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A Review on Acute Pancreatitis

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ABSTRACT:Acute pancreatitis (A.P) is a potentially life-threatening acute inflammatory disease of the pancreas. Characterized by a systemic inflammatory response, with a growing number of hospitalizations each year, and it is associated with mortality ranging from 3% to 30% in the world. Alcohol, smoking, diabetes, hypertension and gallstones are the major risk factors for acute pancreatitis. The presenting symptoms of acute pancreatitis are typically abdominal pain and elevated pancreatic enzymes.

KEYWORDS: Pancreatitis, risk factors, clinical characteristics, necrosis.

I. INTRODUCTION

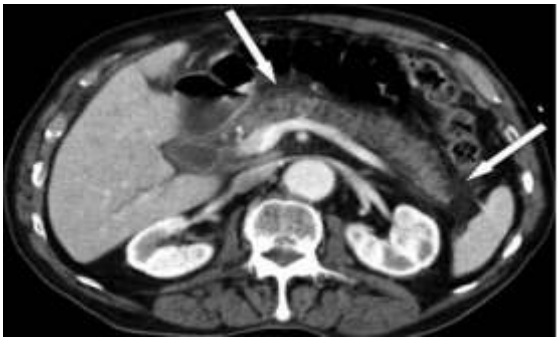
Acute pancreatitis is inflammation of the pancreas with variable involvement of peripancreatic tissues and/or distant organs. The pancreas is a gland that sits just behind the stomach(Figure A,B). It has two roles: 1) To secrete digestive juices into the small bowel to digest food and neutralize gastric acid secretion and 2) To release insulin to regulate the glucose levels in the blood. There are three types of cells: 1) acinar cells, which produce pancreatic digestive enzymes; 2) ductal cells lining pancreatic ducts, which secrete a watery fluid to carry the digestive enzymes into the intestine; and 3) endocrine cells present in the islets of Langerhans, which secrete insulin and other hormones(Figure C). Because acinar and ductal cells secrete into a duct this portion is called the exocrine pancreas. Pancreatic digestive enzymes are made as inactive precursors and carried to the small bowel where there are additional enzymatic processes that convert the inactive digestive enzymes to active ones that digest our food. When pancreatic enzymes are prematurely activated in thepancreas, they attack the pancreas itself instead ofdigesting food and cause pancreatitis.

CLASSIFICATIONOFACUTE PANCREATITIS

Acute pancreatitis can be subdivided into two types: interstitial oedematous pancreatitis and necrotizing pancreatitis.

Interstitial oedematous pancreatitis

The majority of patients with acute pancreatitis have diffuse (or occasionally localized) enlargement of the pancreas due to inflammatory edema. On CECT, the pancreatic parenchyma shows relatively homogeneous enhancement, and the peripancreatic fat usually shows some inflammatory changes of haziness or mild stranding. There may also be some peripancreatic fluid (figures C). The clinical symptoms of interstitial oedematous pancreatitis usually resolve within the first week.[1]



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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 heterogenous appearance due to edema

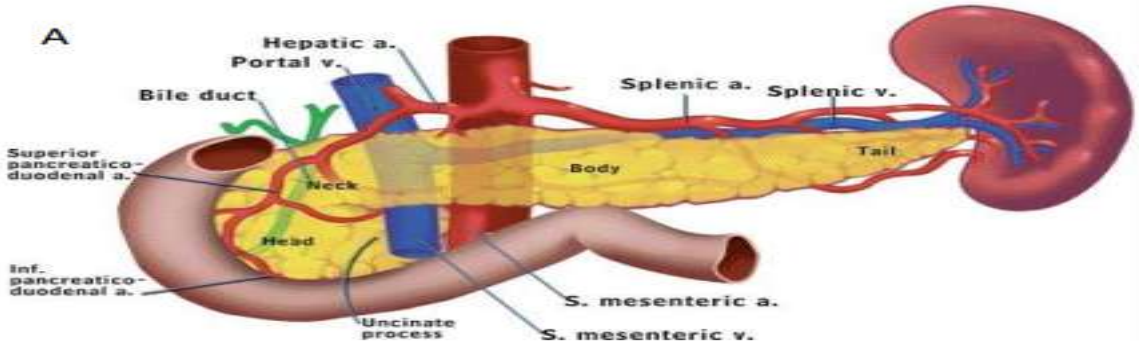

Figure A. An anatomical drawing showing the vascular supply of the pancreas.

