

# Chapter 34

## Approach to Acute and Chronic Pancreatitis in the ICU



### 34.1 Introduction

Acute pancreatitis (AP) is an inflammatory condition that varies in severity, from mild cases with rapid recovery to severe forms leading to necrosis, infection, and multi-organ failure. Chronic pancreatitis (CP), on the other hand, is a long-standing inflammation that results in fibrosis and the irreversible loss of pancreatic function, often requiring a different management strategy. Early intervention, appropriate diagnosis, and treatment in the ICU are essential to minimize morbidity and mortality. This chapter provides a structured, evidence-based approach for managing both acute and chronic pancreatitis, with an emphasis on ICU-level care and chronic management [1] [Ref: Algorithm 34.1].

### 34.2 Acute Pancreatitis Management

#### 34.2.1 Initial Assessment and Diagnosis

**Diagnostic Criteria:** Acute pancreatitis is diagnosed based on **at least two** of the following criteria:

- Abdominal pain consistent with AP.
- Serum amylase or lipase levels elevated more than three times the upper limit of normal.
- Characteristic findings on imaging (CT or MRI). Ultrasonography may be used in resource limited settings or unstable patients.

**Severity Assessment:** The Revised Atlanta classification is used to classify AP into mild, moderately severe, or severe, based on the presence of organ failure and complications such as necrosis.

Mild: No organ failure. No local or systemic complications.

Moderately Severe: Transient organ failure (resolves within 48 h) and/or local or systemic complications without persistent organ failure.

Severe: Persistent organ failure—single/multiple ( $> 48$  h) and often associated with local complications.

- Scoring Systems: Utilize BISAP, APACHE II, and Modified Marshall Score to assess severity. A BISAP score  $\geq 3$  indicates a high risk for severe AP, while the Modified Marshall assesses organ dysfunction [1].

Types of pancreatitis	
Interstitial edematous pancreatitis	<b>&lt; 4 weeks</b>
	<b><i>Acute pancreatic fluid collection</i></b>
	Sterile (< 2 weeks)
	Infected (> 2 weeks)
	<b>&gt;4 weeks</b>
	<b><i>Pancreatic pseudocyst</i></b>
	Sterile (< 2 weeks)
	Infected (> 2 weeks)
Necrotizing pancreatitis	<b>&lt; 4 weeks</b>
	<b><i>Acute necrotizing collection</i></b>
	Sterile (< 2 weeks)
	Infected (> 2 weeks)
	<b>&gt;4 weeks</b>
	<b><i>Walled off necrosis (WON)</i></b>
	Sterile (< 2 weeks)
	Infected (> 2 weeks)

Etiology of AP:

Most common causes: Gallstones (40–70%) and alcohol (25–35%).

Other causes:

Medications—mercaptopurine, azathioprine, didanosine, valproic acid.

Infections—CMV, HIV, coxsackie, mumps.

Metabolic causes—hypercalcemia and hypertriglyceridemia.

### 34.2.2 Initial Stabilization and Supportive Care

Fluid Resuscitation:

- Initial Dose: Start with Lactated Ringer's solution at 250–500 mL/hour for the first 12–24 h.

- Monitoring: Adjust fluid administration based on hemodynamic parameters such as urine output  $\geq 0.5$  mL/kg/hour and mean arterial pressure (MAP)  $\geq 65$  mmHg. Frequent reassessment (every 6–12 h) is essential to avoid complications like abdominal compartment syndrome (ACS).

#### Pain Management:

- Analgesics: Use opioids like morphine, with careful monitoring to avoid respiratory depression. Adjunctive NSAIDs may be added to reduce opioid requirements.

#### Nutritional Support:

- Enteral Feeding: Start within 48 h to prevent gut barrier dysfunction and reduce infection risk. Oral feeding should be encouraged. If the patient is unable to tolerate oral feeds, nasogastric (NG) feeds can be initiated. However, on failure of both the above modalities, the nasojejunal route may be tried. Initial caloric goals are 20–25 kcal/kg/day, progressing as tolerated.
- Parenteral Nutrition: Reserved for cases where enteral feeding is not possible [2].

#### Role of ERCP:

In case of cholangitis or progressive cholestasis (rising bilirubin  $>3$ –5 mg/dL in the setting of severe or moderately severe AP), early ERCP within 24 h is indicated.

