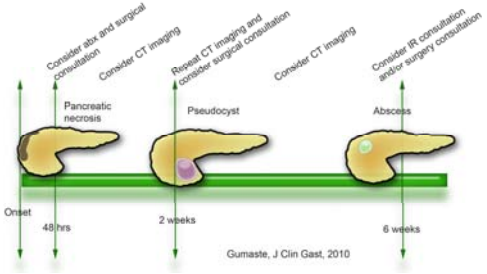
ANTIBIOTICS AND PAIN CONTROL

- Broad spectrum antibiotics are not used routinely, even in demonstrated necrosis. RCTs have not shown benefit of prophylactic abx but they may contribute to fungal infx
- **Consider systemic antibiotics** (such as a monobactam) if there is 1) established infection, or 2) severe pancreatitis with any organ failure, or 3) > 30% pancreatic necrosis; if blood and other cultures (included CT-guided aspiration) are negative and no source of infection is identified, abx should be discontinued
- Typically PCA provides a safe and efficient mechanism to deliver properly titrated analgesia; **fentanyl** may be better in settings of renal impairment; **morphine** is a reasonable alternative; meperidine is to be ***avoided*** because it lowers the seizure threshold

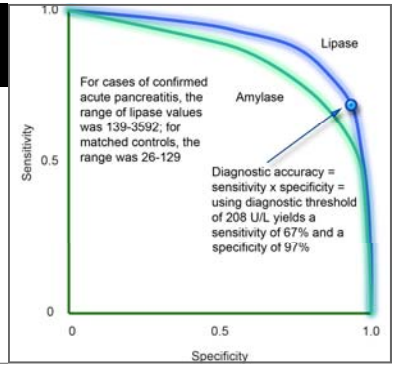
TIMELINES

- Necrotic pancreas tends to occur earlier than a pseudocyst; it can be differentiated by ultrasonography and may require drainage
- Infected necrosis requires a microbiologic diagnosis, usually with CT-guided aspiration



RECEIVER OPERATOR CURVES

Treacy and colleagues computed the receiver-operator characteristics for both amylase and **lipase** during the **first 24 hours** of symptoms. Day 1 serum lipase had the best diagnostic accuracy at the threshold of **208 U/L** (**sn 67% and sp 97%**). Performance dropped by day 3 using a lipase threshold of 216 U/L (sn 55% and sp 84%). The combination of amylase and lipase did not improve performance at days 1, 2, or 3 (day 1 lipase x amylase sn 60% and sp 97%).



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HOSPITALIST APPROACH TO ACUTE PANCREATITIS

A structured approach can be applied to the ward management of acute pancreatitis. This card is not intended to address issues specific to intensive unit care management.

INITIAL CONSIDERATIONS:

Securing a diagnosis

There are two main goals: 1) differentiating from other causes of abd pain; 2) differentiating acute from chronic pancreatitis

Assessing severity of illness

It is critical to assess the presence of complications including organ failure (transient or persistent)

Determination of precipitant

The causes of acute pancreatitis are legion; your role is to identify reversible causes

Considering complications

There are local anatomic and systemic complications that may occur; timing is an important predictor

Decisions about imaging

A common question is whether to image and when; there are guidelines to help with decision making

Fluids and nutrition

Resuscitation is critical and there is good data to support the importance of early nutrition

Pain management

Pain control is a key intervention and pain status is a barometer of clinical response

Securing a Diagnosis

Per **American College of Gastroenterology** , the **dx** requires **two of the three criteria**:

- Acute onset of severe, epigastric pain (50% also radiate to back)
- Elevation in serum amylase or lipase greater than 3x ULN
- Characteristic findings on imaging (generally contrast enhanced CT)

Patients may present with **fever, tachypnea, hypoxemia, and hypotension**; 3% will manifest **ecchymotic discoloration** on the abdomen or back reflecting retroperitoneal bleeding

The **differential diagnosis** for pancreatitis includes peptic ulcer disease, choledocholithiasis, cholangitis, cholecystitis, perforated viscus (for example for a duodenal ulcer), intestinal obstruction, mesenteric ischemia, hepatitis

The **amylase and lipase** can be elevated in a variety of other disorders including bowel obstruction or infarction, duodenal ulceration, pancreatic tumors, medications, DKA, HIV disease, celiac disease, and cholecystitis (see receiver-operator characteristics on back page)

Assessing Severity of Illness

- **Mild** acute pancreatitis represents inflammation without organ failure or local/systemic complications
- **Moderate** acute pancreatitis is characterized by organ failure that resolves within 48 hours or local/systemic complications (estimated **15%** will develop necrotizing pancreatitis; **5%** infected necrosis)
- **Severe** acute pancreatitis is characterized by persistent organ failure

Clinical judgment tends to **underestimate** severity (sensitivity 39%); the AGA recommends using a **scoring system**; a meta-analysis found Ranson's did not perform well; AGA recommends the **APACHE II using a cutoff > 8;** triage high risk pts to the ICU and get a CT — important monitoring criteria include vital signs, O_2 status, electrolyte and acid-base status, white count and HCT, age, and mentation.

