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Assessment of Vascular and Non-Vascular Complications of Acute Pancreatitis on Contrast-Enhanced Computed Tomography

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Abstract

Aims and Objective: To assess the role of Contrast-Enhanced Computed Tomography in the diagnosis of acute pancreatitis and its complications.

Materials and Methods: This study was performed in the Department of Radio-Diagnosis, Basaveshwara Teaching and General Hospital, Kalaburagi on 20 patients referred from the Department of General Medicine and Department of General Surgery.

Result: The study aimed to assess the use of Contrast Enhanced Computed Tomography (CECT) in diagnosing acute pancreatitis and related complications. It included 20 participants, with 85% being male and 15% female, predominantly aged 31-40 years. Alcoholism was identified as the primary cause (60%), followed by cholelithiasis (25%) and idiopathic cases (15%), aligning with other research findings. Vascular complications were observed in 40% of cases, with splenic vein thrombosis (SVT) being the most common, affecting 25% of these patients. Other vascular issues included pseudoaneurysms and thrombosis involving major vessels. Extrapancreatic complications such as ascites and pleural effusion were present in 32% and 28% of cases, respectively. Additionally, 24% exhibited reactive bowel wall thickening, and 8% had common bile duct (CBD) or main pancreatic duct (MPD) dilatation. CT severity scores indicated that 25% of patients had mild pancreatitis, 30% had moderate, and 45% had severe pancreatitis.

Conclusion: Acute pancreatitis can lead to numerous complications involving the pancreatic parenchyma, main pancreatic duct, common bile duct, adjacent tissues, and blood vessels. Contrast Enhanced Computed Tomography (CECT) is the preferred imaging method for acute pancreatitis. It enables precise identification of both vascular and non-vascular complications, aiding in management decisions and minimizing morbidity.

Keywords: Acute Pancreatitis, Bileduct, Alcoholism, Cholelithiasis.

Introduction

Acute pancreatitis is an inflammatory condition characterized by a sudden onset, which can fully resolve with normal pancreatic structure and function if no necrosis occurs[1]. There are two main subtypes: interstitial edematous pancreatitis and necrotizing pancreatitis. Complications associated with acute pancreatitis include acute fluid collections, pseudocysts, acute necrotic collections, hemorrhage, pseudo aneurysms, and venous thrombosis[2].

Inclusion Criteria

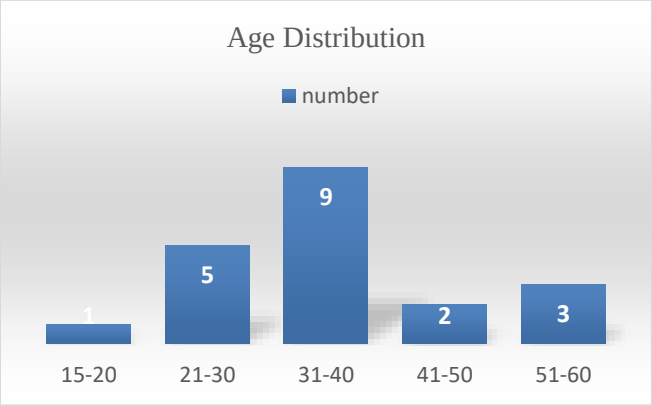
1. Known cases of acute pancreatitis
2. In suspected cases of acute pancreatitis with an increase in serum amylase and serum lipase levels.

Exclusion Criteria

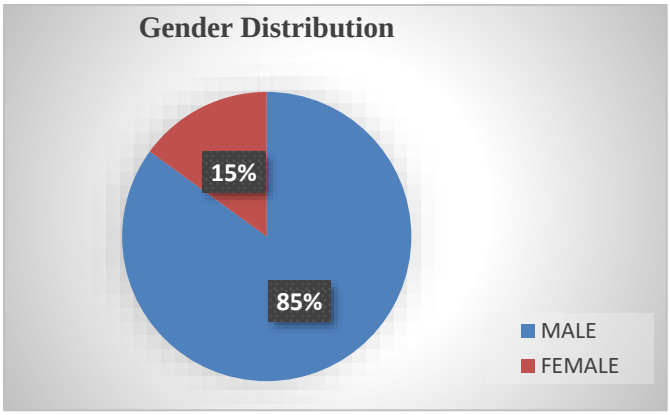
1. Cases of chronic pancreatitis.
2. Patients with deranged renal function tests.
3. Patients who are allergic to contrast material administration.

Results

- There were 17 males and 3 females in this study. Males comprised 85% and females 15% of the study and males exceeded the number of female patients in all the age groups.
- The age groups ranged from 15 to 60 years. Maximum patients were in the age group of 31 to 40 years.
- So it was mostly young male adults who were suspected or diagnosed with acute pancreatitis.

