Minimal → → → Maximal
Chronic pancreatitis: Operative options
Chronic pancreatitis is a benign inflammatory process of the pancreas which leads to irreversible damage of the gland with loss of functional parenchyma.

Etiologic factors: TIGAR-O classification
- Toxic-metabolic (alcohol/tobacco)
- Idiopathic
- Genetic (Trypsinogen gene mutations)
- Autoimmune
- Recurrent and severe acute pancreatitis
- Obstructive (divisum or tumor)

Predominant symptoms: pain, endocrine insufficiency (diabetes mellitus), exocrine insufficiency (steatorrhea)
Anatomic considerations
Anatomic considerations
Anatomic considerations
Chronic Pancreatitis
Types of resection

1. Distal pancreatectomy

2. Duct Drainage Procedures
   A. Puestow procedure
   B. Duodenum-Preserving Pancreatic Head Resections
      Frey Procedure
      Beger Procedure

3. Whipple Procedure

4. Total Pancreatectomy (+/- islet autotransplantation)
Chronic Pancreatitis
Types of resection

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Surgical Procedures
Distal Pancreatectomy/Splenectomy
Distal Pancreatectomy

**Indications**

Localized severe complications of the pancreatic body/tail
- Pancreatic duct stricture
- Pseudoaneurysm
- Pseudocyst

**Downsides**

Does not address pancreatic head
Few anatomic applications
DM, exocrine insufficiency
Chronic Pancreatitis

Types of resection

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Puestow Procedure
Puestow Procedure
Puestow Procedure
Puestow Procedure

Indications

Obstructed, dilated pancreatic duct (>8mm)
No clear inflammatory mass or calcification of the pancreatic head
Patient with multiple comorbidities

Downsides

Pure drainage procedure
Minimal application (dilated pancreatic duct without clear involvement of the pancreatic head)
Prone to long term failure
1. Distal pancreatectomy

2. Duct Drainage Procedures
   A. Puestow procedure
   B. Duodenum-Preserving Pancreatic Head Resections
      Frey Procedure
      Beger Procedure

3. Whipple Procedure

4. Total Pancreatectomy (+- islet autotransplantation)
Frey Procedure

Limited/subtotal pancreatic head resection
Lateral pancreaticojejunostomy
Frey Procedure
Frey Procedure
Beger Procedure

Subtotal pancreatic head resection
Transection of the pancreatic neck above the portal vein
End to side or side to side pancreaticojejunostomy
DPPHR (Frey and Beger procedure)

**Indications**

Calcified/involved pancreatic head  
Obstructed, dilated pancreatic duct (>8mm)  
No concern for malignancy

**Downsides**

Requires ideal anatomy  
Techniques are not widespread  
Non-standardized pancreatic head resection
DPPHR (Frey and Beger procedure)
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Chronic Pancreatitis
Types of resection

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Whipple Procedure
Extent of Resection
Whipple Procedure

Indications

- Inflammatory mass in head
- Inability to exclude malignancy in pancreatic head
- Pancreatic head disease with non-dilated duct (i.e. small duct disease)

Downsides

Morbidity

- Pancreatic leak (15-40%)
- Delayed gastric emptying
- Mortality (2% UPENN)
- DM, exocrine insufficiency
Whipple Procedure
Whipple Procedure
Chronic Pancreatitis
Types of resection

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      Beger Procedure

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4. Total Pancreatectomy (+/- islet autotransplantation)
**TPIAT: Operative Procedure**

**Resection**
- Pancreas
- Duodenum and proximal jejunum
- Gallbladder
- Bile duct
- [Spleen]

**Reconstruction**
- Hepaticojejunostomy
- Duodenojejunostomy or Gastrojejunostomy
- Roux-en-Y preferred in some institutions

**Pancreas processing (3-6 hours)**
- Enzymatic Digestion
- Centrifugation

**Islet infusion**
- Infusion through a stump in the splenic vein
- Leftover cells left in peritoneum
TPIAT
Complications

High reoperation rate (16%)
  9.5% rate of reoperation for bleeding

Delayed gastric emptying (40-50%)

Anastomotic leak 4.2% (G-J 2.8%, H-J 1.4%)

Portal vein thrombosis

Overall low mortality (1.2% at Minnesota)
TPIAT: Operative Procedure
TPIAT: Operative Procedure
Chronic Pancreatitis
Types of resection

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## Summary: Operative Approaches

<table>
<thead>
<tr>
<th>Operation</th>
<th>Patient</th>
<th>Head</th>
<th>Duct</th>
<th>Malignancy</th>
<th>Downsides</th>
</tr>
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<tbody>
<tr>
<td>Distal</td>
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<td>Not involved</td>
<td>Any</td>
<td>Any</td>
<td>Pt selection DM Exoc. Insuf.</td>
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<tr>
<td>Puestow</td>
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<td>Dilated</td>
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<td>Pt selection Long-term Outcome</td>
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<tr>
<td>DPPHR</td>
<td>Any</td>
<td>Involved</td>
<td>Dilated</td>
<td>No</td>
<td>Ideal anatomy Not widespread</td>
</tr>
<tr>
<td>Whipple</td>
<td>Healthy</td>
<td>Involved</td>
<td>Any</td>
<td>Any</td>
<td>Morbidity QoL DM Exoc. insuf</td>
</tr>
<tr>
<td>TPIAT</td>
<td>Healthy Non-diabetic</td>
<td>Any</td>
<td>Any</td>
<td>No</td>
<td>Morbidity Not widespread</td>
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</tbody>
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