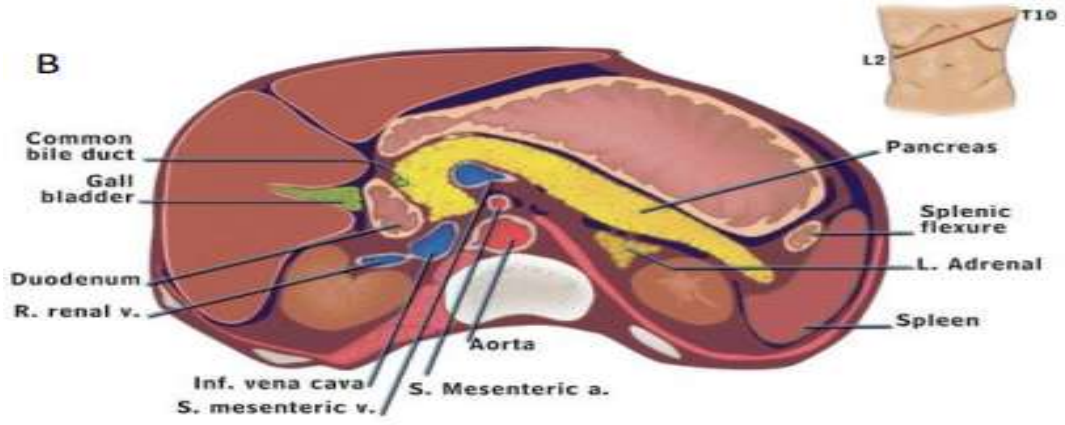

Figure B. A cross sectional image of the pancreas.

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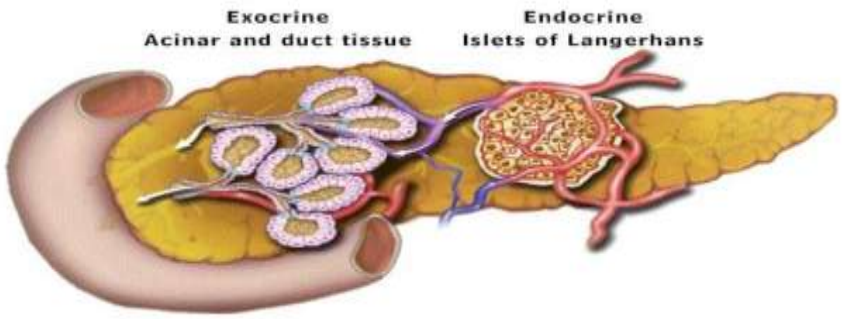

Figure C. Cells of the pancreas.

Necrotizing pancreatitis

About 5–10% of patients develop necrosis of the pancreatic parenchyma, the peripancreatic tissue or both. Necrotizing pancreatitis most commonly manifests as necrosis involving both the pancreas and peripancreatic tissues and less commonly as necrosis of only the peripancreatic tissue, and rarely of the pancreatic parenchyma alone. The impairment of pancreatic perfusion and signs of peripancreatic necrosis evolve over several days,which explains why an early CECT may underestimate the eventual extent of pancreatic and peripancreatic necrosis. In the first few days of the illness, the pattern of perfusion of the pancreatic parenchyma as seen on CECT may be patchy, with variable attenuation before the area of impaired enhancement becomes more demarcated and/or confluent. After the first week of the disease, a non-enhancing area of pancreatic parenchyma should be considered to be pancreatic parenchymal necrosis. In peripancreatic necrosis, the pancreas enhances normally on CECT as it does with interstitial oedematous pancreatitis, but the peripancreatic tissues develop necrosis. Patients with peripancreatic necrosis alone have increased morbidity and intervention rates compared to patients with interstitial oedematous pancreatitis.[2] The natural history of pancreatic and peripancreatic necrosis is variable, because it may remain solid or liquefy, remain sterile or become infected, persist, or disappear over time.

Infected pancreatic necrosis

Pancreatic and peripancreatic necrosis can remain sterile or become infected; most of the evidence suggests no absolute correlation between the extent of necrosis and the risk of infection and duration of symptoms. Infected necrosis is rare during the first week.