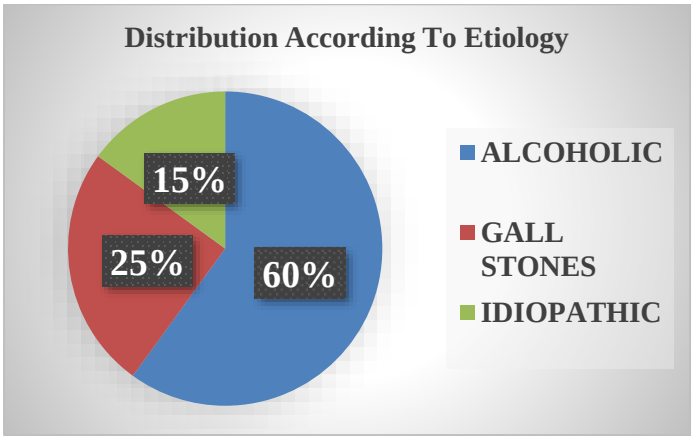


Graph 1:



Graph 2:

- The cause for pancreatitis in 12 (60%) patients was alcohol intake, in 5 (25%) patients was the presence of gall stones and the cause was not known (idiopathic) for 3 (15%) patients.



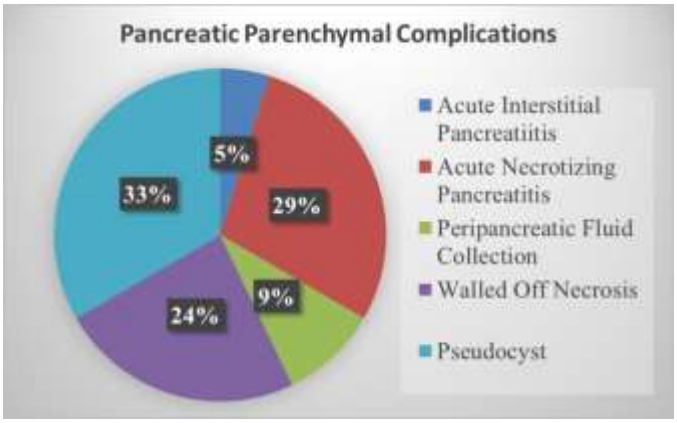
Graph 3:

- 29%,24% and 33% of patients with acute pancreatitis had acute necrotizing pancreatitis, walled-off necrosis, and pseudocyst respectively.

- 9% and 5% of patients with acute pancreatitis had acute intestinal pancreatitis and peripancreatic fluid collections respectively.

Complications	Number
Peripancreatic fluid collections	2
Pseudocyst	7
Walled of necrosis	5
Acute necrotizing pancreatitis	6
Acute interstitial pancreatitis	1

Table 1:

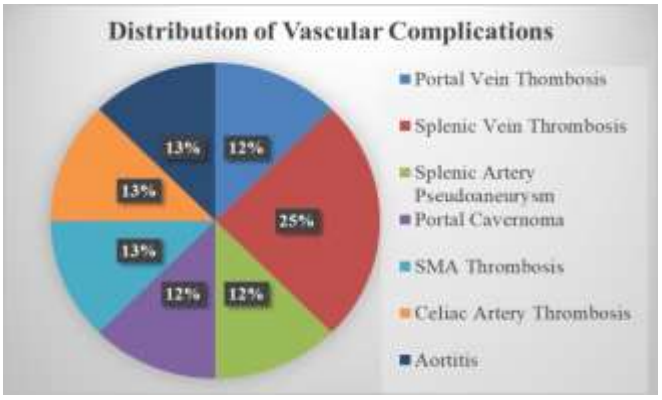


Graph 4:

- 40% (8/20) of patients with acute pancreatitis had Vascular complications
- 25% of patients with Vascular complications had Splenic Vein Thrombosis
- 12%-13% of patients with vascular complications had at least one of the complications like Splenic Artery Pseudoaneurysm, Portal Vein Thrombosis, Portal Cavernoma, SMA Thrombosis, Celiac Artery Thrombosis and Aortitis respectively.

