

COMPLICATIONS OF ACUTE PANCREATITIS ON CT SCAN

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ABSTRACT

Objective: To evaluate the complications of acute pancreatitis in general population.

Methods: The study is cross sectional. The study was conducted in radiology department of Hayatabad Medical Complex Peshawar . Duration of the study is from January 2014 to January 2015 . A total of 150 patients presented with abdominal pain were included in this study.

Results: Total of 150 patients in the general population having abdominal pain and vomiting were evaluated on CT scan. 105(70%) patients had pancreatic and peripancreatic necrosis.

30(20%) patients had peripancreatic necrosis. Pancreatic necrosis alone was seen in 12(8%) of patients. Infection is very frequent in pancreatic necrosis . Infection occur in about 75(50%) patients. Foci of air in pancreatic necrosis is a strong clue of infection. Pseudocyst was found in 27(18%) patients.

Conclusion: This study concluded that CT scan plays an important role in diagnosing the complications of acute pancreatitis . Radiologist plays a key role in the imaging of acute pancreatitis and its complications by selecting the most appropriate imaging techniques that help in diagnosing local complications which in turn will guide management decisions and reduce morbidity.

KEYWORDS: Pseudocyst, Pancreatic necrosis, Peripancreatic necrosis , Acute fluid collections.

INTRODUCTION

Acute pancreatitis is one of the major causes of acute abdominal pain. Imaging plays a pivotal role in the management of selected cases of acute pancreatitis in addition to laboratory investigations such as serum amylase and lipase levels that have a somewhat high sensitivity and specificity¹.

The causes of acute pancreatitis are variable , with gallstones and alcohol responsible for approximately 90% of cases in many parts of the world. In practice the diagnosis of acute pancreatitis is confirmed when serum amylase or lipase levels are greater than three times normal². Classification of acute pancreatitis may be based on clinical, morphologic, or histologic criteria and there are many classification systems, most based on the cause or severity³.

Approximately 10% and 20% of cases of acute pancreatitis are considered severe⁴.

The hospital stay of patients with severe acute pancreatitis is usually for a long time and they have a higher chance of developing systemic or organ failure with renal, respiratory, and cardiovascular failure; disseminated intravascular coagulation; or gastrointestinal hemorrhage⁵.

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As the clinical signs of acute pancreatitis may be nonspecific, at times serum amylase and lipase levels correlate poorly with disease severity. Imaging is advocated to support and confirm the clinical diagnosis, find the cause and to exclude other causes of abdominal pain, and also to grade the extent and severity of acute pancreatitis⁶.

CT is recommended as a diagnostic tool for imaging the pancreas; as this may be beneficial in planning the operative management⁷. The use of positive oral contrast material may obscure hemorrhage or calculi, and for this reason many institutions use negative oral contrast material. It has been postulated that IV administration of iodinated contrast material can increase the severity and duration of acute pancreatitis which has led to contradictory opinions regarding IV contrast usage. The benefit of IV contrast administration at present appear to overbalance the potential risks. Although MRI is comparable to CT for the investigation of acute pancreatitis⁸.

Contrast-enhanced CT is considered the imaging modality of choice for the diagnosis and staging of acute pancreatitis. It has also been observed that the pancreas shows uniform enhancement in mild cases of acute pancreatitis and it may be normal or enlarged with a variable amount of increased attenuation in the surrounding fat, termed "stranding". Local edema is a frequent cause and may track along the mesentery, mesocolon, and hepatoduodenal ligament and into peritoneal spaces. The edematous fluid may extend into the anterior perirenal space leading to a mass effect and a halo sign with sparing of the perinephric fat⁹.

Acute pancreatitis can lead to a wide variety of

complications. Increasing age, gallstone disease, organ failure on admission and pancreatic necrosis are poor prognostic factors and there is a very high probability that they may lead to complications. One of the most important complications that can occur, is pancreatic necrosis which is also considered to be the most important indicator of disease severity. Necrosis is seen in 6–20% of patients with acute pancreatitis.