The diagnosis of infected pancreatic necrosis is important because of the need for antibiotic treatment and likely active intervention. The presence of infection can be presumed when there is extraluminal gas in the pancreatic and/or peripancreatic tissues on CECT or when percutaneous, image-guided, fine-needle aspiration (FNA) is positive for bacteria and/or fungi on Gram stain and culture.There may be a varying amount of suppuration (pus) associated with the infected pancreatic necrosis, and this suppuration tends to increase with time with liquefaction. The original Atlanta Classification proposed the term ‘pancreatic abscess’ to define a ‘localised collection of purulent material without significant necrotic material’. This finding is extremely uncommon, and because the term is confusing and has not been adopted widely, the term ‘pancreatic abscess’ is not used in the current classification.

The development of secondary infection in pancreatic necrosis is associated with increased morbidity and mortality.[2]

SEVERITY OF ACUTE PANCREATITIS

There are important reasons to define and stratify the severity of acute pancreatitis. First, on admission, it is important to identify patients with potentially severe acute pancreatitis who require aggressive early treatment. Second, in a secondary care setting, clinicians need to identify such patients for possible transfer to specialist care. Third, for specialists who receive such referrals, there are advantages to stratifying these patients into subgroups based on the presence of persistent organ failure and local or systemic complications. This classification defines three degrees of

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severity: mild acute pancreatitis, moderately severe acute pancreatitis, and severe acute pancreatitis.[4] Terminology that is important in this classification includes transient organ failure, persistent organ failure, and local or systemic complications. Transient organ failure is organ failure that is present for 48 h. Local complications include peripancreatic fluid collections and acute necrotic collections, while systemic complications can be related to exacerbations of underlying co-morbidities related to the acute pancreatitis.[1]

Mild acute pancreatitis

Mild acute pancreatitis is characterised by the absence of organ failure and the absence of local or systemic complications. Patients with mild acute pancreatitis will usually be discharged during the early phase. Patients with mild acute pancreatitis usually do not require pancreatic imaging, and mortality is very rare.[1]

Moderately severe acute pancreatitis

Moderately severe acute pancreatitis is characterised by the presence of transient organ failure or local or systemic complications in the absence of persistent organ failure. An example of a symptomatic local complication is a peripancreatic collection resulting in prolonged abdominal pain, leucocytosis and fever, or that prevents the ability to maintain nutrition orally. An example of a symptomatic systemic complication is exacerbation of coronary artery [disease] or chronic lung disease precipitated by the acute pancreatitis.

Grades of severity
➢ Mild acute pancreatitis • No organ failure • No local or systemic complications
➢ Moderately severe acute pancreatitis • Organ failure that resolves within 48hrs (transient organ failure) and/or • Local or systemic complications without persistent organ failure
➢ Severe acute pancreatitis • Persistent organ failure (>48hrs) 1. Single organ failure 2. Multiple organ failure

Moderately severe acute pancreatitis may resolve without intervention (as in transient organ failure or acute fluid collection) or it may require prolonged specialist care (as in extensive sterile necrosis without organ failure). Mortality of moderately severe acute pancreatitis is far less than that of severe acute pancreatitis.

Severe acute pancreatitis

Severe acute pancreatitis is characterized by persistent organ failure.[4,5] Organ failure that develops during the early phase is set in motion by the activation of cytokine cascades resulting in SIRS. When SIRS is present and persistent, there is an increased risk that pancreatitis will be complicated by persistent organ failure, and the patient should be treated as if they have severe acute pancreatitis. Persistent organ failure may be single or multiple organ failures. Patients with persistent organ failure usually have one or more local complications. Patients who develop persistent organ failure within the first few days of the disease are at increased risk of death.[6]

EPIDEMIOLOGY

The incidence of acute pancreatitis varies between 4.8 to 24.2 cases per 100,000 population, according to data from England, Denmark, and the United States This range may be inaccurate, as many cases may be missed. Death may occur in as