Complications	Number
Splenic artery Pseudoaneurysm	1
Portal vein thrombosis	1
Splenic vein thrombosis	2
Portal Cavernoma	1
SMA thrombosis	1
Celiac artery thrombosis	1
Aortitis	1

Table 2:

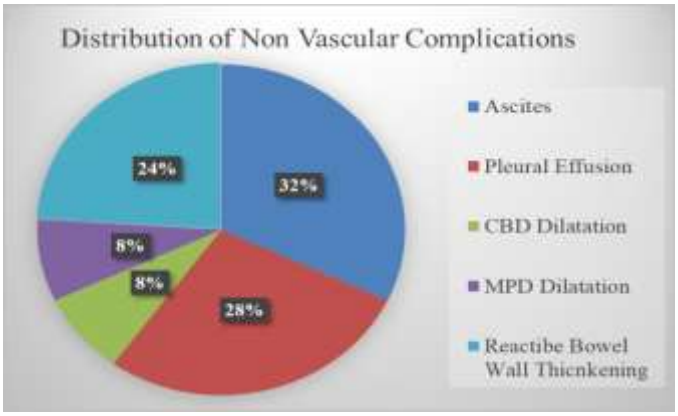


Graph 5:

- 32%,28%, and 24% of patients with acute pancreatitis had Ascites, Pleural Effusion, and Reactive Bowel Wall Thickening respectively.
- 8% of patients with acute pancreatitis had CBD or MPD Dilatation.

Complications	Number
Ascites	8
Pleural effusion	7
CBD dilatation	2
MPD dilatation	2
Reactive bowel wall thickening	6

Table 3:



Graph 6:

Discussion

Acute pancreatitis is an inflammatory condition that poses significant clinical challenges due to its varied presentation and potential for serious complications. The condition can be broadly categorized into interstitial edematous pancreatitis and necrotizing pancreatitis [3]. While interstitial edematous pancreatitis generally resolves without permanent damage, necrotizing pancreatitis can lead to substantial tissue destruction and more severe outcomes.

Parenchymal complications include acute fluid collections and acute necrotic collections. These can progress to organized fluid collections such as pseudocysts or walled-off necrosis, depending on the timeline and extent of the inflammatory process. The development of necrotizing pancreatitis increases the risk of secondary infection, which significantly raises morbidity and mortality rates.

Vascular complications are crucial to recognize, as they often portend more severe disease and impact management decisions. Venous thrombosis, including splenic vein thrombosis and portal vein thrombosis, is relatively common and can lead to complications such as portal hypertension and variceal bleeding. Arterial pseudoaneurysms, although less common, are critical to identify due to the risk of rupture and hemorrhage, which can be life-threatening. Contrast Enhanced Computed Tomography (CECT) is highly effective in detecting these vascular changes, aiding in timely intervention. [4]

Non-vascular complications of acute pancreatitis include extrapancreatic manifestations such as pleural effusion, ascites, and reactive bowel wall thickening. These findings often correlate with more severe disease and can complicate patient management. CECT is invaluable not only for initial diagnosis but also for characterizing these complications, thus guiding both surgical and non-surgical treatment approaches.

A comprehensive understanding of the parenchymal, vascular, and non-vascular complications of acute pancreatitis is essential for effective clinical management. Early identification and appropriate intervention based on CECT findings can greatly reduce morbidity and improve patient outcomes.

Figure 1:

Pancreatic parenchyma appears bulky with adjacent peri-pancreatic fat stranding and peri-pancreatic fluid collection.

Ascending colon appears thickened with adjacent fat stranding suggestive of reactive bowel wall thickening.

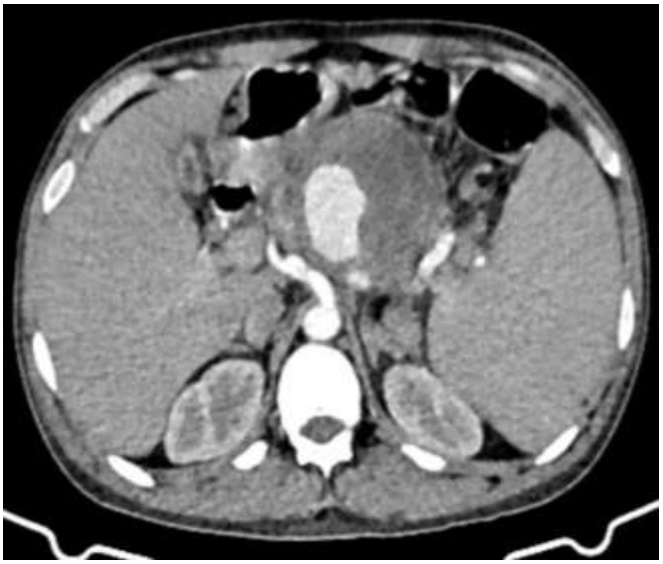


Figure 2:

Large focal out pouching in anterior para renal space which appears to communicate with splenic artery. The out pouching shows eccentric hypo-dense filling defect and central contrast filling. Suggestive of large pseudo aneurysm of splenic artery with eccentric thrombosis.

Figure 3:

Multiple thin walled cystic lesions involving head, body and tail of pancreas, abutting main pancreatic duct showing peripheral wall enhancement,

Partial short segment filling defect seen involving of splenic vein at the level of its origin…possibly suggestive of splenic vein thrombosis.

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