⇒ Changes in **BUN** are best predictor of mortality; each rise of 5 in first 24hrs equates to a 2.2 odds ratio increase in mortality — *Wu, Gastroenterology, 2009*

⇒ Follow serial **Hct** q 6 hrs; if increasing or > 44%, hydrate vigorously — *Brown, Pancreas, 2000*

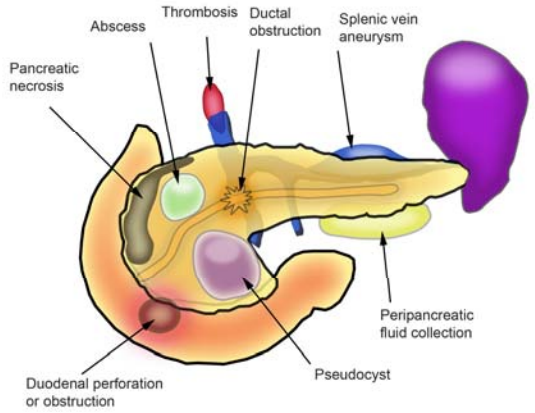
Determination of Precipitant

- **Gallstones** account for an estimated 40% and **alcohol** an estimated 30-40% of cases. For this reason, one should **look at LFTs** and strongly **consider an US** for workup (an ALT level > 150 IU/L has a PPV for gallstone pancreatitis of 95%).
- Other relatively common causes include **hypertriglyceridemia**, **hypercalcemia**, and **medications** including **cannabis**, enalapril, furosemide, metronidazole, pravastatin, simvastatin, valproate, TMP-SMX, and omeprazole.
- If **recurrent pancreatitis** and no evidence of gallstones or EtOHism, consider **anatomic abnormalities or microlithiasis** (an indication for cholecystectomy)
- ERCP is NOT done acutely unless the patient has **cholangitis and sepsis**; it may be indicated in the acute setting if **1)** the patient has worsening liver chemistry test in the setting of clinical instability or **2)** documented ascending cholangitis; you may perform AFTER acute period to exclude or treat any common duct stones when duct obstruction is suspected

Toxic	Metabolic	Obstructive	Autoimmune	Trauma	Infectious
Alcohol Medications Marijuana	Hypercalcemia Triglycerides Cystic fibrosis	Gallstones Cancer Ampullary stenosis Ductal stricture Divisum	Autoimmune pancreatitis Sjogrens Vasculitis	Blunt force ERCP Ischemia Atheroembolism	Viral (HBV,HIV) *Bacterial (Legionella)* Parasites (Ascaris)

Considering Complications

- **Acute fluid collections** appear in up to 50% of pts w/i 48h of pain onset; they usually resolve
- **Necrotic pancreas** occurs in 1-2w, and eventually may require drainage, but is best **managed medically** in the first 2-3w — it is typically identified using contrast enhanced CT; there is no role for prophylactic abx in necrosis without documented infx
- **Infected pancreatic necrosis** usually **requires surgery** within 2 weeks of episode; diagnose with CT-guided aspiration with culture; obtain a surgical consult for surgical debridement
- **Pseudocyst** develops in 2-4 weeks; a size > 5cm is unlikely to resolve and may require drainage; follow with imaging and engage surgery for enlarging pseudocyst
- **Abscesses** tend to occur 4-6 weeks after acute episode and are diagnosed with CT-guided aspiration



Decisions on Imaging

- **Imaging has two main roles**: 1) secure a diagnosis when the diagnosis is in question, 2) survey for complications
- Imaging is **NOT** needed for diagnosis if the clinical picture is consistent and enzymes are > 3x ULN
- ***Get imaging if 1) the diagnosis is in question, 2) the enzymes are not sufficiently elevated, 3) clinical evidence of severe disease, or 4) failure to improve or clinical deterioration***
- If imaging is required, contrast enhanced abd CT is preferred; consider an abdominal MRI without gadolinium if there is a contrast allergy or renal failure; the CT is **best obtained on the second or third day** of admission to distinguishing interstitial from necrotizing pancreatitis
- All patients with a **first attack** should have at least an **abdominal US** to search for signs of biliary tract obstruction

Fluids and Nutrition

- Patients should be **NPO** at admission; the criteria for resumption of oral feeds include 1) presence of bowel sounds and passing flatus, 2) not requiring narcotics, 3) expressing hunger
- For **mild pancreatitis**, orals are usually restored in 3-7 days and nutritional support is **NOT** required
- In **severe pancreatitis**, nutritional support should be initiated if it appears the patient will not eat for several weeks; enteral feeds have been shown to be superior to TPN in maintaining nutrition
- Studies indicate **nasojejunal feedings** are superior for nutritional support; they should be started as soon as feasible in patients that do not show signs of improvement within 72-96 hrs.
- Aggressive fluid resuscitation is critical to prevent organ failure since the pancreas can sequester a significant amount of fluid