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many as 10% of patients.[7] The incidence of chronic pancreatitis has not been well studied. One reason for the lack of epidemiological data has been the difficulty in achieving a generalized consensus on the classification and diagnosis of chronic pancreatitis, making it difficult to compare between studies. Most estimates are based on studies from the 1980s and 1990s performed throughout Euro pean countries.[8]One study in the Czech Republic showed an incidence of 7.9 cases per 100,000 persons, which was found to be relatively similar to incidence rates reported in Denmark (8.7 cases per 100,000 persons) and Germany (7.0 cases per 100,000 persons).However, these rates were higher than those reported in Poland (4.0 cases per 100,000 persons) and Switzerland (1.6 cases per 100,000 persons). A more recent study in France showed a crude incidence rate between 5.86 and 7.74 cases per 100,000 persons, and a prevalence of 26.4 cases per 100,000 persons. Differences between European countries are likely due to differences in the amount of alcohol consumed within each region. Some patients experience recurrent acute pancreatitis, a condition that may be difficult to distinguish from early-stage chronic pancreatitis. The incidence of recurrent acute pancreatitis is not well defined but has been estimated to be up to 15% among patients who experienced a first acute pancreatitis attack.3 One study reported an incidence of recurrent acute pancreatitis of 10.9% in patients who experienced a first attack, with 6.4% going on to develop chronic pancreatitis.

CLINICAL SIGNS AND SYMPTOMS

- Abdominal pain,
- Pain radiating to the back,
- Anorexia,
- Fever,
- Nausea and vomiting,
- Decreased bowel sounds
- Abdominal guarding
- Shock
- Jaundice
- Hematemesis are frequent manifestations of acute pancreatitis.[9]

However, these features are not specific to acute pancreatitis, and when a patient presents with these manifestations, acute pancreatitis must be differentiated from other acute abdominal diseases. Acute pancreatitis accounts for 2% to 3% of all acute abdominal diseasesand in very few patients there is no abdominal pain. Acute pancreatitis is sometimes manifested by discoloration of the skin, such as Grey Turner's sign (on the lateral abdominal wall), Cullen's sign (around the navel), and Fox's sign (over the lower portion of the inguinal ligament). However, because these signs appear in only 3% of patients, and because they are also observed in patients with other diseasesand are often seen 48 to 72h after the onset of pancreatitis, their diagnostic significance is low.

ETIOLOGY

In the majority of cases, alcohol use, gallstones, and hypertriglyceridemia cause acute pancreatitis. The rate of occurrence of each etiology of acute pancreatitis varies across geographic regions and socioeconomic strata. Common aetiologies of acute pancreatitis are listed below.[10]

- Alcohol use
- Gallstones
- Hypertriglyceridemia
- Idiopathic
- Drug-induced pancreatitis
- Post-procedural (endoscopic retrograde cholangiopancreatography or abdominal surgery)
- Ampullary stenosis is formerly known as sphincter of Oddi dysfunction type I
- Autoimmune pancreatitis, type I (systemic IgG4 disease-related), and type II
- Viral infection (Coxsackie, Cytomegalovirus, Echovirus, Epstein-Barr virus, Hepatitis A/B/C, HIV, Mumps, Rubella, Varicella)
- Bacterial infection (Campylobacter jejuni, Legionella, Leptospirosis, Mycobacterium avium, Mycobacterium tuberculosis, Mycoplasma)
- Trauma
- Smoking
- Congenital anomalies (annular pancreas)
- Genetic disorders (hereditary pancreatitis, cystic fibrosis, alpha 1-antitrypsin deficiency)
- Hypercalcemia
- Parasitic infections (Ascaris lumbricoides, Cryptosporidium, Clonorchis sinensis, Microsporidia)
- Renal disease (Haemodialysis)
- Toxins (Scorpion bites, organophosphate poisoning)
- Vasculitis (Polyarteritis nodosa, Systemic lupus erythematosus).

