**Pancreatitis, Acute**

**Description/Etiology**

Acute pancreatitis (AP) is a rapidly developing, potentially fatal inflammatory disorder of the pancreas with variable involvement of other organ systems. AP occurs when pancreatic enzymes are prematurely activated, leak into surrounding tissue, and begin the digestive process before reaching the intestines. The clinical course of AP varies widely among patients; AP can be a one-time occurrence, a relapsing condition, or an exacerbation of chronic pancreatitis.

Diagnosis of AP is made based on the presence of at least two of the three following findings: clinical presentation of severe abdominal pain, laboratory test results showing at least three times the normal level of amylase and/or lipase, and imaging study results that indicate AP. Early staging of AP severity (e.g., using prognostic scoring systems such as the Atlanta Classification System, Ranson criteria, or APACHE II guidelines) is important to minimize progression of AP. Mild AP is characterized by a swollen pancreas and minimal exudate into the surrounding retroperitoneal structures that typically resolve within a few days. Severe AP is characterized by systemic circulation of toxins that cause progressive development of bleeding, pancreatic necrosis, and early complications (e.g., visual disturbances, metabolic disturbances, changes in mental status, acute fluid collections, renal failure, cardiovascular collapse, respiratory failure). Complications that can occur later in the disease course include pseudocyst, perforation, obstruction, fistulization, abscess, infected necrosis, and sepsis.

Treatment of mild AP involves supportive care (e.g., fluid replacement, pain management) and treatment of severe AP involves intensive monitoring, complication management, and surgical intervention. Aggressive hydration is the most important and effective intervention for early restoration of all systems. Nutritional support is generally not needed for patients with mild AP but should be initiated early during treatment for patients with severe AP. Enteral nutrition is preferred, but parenteral nutrition is required if the patient’s caloric needs are not met with enteral feedings. Antibiotic prophylaxis is generally reserved for patients with evidence of infection (e.g., pancreatic abscess, sepsis) or pancreatitis caused by biliary calculi. In some cases, percutaneous catheter drainage is performed to delay or avoid surgery.

**Facts and Figures**

There is significant geographic variation in the incidence of AP; worldwide, annual rates are 5–80 cases per 100,000 population. In the U.S., the incidence of AP is about 40 cases per 100,000 adults and more than 220,000 adults are hospitalized for AP each year. AP affects an estimated 4–13 per 100,000 children each year. The incidence of AP is increasing in both adults and children, possibly due to the rising incidence of obesity, which is a risk factor for the development of gallstones. Incidence is higher in men and the hospitalization rate is three times higher in blacks than in whites. The median age at onset of AP varies by etiology as follows: 39 years of age for alcohol-related AP, 69 years of age for biliary-tract-related AP, 66 years of age for trauma-related AP, 31 years of age for AIDS-related AP, 36 years for vasculitis-related AP, and 42 years of age for drug-induced AP. About 80–85% of cases of AP are classified as mild and the other 15–20% meet the criteria for severe AP. Infection develops in 40–70% patients with pancreatic necrosis. The overall mortality rate is 10–15%; in patients with severe AP, the mortality rate is ~30%.
Risk Factors

Although the specific enzyme-triggering agent for AP is unknown, several conditions and factors are related to AP development. Gallstones (40–70%) and alcohol abuse (25–35%) account for most cases of AP. Iatrogenic causes of AP include endoscopic retrograde cholangiopancreatography (ERCP), cardiopulmonary bypass, and pancreas, stomach, and biliary tract surgery; AP can also occur due to abdominal trauma, obesity, infection (e.g., mumps, hepatitis, Coxsackie-B, HIV infection/AIDS, mycoplasma, salmonellosis, toxoplasmosis), certain medications (e.g., thiazides, corticosteroids, azaTHIOprine, pentamidine, estrogen), vasculitis, hypertriglyceridemia, hypercalcemia, congenital malformations, and peritoneal dialysis. AP is a rare, but well-recognized complication of liver transplantation, occurring in 3–8% of patients with a mortality rate of 38–63%.

Signs and Symptoms/Clinical Presentation

Presentation of AP varies, but the patient is usually dehydrated and in distress. Almost all patients have abrupt onset of severe abdominal pain that remains constant and might radiate to the back. Lying supine or walking usually increases the pain, whereas sitting and leaning forward usually decreases the pain. Confusion, nausea, and vomiting can occur. Other signs and symptoms can include fever, weakness, sweating, jaundice, ileus, abdominal ecchymosis, tachycardia, hypotension, anxiety, and shock.

