Objectives

- Introduce the revised Atlanta Classification
- Review the definitions, classifications of acute pancreatitis
- Review latest prediction models, labs for disease severity
- Review the latest recommendations on imaging
- Review the current recommendations for fluid resuscitation
- Differentiate acute peri-pancreatic fluid collections (APFC), pancreatic pseudocyst, acute necrotic collection (ANC) and walled-off necrosis (WON)
- Discuss the ideal management for these collections
Original Article

Classification of acute pancreatitis—2012: revision of the Atlanta classification and definitions by international consensus

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Acute Pancreatitis Classification Working Group

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Acute Pancreatitis

Definition of Acute Pancreatitis

- 2 of 3 features
  1. Abdominal pain
  2. Elevated Lipase
  3. Imaging consistent with pancreatitis

Acute Pancreatitis

Onset of Pancreatitis

- Start of abdominal pain.
- NOT date of admission.
Acute Pancreatitis

Phases of Acute Pancreatitis

- **Early:** 1-2 weeks
  - Transient < 48hrs
  - Persistent > 48hrs
- **Late:** > 2 weeks
  - Exists only in patients with moderate and severe pancreatitis.

Acute Pancreatitis

**Types of Acute Pancreatitis**

1. Interstitial pancreatitis
2. Necrotizing pancreatitis
3. Infected pancreatic necrosis
Acute Pancreatitis

Types of Acute Pancreatitis

- Interstitial pancreatitis

![Interstitial pancreatitis image](image1.png)

**Figure 1** A 63-year-old man with acute interstitial oedematous pancreatitis. There is peripancreatic fat stranding (arrows) without an acute peripancreatic fluid collection; the pancreas enhances completely but has a heterogeneous appearance due to oedema.

Acute Pancreatitis

Types of Acute Pancreatitis

- Necrotizing pancreatitis

![Necrotizing pancreatitis image](image2.png)

5-10% of patients
Acute Pancreatitis

Types of Acute Pancreatitis

- Infected pancreatic necrosis

Figure 6 A 47-year-old man with acute necrotising pancreatitis complicated by infected pancreatic necrosis. There is a heterogeneous, acute necrotic collection (ANC) in the pancreatic and peripancreatic area (white arrows pointing at the borders of the ANC) with presence of gas bubbles (white arrowheads), usually a pathognomonic sign of infection of the necrosis (infected necrosis).

Acute Pancreatitis

Severity of Acute Pancreatitis

Table 3. Definitions of severity in acute pancreatitis: comparison of Atlanta and recent revision

<table>
<thead>
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<tbody>
<tr>
<td>Mild acute pancreatitis</td>
<td>Mild acute pancreatitis</td>
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<tr>
<td>Absence of organ failure</td>
<td>Absence of organ failure</td>
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<td>Absence of local complications</td>
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Severe acute pancreatitis

1. Local complications AND/OR
2. Organ failure

GI bleeding (>500 cc/24 h)  Severe acute pancreatitis
Shock – SBP < 90 mm Hg Persistent organ failure > 48 h
PaO2 < 60% 
Creatinine ≥ 2 mg/dl

GI, gastrointestinal; SBP, systolic blood pressure.
*Persistent organ failure is now defined by a Modified Marshall Score (6,8)

Am J Gastroenterol 2013;108:1439–1445; doi:10.1038/ajg.2013.216; published online 30 July 2013
Acute Pancreatitis: Imaging Utilization Practices in an Urban Teaching Hospital—Analysis of Trends with Assessment of Independent Predictors in Correlation with Patient Outcomes


Wake Forest Baptist Medical Center

- Data from 177 U.S. Hospitals and > 17,000 cases of acute pancreatitis
- Either an elevated BUN on admission or early rise in BUN was predictive of increased mortality
- Persistent systemic inflammatory response syndrome (SIRS) lasting > 48 hrs. is associated with increased risk of necrosis, multi organ failure, and death
Association of SIRS with severity


Fluid Resuscitation

American College of Gastroenterology Guideline: Management of Acute Pancreatitis

Recommendations
1. Aggressive hydration, defined as 250–500 ml per hour of isotonic crystalloid solution should be provided to all patients, unless cardiovascular, renal, or other related comorbid factors exist. Early aggressive intravenous hydration is most beneficial during the first 12–24h, and may have little benefit beyond this time period (strong recommendation, moderate quality of evidence).
2. In a patient with severe volume depletion, manifest as hypotension and tachycardia, more rapid repletion (bolus) may be needed (conditional recommendation, moderate quality of evidence).
3. Lactated Ringer's solution may be the preferred isotonic crystalloid replacement fluid (conditional recommendation, moderate quality of evidence).
4. Fluid requirements should be reassessed at frequent intervals within 6 h of admission and for the next 24–48 h. The goal of aggressive hydration should be to decrease the BUN (strong recommendation, moderate quality of evidence).

Figure 3. Impact of resuscitation strategy and fluid type on prevalence of SIRS at enrollment and 24 hours after randomization. GDF, goal-directed resuscitation; STD, standard resuscitation. respectively, \( P = .02 \). CONCLUSIONS: Patients with acute pancreatitis who were resuscitated with lactated Ringer's solution had reduced systemic inflammation compared with those who received saline.
Acute Pancreatitis

Local and Systemic Complications

Local
- Acute peripancreatic fluid collections
- Pancreatic pseudocysts
- Acute necrotic collection
- Walled-off necrosis
- GOO
- CBD obstruction

Systemic
- Exacerbate existing condition, e.g. CAD
  NOT organ failure

Acute Pancreatitis

Definition of Pancreatic Collections

- Acute peripancreatic fluid collection (APFC)
- Pancreatic pseudocyst
- Acute necrotic collection (ANC)
- Walled-off necrosis (WON)
Acute Pancreatitis

Definition of Pancreatic Collections

- Acute peripancreatic fluid collection (APFC)
  - Arises in acute interstitial edematous pancreatitis, < 4 weeks

- Pancreatic pseudocyst
  - Arising from acute interstitial pancreatitis BUT > 4 weeks

Figure 7 A 40-year-old man with two pseudocysts in the lesser sac 6 weeks after an episode of acute interstitial pancreatitis on CT (A, B). Note the round to oval, low-attenuated, homogeneous fluid collections with a well-defined enhancing rim (white arrows pointing at the borders of the pseudocyst), but absence of areas of greater attenuation indicative of non-liquid components. White stars denote normal enhancing pancreas.
Acute Pancreatitis

Definition of Pancreatic Collections

- Acute necrotic collection (ANC)
  - Collection with fluid and/or necrotic tissue before 4 weeks

- Walled-off necrosis (WON)
  - Collection of liquid or solid necrotic tissue > 4 weeks
Authors' conclusions

- In patients with acute pancreatitis, enteral nutrition significantly reduced mortality, multiple organ failure, systemic infections, and the need for operative interventions compared to those who received TPN. In addition, there was a trend towards a reduction in length of hospital stay.
- These data suggest that EN should be considered the standard of care for patients with acute pancreatitis requiring nutritional support.

A step-up approach or open necrosectomy for necrotizing pancreatitis

A conservative and minimally invasive approach to necrotizing pancreatitis improves outcomes

Conclusions

- Increased clarity regarding nomenclature of acute pancreatitis—revised Atlanta Classification
- Alternate indices for assessing disease severity
- Obtain a clearer approach for fluid resuscitation
- Distinguish pancreatic fluid collections
- The role of IV antibiotics, nutrition and surgery for optimal management