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PATHOPHYSIOLOGY

There are many recognized causes of acute pancreatitis, but surely gallstones constitute the predominant etiological factor in our geographical area.[11] Less frequently, acute pancreatitis is related to chronic use or abuse of alcohol and even more rarely is secondary to abdominal surgery, diagnostic and/or interventional endoscopic procedures on the papilla of Vater, abdominal trauma, dyslipidaemia, or the use of drugs with pancreatic toxicity. The mechanisms by which the various etiological factors trigger pancreatic inflammation have not yet been fully identified but it seems proved with sufficient certainty that, whatever the initial pathogenic noxious stimuli, the earliest pathogenetic events are triggered inside the acinar cells. Under normal conditions these cells produce digestive enzymes and lysosomal enzymes, the former segregated in lysosomal vacuoles, the latter in the vacuoles of the zymogen. In acute pancreatitis, this strict compartmentalization can be overridden by the alteration of a complex biological process, calcium-dependent, defined as "stimulus-secretion coupling". A colocalization of lysosomes and zymogen granules in a unique vacuole is thus determined: the lysosomal enzyme cathepsin B can activate trypsinogen at this point with consequent cascade activation of other proteases and phospholipases. It follows the rupture of vacuoles, cell damage, necrosis and release of cellular-activated enzymes in the interstitium. Local processes of vasoconstriction-dilatation determine infiltration of inflammatory cells and increased necrosis. In the most severe forms of acute pancreatitis, it is presents a complex biochemical cellular and humoral response not substantially different from what happens in other serious diseases such as septic shock, poly-trauma and extensive burns. The magnitude and the continuation of such events, assignable to the so-called SIRS (systemic inflammatory response syndrome), affect the extent and severity of local damage and progression to systemic complications. Implicated mediators are various cytokines such as interleukin-1 (IL-1), IL-6, IL-8, TNF (tumour necrosis factor), PAF (platelet activating factor). All these mediators are markedly elevated in the first 24 hours of illness, whereas the anti-inflammatory cytokines to (IL-2, IL-10) are reduced. The result is the activation of neutrophils, monocytes, lymphocytes, platelets and endothelial cells. The increased expression of cell adhesion molecules and integrins on neutrophils results in increased adhesion to the endothelium, diapedesis and invasion of distant organs (first of all the lungs) where hyperactive neutrophils call forth other polymorphonuclear leukocytes and result in extensive tissue destruction. The presence of trypsin, chymotrypsin and elastase in the pancreatic interstitium, in serum and peritoneal fluid is responsible for activation of the coagulation-fibrinolysis systems, endothelial cells, PMN leukocytes and monocytes-macrophages with synthesis and release of cytokines, superoxide ions and PAF. The latter is a key mediator capable of stimulating the release of other proinflammatory cytokines, increase vascular permeability, induce a negative inotropic effect, leukocyte chemotaxis, tissue edema and cellular damage. It is possible to clearly appreciate the possibility of a serious involvement of distant organs up to the development of the "fearsome" multi-organ failure syndrome.

DIAGNOSIS:

Diagnosis and severity assessment of acute pancreatitis

Clinical diagnosis of acute pancreatitis is based on patient symptoms, physical examination, laboratory analysis, and radiological data. According to practice guidelines published in 2006, a diagnosis of acute pancreatitis requires two out of three main features: (a) abdominal pain typical for acute pancreatitis, (b) serum amylase and/or lipase greater than or equal to three times the upper normal limit; and (c) evidence of acute pancreatitis on computed tomography (CT) scans. Almost all patients with acute pancreatitis have acute upper abdominal pain at onset. The pain is usually severe and constant. The pain may be confined to the mid-epigastrium or may be diffuse throughout the abdomen. Approximately half of patients report pain that radiates to the back that may be relieved by sitting or leaning forward. Patients frequently experience nausea and vomiting as well. However, the differential diagnosis for patients presenting with these symptoms is broad and includes diagnoses ranging from biliary colic, gastric or duodenal ulcer perforation and bowel obstruction, to mesenteric ischemia, aortic aneurysm or dissection, and even inferior wall myocardial infarction. Physical signs and symptoms often depend on the severity of the attack. Systemic features include fever and tachycardia, and in severe cases, patients may be in shock. In mild disease, the epigastrium may be minimally tender on physical examination, whereas patients with

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severe pancreatitis may have abdominal distention, tenderness, and guarding. Jaundice can occur due to obstruction of the common bile duct secondary to choledocholithiasis or due to extrinsic compression of the common bile duct due to edema within the pancreas head. Laboratory analysis for work-up of patients with signs and symptoms of acute pancreatitis includes serum amylase and lipase levels, as well as a complete blood count, electrolytes, blood urea nitrogen (BUN), creatinine, liver function tests, and inflammatory markers, such as C reactive protein (CRP). In a recent retrospective analysis, the sensitivity and specificity for lipase levels in the diagnosis of acute pancreatitis were 96.6% and 99.4%, respectively. The sensitivity and specificity of amylase levels in diagnosing acute pancreatitis were 78.6% and 99.1%, respectively. An elevated serum amylase level is less specific as it can also occur in a number of other conditions aside from acute pancreatitis, including diseases of the salivary glands, cholecystitis, bowel obstruction or ischemia, and peptic ulcer disease. In addition, the longer half-life of lipase in comparison to amylase makes it a useful diagnostic measure in patients with delayed presentation in whom amylase levels may have already returned to normal. The level of pancreatic enzyme elevation does not correlate with the severity of the disease, and serial measurements should not be used as a tool to assess the prognosis or progress of acute pancreatitis. However, it has been noted that CRP levels >150 mg/dL at 48 hours help to differentiate between severe and mild disease.[12]