Assessment

› Patient History
  • Ask about onset of manifestations and take a complete medical history
  • Assess risk factors for AP

› Laboratory Tests
  • Pancreatic enzymes show variable increases
    – Serum amylase levels that are elevated within 12 hours of AP onset that normalize in 48–72 hours indicate AP. Urine amylase levels in AP show significant elevation several days after onset of signs and symptoms
    - An amylase/creatinine clearance ratio ≥ 5% provides the definitive diagnosis for AP
    – Serum lipase levels increase to 5–10 times the normal value 24–48 hours after PA onset and remain elevated for approximately 7 days
  • AP commonly causes an abnormal elevation in
    – WBC count, hematocrit, and BUN
    – triglycerides and serum electrolytes (e.g., potassium, sodium)
    – C-reactive protein; ≥ 10 mg/dL at 48 hours after onset indicates severe AP
    – liver profile (e.g., aspartate aminotransferase [AST], lactate dehydrogenase [LDH], bilirubin, alkaline phosphatase, alanine aminotransferase [ALT])

› Other Diagnostic Tests/Studies
  • Abdominal X-ray can show signs of ileus, dilation of transverse colon, calcified gallstones, or conditions that mimic pancreatitis
  • Chest X-ray can show pleural effusion, diaphragm elevation, and atelectasis
  • Ultrasound can identify gallstones, pancreatic enlargement, and pseudocysts
  • Endoscopic retrograde cholangiopancreatography (ERCP) can identify ductal deformity, strictures, and impacted stones, and can be performed to remove stones
    – Magnetic resonance cholangiopancreatography (MRCP) can be used to identify stones and visualize the anatomy of the pancreas and biliary tract. Although MRCP is not as sensitive as ERCP, it is safer, noninvasive, and fast
  • Contrast-enhanced CT scan can be performed to predict disease severity and prognosis
  • MRI can assist with staging of AP
    – Clinical manifestations of AP can usually lead to a diagnosis. CT scan and MRI of the pancreas should not be performed unless the diagnosis of AP has not been confirmed or the patient is not showing clinical improvement in response to treatment

Treatment Goals

› Limit AP Severity with Supportive Care and Promote Optimal Pancreatic Status
  • Assess patient status, assist with resuscitation in severe AP cases, and review laboratory/other diagnostic test results; administer prescribed treatment to promote patient stability and resolution of AP
• Assess for pain and administer prescribed analgesics. Assess comfort status frequently and monitor patient-controlled analgesia or administer prescribed opiates
• Rest the pancreas and maintain hemodynamic stability
  – Maintain NPO status; administer prescribed enteral (i.e., nasogastric [NG], nasojejunal) or parenteral feedings, as ordered
  – Maintain NG suction to resolve ileus and relieve vomiting
  – Provide frequent mouth and nasal care to maintain skin integrity
  – Infuse IV fluids, blood products, and vasoactive drugs, as ordered
  – Monitor blood pressure, urine output, and peripheral circulation
• Improve oxygenation and maintain metabolic balance
  – Maintain supplemental O₂ or mechanical ventilation, as ordered
  – Frequently assess pulmonary status and monitor ABGs
  – Encourage coughing and deep breathing, as ordered
  – Monitor laboratory values and EKG; replace metabolites, as ordered

Monitor for and Administer Treatment for Complications
• Administer prescribed antimicrobial drugs
• Frequently assess cardiac, pulmonary, renal, and metabolic status; examine stools for steatorrhea or diarrhea; observe sclera and skin for jaundice
• Follow pre- and post-surgical or special procedure protocols if patient becomes a candidate for surgery (e.g., resection of necrotic pancreas) or an invasive procedure (e.g., percutaneous catheter drainage)
  – Reinforce pre- and post-surgical/procedural education; verify completion of facility informed consent documents
• Monitor for withdrawal signs and symptoms in patients suspected or known to abuse substances
• Provide emotional support and education on disease process. Request referral to a social worker for substance abuse rehabilitation programs or local resources for convalescence assistance, if appropriate

Food for Thought
› Although ERCP itself is associated with increased risk of AP, it remains an important diagnostic and treatment tool
› The administration of probiotics to patients with AP is not beneficial and might cause harm
› Researchers who examined risk factors for AP in Taiwanese aboriginal and non-aboriginal patients found that aboriginal patients were more susceptible to alcohol-related AP and tended to experience a first episode of AP at a younger age (~39 years) than did non-aboriginal patients (~48 years). In addition, more female patients (61%) experienced AP in the aboriginal group than in the non-aboriginal group (27%) (Ho et al., 2018)
› Plasma glutamine levels are inversely correlated with severity of AP. The authors of a recent meta-analysis concluded that the administration of glutamine-enriched nutrition support in patients with severe AP is associated with a 38% reduced risk of infectious complications or mortality, and with an average reduction in the length of hospital stay by 3.9 days, without significantly increasing health care costs (Yong et al., 2016)

Red Flags
› Abdominal compartment syndrome is an uncommon and potentially deadly complication of AP
› In rare cases, AP is a presenting manifestation of pancreatic cancer

What Do I Need to Tell the Patient/Patient’s Family?
› Educate the patient to avoid substances that are known to cause AP (for details, see Risk Factors, above) and monitor for signs and symptoms that require immediate medical attention
› Emphasize the importance of continued medical surveillance

References