Radiologically grading of the severity of acute pancreatitis can be done with the CT severity index (CTSI) which has a fairly good prognostic accuracy¹⁰.

Approximately 50% of acute fluid collections in patients with acute pancreatitis resolve spontaneously while 50% may progress to form a pseudocyst or an abscess. Pancreatic pseudocyst is a sterile organized peripancreatic fluid collection containing pancreatic secretions encapsulated by a fibrous wall seen approximately 4 weeks after the onset of symptoms.

Infection is another major complication of pancreatic necrosis—seen in 30–70% of cases—and accounts for approximately 80% of deaths in patients with severe acute pancreatitis.

Another complication seen typically 4-6 weeks after onset of symptoms is pancreatic abscess formation that occurs in the pancreatic vicinity. There is no necrotic debris in a pancreatic abscess rather it contains pus³.

Vascular abnormalities that occur as a result of enzymatic digestion from pancreatic secretions or infection have been observed to complicate severe acute pancreatitis. Pseudoaneurysm formation has been reported in 3.5–10% of patients with acute pancreatitis.

A disconnected main pancreatic duct observed in the setting of pancreatic necrosis is yet another serious complication. Disconnection occurs as a result of pancreatic ductal epithelium undergoing necrosis which in turn leads to viable pancreatic tissue becoming isolated from the duodenum¹. CT therefore is critical for diagnosing complications and also for guiding the management of acute pancreatitis, which justifies the increased use of CT in patients who are critically ill. According to The American College of Radiology Appropriateness Criteria suggest that CT is the most appropriate modality for imaging patients presenting with severe abdominal pain, an elevated serum lipase level, and signs of sepsis or shock or failure to show response to treatment even after 48 hours of therapy. Complementary imaging like ultrasound and MRI can be performed if practicable in the follow-up of collections or before hospital discharge¹².

MATERIALS AND METHODS

During the period January 2014 to January 2015, 150 patients having pancreatitis referred for computed tomographic assessment to the Radiology Department of Hayatabad Medical Complex Peshawar.

Sampling procedure was simple non probability consecutive sampling. Informed consent from the patient or attendant was obtained. Explanation was given to the patients regarding the nature of the procedure, time consumed, and risk to the patient.

All patients admitted to our hospital in the period from January 2014, up to January 2015, with a typical history including the onset of upper abdominal pain (nausea and/or vomiting) within 48 h prior to admission and the elevation of the serum amylase activity at least 3 times greater than the upper limit of normal, were considered to have acute pancreatitis.

Only the patients having the first attack of acute pancreatitis were included in the study. Patients with a relapse of acute pancreatitis or a relapse of chronic pancreatitis were excluded.

RESULTS

The age group commonly involved was between 20-60 years. The gender distribution is like that males are commonly affected. out of 150 patients 85(56.4%) were males and 65(43.3) were females.

Patients referred for ct-scan the most common presenting symptom was abdominal pain followed by nausea and vomiting.

The commonest complication of pancreatitis is pancreatic and peripancreatic necrosis. of total patients 105(70%) patients had pancreatic and peripancreatic necrosis. 30(20%) patients had peripancreatic necrosis. Pancreatic necrosis alone was seen in 12(8%) of patients.

Infection is very frequent in pancreatic necrosis. infection occur in about 75(50%) patients. foci of air in pancreatic necrosis is a strong clue of infection. pseudo-cyst was found in 27(18%) patients.

Table 1. Gender wise distribution

Gender	Percentage
Male	85(56.3%)
Female	65(43.3%)
Total	150

Table 2. Complications of acute pancreatitis

	Complications	Percentage
1.	Pseudocyst	27(18%)
2.	Pancreatic necrosis	12(8%)
3.	Peripancreatic necrosis	30(20%)
4.	Pancreatic+peripancreatic necrosis	105(70%)
5.	Infection	75(50%)

DISCUSSION

Acute fluid collections(APFCs)