TREATMENT OPTIONS FOR ACUTE PANCREATITIS

Fasting and short-term intravenous feeding

Following the positive outcomes of several clinical studies, nutritional support is now considered a critical part of the treatment of patients with severe acute pancreatitis. The choice for administering nutritional support is between either enteral administration or total parenteral nutrition (TPN). One randomized comparative study reported that hypocaloric jejunal feeding was safer and less expensive than TPN among patients with acute pancreatitis. However, a randomized clinical study of the 2 feeding methods has not been conducted among patients diagnosed with severe acute pancreatitis. Several studies have shown that enteral nutritional support may be successfully administered either by a gastric or jejunal route.[13] A randomized trial that compared jejunal tube feeding versus oral feeding reported that while both methods were beneficial, jejunal tube feeding was associated with a lower incidence of pain, most likely due to increased pancreatic stimulation following gastric feeding. A separate study showed that enteral feeding delivered via the mid-distal jejunum did not result in pancreatic stimulation, suggesting that this method would be preferred over the gastric route. Administration of enteral nutrition formula via a nasogastric tube was found to be feasible and well tolerated in one study that included 26 patients with severe acute pancreatitis, although the good results in this study have not been easy to confirm. A randomized study of 50 patients with severe acute pancreatitis showed that nasogastric feeding resulted in improved control of blood glucose levels, although these patients also experienced a higher number of complications. Standard enteral formula is effective in this setting, and specialized formulas are unnecessary. Recent studies comparing enteral feeding to TPN suggest that both modalities are equally efficacious and have similar side effects.

Fluid resuscitation fluid therapy

Fluid resuscitation fluid therapy has been found to play a critical role in improving the outcomes of patients with acute pancreatitis, and is a component of the supportive care recommended in the American College of Gastroenterology (ACG) Practice Guidelines. Aggressive fluid resuscitation is an important treatment to counteract the hypovolemia that may accompany acute pancreatitis. Hypovolemia has a negative effect on the microcirculation within the pancreas, and can lead to further complications including hemoconcentration (haematocrit ≥44), tachycardia, hypotension, scant urine output, and prerenal azotaemia.[14]Reduced volume can also result in organ failure, which is responsible for many of the early deaths attributed to acute pancreatitis. Aggressive fluid resuscitation can also be used to minimize ischemia and reperfusion injury, thereby preventing organ failure. Although not established through clinical study, the general consensus of the amount of fluids to be administered is 250–300 cc/hour.The success of fluid therapy is determined by monitoring vital signs and urine output, as well as a drop in haematocrit levels within 24 hours.[14]

Pain management

Abdominal pain is one of the chief symptoms of acute pancreatitis and can range from mild discomfort to severe pain depending on the

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severity of the disease. Alleviation of this pain is an essential step in the management of acute pancreatitis. Parenteral narcotics are generally administered for severe acute pancreatitis. The parenteral narcotics used in this setting include meperidine, morphine, fentanyl, and hydromorphone, among others. According to the ACG Practice Guidelines, there is no evidence to suggest the superiority of one drug over another.[14] The amount and frequency with which these agents are administered should be closely monitored.Patient-controlledanalgesia administration is used for patients who experience particularly severe pain. Nonsteroidal anti-inflammatory drugs (NSAIDs) are alternatively used as disease symptoms improve and patients are weaned off narcotic therapy.