### ***34.2.3 Ongoing Monitoring and Complication Management***

#### Monitoring Clinical Response:

- Evaluate clinical response every 48–72 h through clinical, laboratory, and radiological markers. Persistent organ failure or clinical deterioration warrants imaging (CT or MRI) to assess for necrosis or complications.

### ***34.2.4 Management of Necrosis and Infection***

Management of necrosis and infection in acute pancreatitis is complex, requiring a strategic approach that minimizes invasiveness, limits infection risk, and supports optimal recovery.

#### **Necrosis**

##### Sterile vs. Infected Necrosis:

- Sterile Necrosis: In cases of sterile necrosis, conservative management is preferred, as sterile necrotic tissue does not generally benefit from invasive

procedures. Most patients with sterile necrosis improve with supportive care alone, including fluid resuscitation, nutritional support, and pain management.

- **Infected Necrosis:** When infection of necrotic pancreatic tissue occurs, it significantly increases the risk of morbidity and mortality. Infection is suspected when clinical signs worsen (fever, increased WBC count, persistent organ dysfunction) and can be confirmed by imaging (air in the necrotic tissue on CT) or fine-needle aspiration (FNA) if there is uncertainty [3].

### Step-Up Approach

The step-up approach begins with the least invasive options, typically starting with percutaneous or endoscopic drainage for infected necrosis. This strategy reduces the need for open surgical intervention, thereby decreasing the risk of complications.

- **Percutaneous Drainage:** Image-guided percutaneous drainage is often the first step. This minimally invasive technique allows for effective drainage of infected collections with relatively low risk.
- **Endoscopic Drainage:** If percutaneous drainage is insufficient, endoscopic drainage is considered. Drainage is typically performed via a transgastric or transduodenal route, allowing access to peripancreatic collections without open surgery. This is especially useful for walled-off necrosis (WON), a mature collection with a well-defined capsule that develops 4 weeks or more after onset.
- **Surgical Intervention:** Surgical necrosectomy is reserved for cases where percutaneous and endoscopic drainage are unsuccessful, or in patients with large, complex necrotic areas that cannot be managed through minimally invasive methods. Delaying surgery until 4 weeks after onset is recommended to allow for encapsulation of necrotic tissue, which makes debridement safer and more effective.

### Antibiotics

- **Prophylactic Use:** Prophylactic antibiotics for sterile necrosis are not recommended, as they do not improve outcomes and can contribute to antibiotic resistance. Antibiotic therapy should be withheld unless infection is suspected or confirmed.
- **Indications for Antibiotics:** Antibiotics are reserved for confirmed infected necrosis. Empirical broad-spectrum antibiotics may be started when infection is strongly suspected, with adjustments based on culture results. Agents with good tissue penetration, such as carbapenems, fluoroquinolones, or metronidazole, are preferred for treating infected necrosis.

### Endoscopic Management

Endoscopic Ultrasound (EUS)-Guided Drainage for Walled-Off Necrosis:

- **Indications:** In patients with walled-off necrosis (WON), EUS-guided drainage has become the preferred approach due to its minimally invasive nature and effectiveness in accessing peripancreatic fluid collections. WON is typically mature and well-defined, with a fibrotic wall that allows safe drainage through endoscopic means.

- Procedure: EUS-guided drainage involves placing stents through the stomach or duodenum into the necrotic cavity. Self-expanding metal stents (LAMS) are often used, as they provide larger drainage channels compared to plastic stents, facilitating drainage and enabling direct endoscopic necrosectomy if required.
- Endoscopic Ultrasound (EUS)-Guided Drainage of pancreatic pseudocyst: Only if symptomatic.
- Direct Endoscopic Necrosectomy (DEN): If initial drainage is inadequate or if residual necrotic material remains, DEN can be performed through the previously placed stents. This technique allows for repeated debridement sessions without open surgery, which is beneficial for patients at high surgical risk [4].

### 34.3 Chronic Pancreatitis Management

#### 34.3.1 Overview of Chronic Pancreatitis (CP)

Chronic pancreatitis (CP) is characterized by long-standing inflammation leading to irreversible fibrosis and functional impairment of the pancreas. It often presents with recurrent episodes of abdominal pain, exocrine insufficiency, and endocrine dysfunction (e.g., diabetes). CP management focuses on symptom control and preventing disease progression [5].