APFCs are Peripancreatic fluid collections without nonliquefied components observed during the first 4 weeks of an attack of acute pancreatitis. They may occur as a result of pancreatic and peripancreatic inflammation or due to rupture of one or more small side branches of peripheral pancreatic ducts. APFCs are usually seen in close proximity to the pancreas, have no identifiable wall and conform to the anatomic boundaries of the retroperitoneum (especially the anterior pararenal fascia). Fluid collections in the pancreatic parenchyma however should be diagnosed as necrosis and not as APFCs

Pseudocyst

Approximately 4 weeks from onset of acute pancreatitis, an APFC may gradually transform into a pseudocyst. Pseudocyst occurs as a complication of acute pancreatitis in approximately 18% of cases in our study which is comparable to study done by Memis A whose study showed pseudocyst in 10-20% of cases¹³. On contrast-enhanced CT images, pseudocyst is usually seen as a well-circumscribed, round or oval peripancreatic fluid collection of homogeneously low attenuation that has a well-defined enhancing wall (capsule consisting of fibrous or granulation tissue). According to the revised Atlanta classification, pseudocysts contain no formed components, and such a collection should be categorized as an APFC¹⁴.

Pancreatic abscess

Later in the course of acute pancreatitis a circumscribed collection of infected fluid that is seen in close proximity to the pancreas, with little or no necrosis, is termed a pancreatic abscess according to the Atlanta symptom. This definition includes infected pseudocysts¹⁵ CT, however defines abscesses as well-circumscribed fluid collections that may or may not contain foci of air.

Pancreatic necrosis

Isolated pancreatic parenchymal necrosis can be seen in a few patients. About 12(8%) showed pancreatic necrosis in our study which is in comparison with the study done by Sakorafas GH where 5% patients had pancreatic necrosis. On contrast-enhanced CT images it is seen as lack of parenchymal enhancement¹⁶. It has been observed that during the 1st week of necrotizing pancreatitis, pancreatic necrosis appears as a more homogeneous nonenhancing non enhancing area of variable attenuation which on contrast enhanced CT later in the course of the disease, changes into a more heterogeneous area. The radiologic change occurs due to liquefaction of the nonviable and necrotic tissues (primarily pancreatic parenchyma and peripancreatic

fat). Contrast-enhanced CT studies divide parenchymal necrosis into three categories: less than 30%, 30%–50%, greater than 50% of the gland involved¹⁷. However according to a newer modified CT grading system only two categories are recognized: less than 30% and greater than 30%. There are situations when areas of no or poor enhancement that are estimated to be less than 30% in the early phase may actually be findings of edema rather than necrosis.

Peripancreatic necrosis alone.—Peripancreatic necrosis alone was seen in approximately 30(20%) of patients. Results are comparable to study by Sakorafas GH where 20% patients showed peripancreatic necrosis¹⁶. On contrast enhanced CT it is seen as heterogeneous areas of nonenhancement in the pancreas due to the presence of non liquefied components. Peripancreatic necrosis is usually seen in the retroperitoneum and lesser sac. The clinical importance of differentiating between pancreatic and peripancreatic necrosis lies in the fact that patients with the former have a better prognosis than the latter¹⁸.

Infected necrosis

Necrotic pancreatic tissue complicated by infection is associated with higher mortality rates in comparison with sterile necrosis. The rate at which pancreatic necrosis becomes infected increases with time in the course of the disease process. 75(50%) patients showed infection in our study, which is consistent with a study done by van Santvoort HC 30% to 70%(19). It is very difficult to clinically differentiate between sterile and infected necrosis, because patients with sterile necrosis may have signs suggestive of infection. Limitations of CT or MRI is that they may not be able to reliably differentiate between infected and sterile necrosis, although the presence of gas bubbles within the necrotic portion of the gland is suggestive of infection²⁰.

CONCLUSION

A wide variety of complications have been seen to be associated with acute pancreatitis which may affect the pancreatic gland, pancreatic duct and surrounding vasculature. Radiologist plays a key role in the imaging of acute pancreatitis and its complications by selecting the most appropriate imaging techniques that help in diagnosing local complications which in turn will guide management decisions and reduce morbidity.

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