Antibiotic therapy

The danger of patients with acute pancreatitis developing associated infection has led to the use of antibiotics as prophylactic therapy to prevent infected necrosis. Infection of pancreatic necrosis may develop in 40–70% of patients with severe acute pancreatitis during the second and third week after onset. The widespread use of antibiotics in this setting is largely based on a Cochrane review of 4 randomized trials which found that prophylactic intravenous antibiotics could reduce mortality and incidence of pancreatic sepsis. However, a subsequent meta-analysis of 7 trials, including 2 double-blind trials, concluded that prophylactic antibiotic therapy had no benefit in preventing infected necrosis or mortality.[15] A more recent Cochrane review showed that although the mortality rate was reduced among patients treated with prophylactic antibiotics compared with placebo (6% vs 15.3%; odds ratio, 0.37, 95% confidence interval [CI], 0.17–0.83), the rate of infected pancreatic necrosis was similar between the 2 treatment groups (20% vs 27.8%; odds ratio 0.62, 95% CI, 0.35–1.09).In this review, the benefit associated with antibiotics was limited to beta lactam regimens, but not to quinolone or imidazole regimens. Because of the conflicting evidence regarding their use, the ACG does not recommend prophylactic antibiotic therapy for patients with pancreatic necrosis, whereas the American Gastroenterological Association guidelines recommend prophylactic antibiotics only for patients with greater than 30% necrosis of the pancreas. If an infection is suspected, antibiotic therapy can be initiated and a pancreatic fine needle aspiration performed for bacteriology; treatment is then halted if an infection is not confirmed. Otherwise, treatment should continue for 14 days.

Octreotide

Octreotide, a synthetic version of the naturally occurring peptide hormone somatostatin, has been explored as a possible treatment for acute pancreatitis. Somatostatin is a potent inhibitor of pancreatic exocrine secretion, and thus reduces or suppresses the pancreatic response to food intake. This ability to allow the pancreas to “rest” is the primary rationale for its use in the treatment of acute pancreatitis. The half-life of somatostatin is very short (2–3 minutes), greatly limiting its therapeutic potential.[16]Therefore, octreotide was designed and developed to have a comparatively longer half-life (approximately 72–98 minutes). However, octreotide must also be administered several times daily in order to attain therapeutic levels; thus longer-acting formulation of octreotide requiring once-monthly administration have also been developed. A high dose of octreotide (200 mg 3 times daily) is typically used to treat patients with severe acute pancreatitis.

A number of clinical trials have evaluated somatostatin and octreotide in patients with acute pancreatitis, and the overall conclusion from these studies is that neither agent is effective in the treatment of this disease. The largest well-designed clinical trial randomized patients (n=302) with moderate to severe acute pancreatitis to receive either 1 of 2 octreotide doses (100 mg or 200 mg 3 times daily) or a placebo. However, an analysis of both the intent-to-treat and evaluable populations showed no significant difference in patient outcomes, including the mortality rate, complication rate, pain duration, need for surgical intervention, or duration of hospital stay. The study investigators concluded that octreotide had no benefit in the treatment of acute pancreatitis. More recently, a meta-analysis suggested that while octreotide and somatostatin offered no benefit in the treatment of mild acute pancreatitis, they reduced the mortality rate among patients with severe disease. However, the majority of clinical trials included in this meta-analysis were not well designed (not randomized or controlled) and contained only a small number of study patients.Therefore, there is currently no conclusive clinical trial evidence to support the use of either somatostatin or octreotide in the treatment of acute pancreatitis.

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Investigational therapies

Although the pathophysiology of acute pancreatitis has not been clearly established, it is thought that reactive oxygen free radicals may play a central role. Reactive oxygen free radicals such as superoxide anions, hydrogen peroxide, and hydroxyl free radicals have been shown to be produced during a pancreatitis episode, and patients with pancreatitis have higher free radical activity.[17] Based on this evidence, antioxidants have been explored as a possible therapeutic agent in acute pancreatitis. Antioxidants have been shown to be partially effective in experimental models of acute pancreatitis. However, to date antioxidants have only been investigated in the clinical setting to a limited extent, and require further testing in well-designed clinical trials.

COMPLICATIONS OF ACUTE PANCREATITIS

Acute peripancreatic fluid collection

Fluid collections usually develop in the early phase of pancreatitis.[18] On CECT, APFCs do not have a well-defined wall, are homogeneous, are confined by normal fascial planes in the retroperitoneum, and may be multiple. Most acute fluid collections remain sterile and usually resolve spontaneously without intervention. When a localized APFC persists beyond 4 weeks, it is likely to develop into a pancreatic pseudocyst, although this is a rare event in acute pancreatitis. APFCs that resolve or remain asymptomatic do not require treatment and do not by themselves constitute severe acute pancreatitis.