#### 34.3.2 Diagnosis and Assessment

- Diagnosis: CP is diagnosed based on clinical presentation, imaging (CT, MRI, or EUS), and pancreatic function tests. It is important to differentiate CP from acute relapses of pancreatitis.
- Assessment Tools: Use imaging techniques like endoscopic ultrasonography (EUS) or CT scans to assess the degree of fibrosis and ductal abnormalities. Functional tests like fecal elastase can help assess exocrine insufficiency.

#### 34.3.3 Treatment of Chronic Pancreatitis

##### Pain Management:

- Analgesia: Chronic pain in CP may require a multimodal approach, including opioids (e.g., morphine) and adjuncts like NSAIDs or tricyclic antidepressants for neuropathic pain.
- Endoscopic Treatment: Endoscopic interventions like EUS-guided drainage of pseudocysts or stenting of strictures can be useful for pain relief and management of complications.

### Nutritional Management:

- Pancreatic Enzyme Replacement Therapy (PERT): Patients with exocrine pancreatic insufficiency (EPI) should receive PERT with meals to aid digestion and prevent malnutrition.
- Nutritional Screening: Regular screening for malnutrition, osteoporosis, and diabetes is recommended due to the high prevalence of these conditions in CP patients [5].

## 34.4 Multidisciplinary and Step-Up Approaches in Pancreatitis

Effective management of pancreatitis, particularly in severe cases or those with complications, benefits significantly from a multidisciplinary approach that incorporates early intervention, cross-specialty collaboration, and evidence-based bundled care protocols. This structured approach improves patient outcomes by coordinating timely interventions and comprehensive support.

### Pancreatitis Bundles

- Overview: The Japanese guidelines emphasize the importance of a bundled care approach for severe acute pancreatitis, integrating key interventions like fluid resuscitation, pain management, and early nutritional support. The goal of these “Pancreatitis Bundles” is to standardize care in a way that minimizes complications and improves overall prognosis [6, 7].

### Components

- *Fluid Resuscitation:* Start with controlled, isotonic fluid administration (e.g., Lactated Ringer's), monitoring closely to avoid under- or over-resuscitation. Adjust fluid rates based on parameters such as urine output, blood pressure, and hematocrit levels to maintain organ perfusion without risking complications like abdominal compartment syndrome.
- *Pain Control:* Effective pain management is essential to minimize patient distress and prevent respiratory complications from shallow breathing due to pain. Opioids are typically used, though carefully titrated, with adjunctive medications like NSAIDs if appropriate.
- *Early Enteral Nutrition:* Initiate enteral feeding within 48 hours to preserve gut integrity and prevent bacterial translocation. This component of the bundle is particularly emphasized in Japanese guidelines as it supports immune function and reduces infection risk. Nasogastric or nasojejunal feeding is preferred over parenteral nutrition, except in cases where enteral routes are contraindicated.
- *Outcome Improvement:* Implementing pancreatitis bundles has been associated with reduced mortality and shorter ICU stays by proactively addressing the fac-

tors that lead to complications in severe acute pancreatitis. Studies indicate that following these protocols can also reduce the need for intensive interventions by controlling inflammation and maintaining physiological stability early in the disease course.

### Multidisciplinary Management

- Rationale: Given the complexity and variability in the progression of pancreatitis, particularly in cases involving necrosis, strictures, or pseudocysts, a multidisciplinary approach ensures that all potential complications are managed effectively. Complex cases often require expertise across gastroenterology, surgery, critical care, radiology, and nutrition.

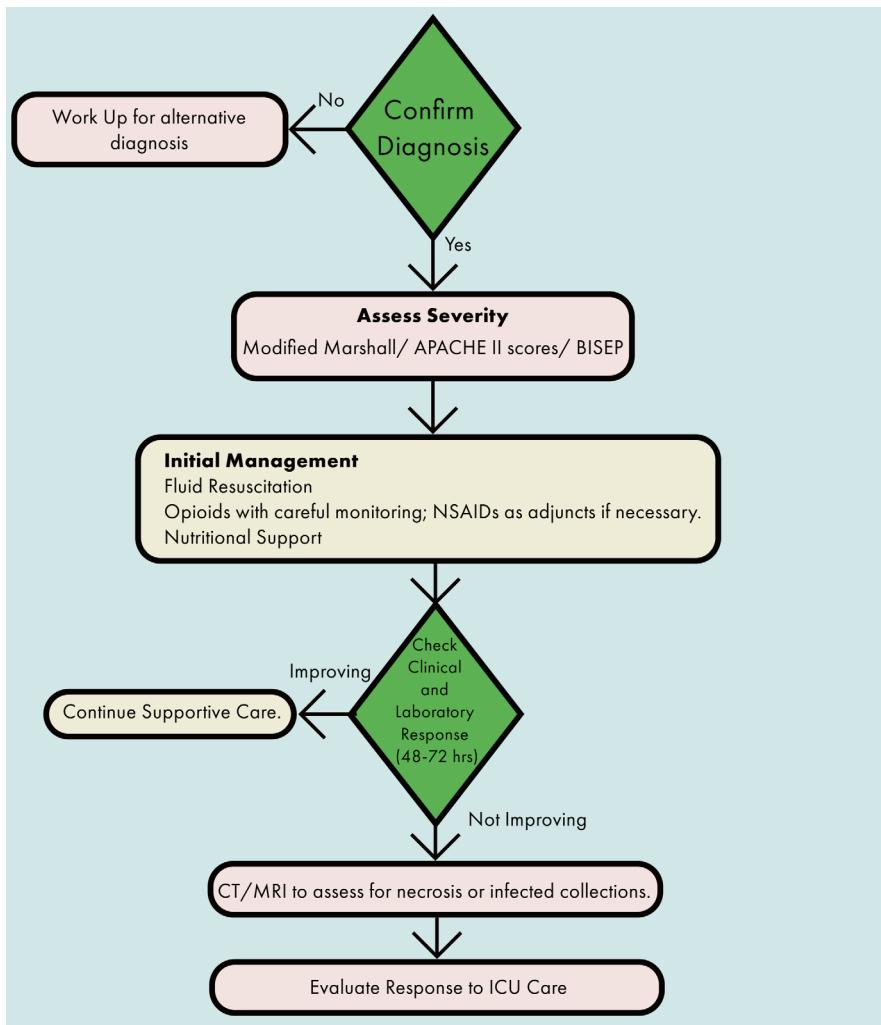
#### Specialist Involvement:

- Gastroenterologists: Provide expertise in diagnostic and therapeutic endoscopy, including ERCP for biliary pancreatitis and endoscopic drainage of pseudocysts or walled-off necrosis (WON). Gastroenterologists play a central role in early intervention, particularly with minimally invasive procedures.
- Surgeons: Reserved for cases where invasive intervention is unavoidable, such as when percutaneous or endoscopic drainage fails in infected necrosis. Surgeons are also involved in necrosectomy, either minimally invasive or open, particularly if the patient has developed complications that cannot be managed nonsurgically.
- Radiologists: Essential for diagnostic imaging, including contrast-enhanced CT or MRI, to guide decisions on the timing and type of intervention for necrotic or infected pancreatic collections. Interventional radiologists can perform percutaneous drainage, which is often the first step in the step-up approach to managing infected necrosis.
- Critical Care Specialists: Oversee the hemodynamic and respiratory support of patients with severe acute pancreatitis in the ICU. This includes monitoring for complications like systemic inflammatory response syndrome (SIRS) and managing any organ dysfunction.
- Nutritionists: Essential for managing malnutrition risk, particularly in patients with severe or chronic pancreatitis. Nutritionists guide the implementation of early enteral feeding and adjust caloric and macronutrient intake to meet patient needs and prevent complications like infection and prolonged recovery time.
- Collaborative Case Reviews: Regular, collaborative reviews of complex cases (e.g., severe acute pancreatitis with necrosis) enable a team-based approach to decision-making. This is particularly beneficial for optimizing the timing of invasive interventions and ensuring that all treatment avenues are considered before resorting to more invasive options [8].

### 34.5 Conclusion

The management of acute and chronic pancreatitis in the ICU requires a structured and multidisciplinary approach. Fluid resuscitation, pain management, and early nutritional support are cornerstones of care in acute pancreatitis, while chronic pancreatitis treatment focuses on symptom relief, nutritional support, and preventing complications. Close monitoring, the use of minimally invasive techniques for necrosis, and a focus on multidisciplinary team-based care are essential to improving patient outcomes.

**Algorithm 34.1: Approach to acute and chronic pancreatitis in the ICU**



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