Pancreatic pseudocyst

The term pancreatic pseudocyst refers specifically to a fluid collection in the peripancreatic tissues (occasionally it may be partly or wholly intra-pancreatic). A pancreatic pseudocyst is surrounded by a well-defined wall and contains essentially no solid material. Diagnosis can be made usually on these morphologic criteria. If aspiration of cyst content is performed, there is usually a markedly increased amylase activity. A pancreatic pseudocyst is thought to arise from disruption of the main pancreatic duct or its intra-pancreatic branches without any recognizable pancreatic parenchymal necrosis; this theory suggests that consequent leakage of pancreatic juice results in a persistent, localized fluid collection, usually after more than 4 weeks. When there is evident solid necrotic material within a largely fluid-filled cavity, the term pseudocyst should not be used. The development of a pancreatic pseudocyst is extremely rare in acute pancreatitis, and thus the term pancreatic pseudocyst in the setting of acute pancreatitis may fall into disuse. In this classification, pseudocyst does not result from an ANC (defined below). Although CECT is the imaging modality used most commonly to describe pseudocysts, MRI or ultrasonography may be required to confirm the absence of solid content in the collection. A pseudocyst may also arise in the setting of acute necrotizing pancreatitis as a result of a 'disconnected duct syndrome', whereby pancreatic parenchymal necrosis of the neck or body of the gland isolates a still viable distal pancreatic remnant.[19] A pseudocyst may be evident many weeks after operative necrosectomy due to localized leakage of the disconnected duct into the necrosectomy cavity. Necrosis is absent because it has been removed by the earlier necrosectomy

Acute necrotic collection

During the first 4 weeks, a collection containing variable amounts of fluid and necrotic tissue is termed an ANC to distinguish it from an APFC. The necrosis can involve the pancreatic parenchyma and/or the peripancreatic tissues. On CECT, acute pancreatic or peripancreatic necrotic collections contain varying amounts of solid necrotic material and fluid, may be multiple and may appear loculated. An ANC is not an APFC, because an ANC arises from necrotizing pancreatitis (necrosis of the pancreatic parenchyma and/or peripancreatic tissues) and contains necrotic tissue. An ANC may be associated with disruption of the main pancreatic duct within the zone of parenchymal necrosis and can become infected. Sequential imaging may be useful to characterize acute collections. Within the first week of the disease, it may be difficult to differentiate an APFC from an ANC. At this stage, both types of collections may appear as areas with fluid density. After the first week, the distinction between these two important types of collections becomes clear, such that at this stage of necrosis, a peripancreatic collection associated with pancreatic parenchymal necrosis can be properly termed an ANC and not an APFC. MRI, transcutaneous ultrasonography or endoscopic ultrasonography may be helpful to confirm the presence of solid content in the collection.

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Walled-off necrosis

WON consists of necrotic tissue contained within an enhancing wall of reactive tissue. It is a mature, encapsulated collection of pancreatic and/or peripancreatic necrosis and has a well-defined inflammatory wall; usually this maturation occurs ≥4 weeks after the onset of necrotising pancreatitis. Previously suggested nomenclature had designated this entity as organized pancreatic necrosis, necroma, pancreatic sequestration,pseudocyst associated with necrosis, and subacute pancreatic necrosis.[20] WON derives from necrotic pancreatic parenchyma and/or necrotic peripancreatic tissues and may be infected, may be multiple, and may be present at sites distant from the pancreas. CECT may not readily distinguish solid from liquid content, and, for this reason, pancreatic and peripancreatic necrosis may be misdiagnosed as pancreatic pseudocyst. For this purpose, MRI, transabdominal ultrasonography, or endoscopic ultrasonography may be required for this distinction. Demonstration of the presence or absence of pancreatic ductal communication is not necessary in this classification, although determination of such ductal communication is of potential importance, because it may affect management.

II. CONCLUSION

Acute pancreatitis (A.P) is a potentially life-threatening acute inflammatory disease of the pancreas. It is associated with mortality ranging from 3% to 30% in the world. Alcohol consumption, smoking, diabetes, gall stones are major risk factors. Some patients may experience recurrent pancreatitis, a condition that may be difficult to distinguish from early-stage chronic pancreatitis. Prompt recognition, diagnosis, and initial treatment with early fluid resuscitation and nutrition are very important aspects of care for acute pancreatitis.

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