



ROLE OF COMPUTED TOMOGRAPHY IN EVALUATION OF ACUTE PANCREATITIS AND ITS COMPLICATIONS

Radiodiagnosis

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ABSTRACT

Among all abdominal disorders, pancreatitis is one of the most complex and clinically challenging. USG and CT abdomen are the most commonly used diagnostic imaging modalities for evaluation of the pancreas. Compared to USG, Computed Tomography (CT) is highly accurate and sensitive in both diagnosing and demonstrating the extent. For prompt treatment and close monitoring of the patient with severe disease, early assessment of the cause and severity of acute pancreatitis is of utmost importance. CT is the imaging method of choice for assessing the extent of acute pancreatitis and for evaluating complications.

KEYWORDS

Acute Pancreatitis, Chronic Pancreatitis, Contrast-enhanced Computed Tomography, Necrotizing Pancreatitis, Pseudocyst, Peri-pancreatic Fluid.

INTRODUCTION

Acute pancreatitis is clinically defined as the presence of at least two of three features:

1. Abdominal pain indicative of pancreatitis (epigastric pain that might radiate to the back), with the start of pain being considered as onset of the acute pancreatitis
2. Elevated serum amylase and lipase levels, three or more times than normal (imaging is to be considered if the elevated values are 3 times normal) and
3. Characteristic imaging findings on CT, magnetic resonance imaging (MRI), or transabdominal ultrasonographic (US) studies. The annual incidence of AP ranges from 13 to 45/100,000 persons, and CP from 5 to 12/100,000; the prevalence of CP is about 50/100,000 persons. Population distributions are mainly reported from the United States, Europe, and Japan; however, data is emerging from other regions also. Provincial differences in demographics are: alcohol-related pancreatitis is usually more common in West and Japan when compared to the other Asian countries, and also there is a wide variance in prevalence of CP, which is endemic to the tropical countries (20–125/100,000 persons reported in 2 parts of South India). Various imaging modalities include transabdominal ultrasonography (US), Contrast-enhanced computed tomography (CECT), Magnetic resonance imaging (MRI), Magnetic resonance cholangiopancreatography (MRCP), Endoscopic ultrasonography (EUS). There are two subtypes: Interstitial edematous pancreatitis, Necrotizing pancreatitis.

AIMS AND OBJECTIVES

1. Study of computed tomography in the evaluation of acute pancreatitis and its prognostic role.
2. To study various stages and grading of acute pancreatitis using computed tomography.
3. To differentiate between acute edematous and acute necrotizing pancreatitis.
4. To evaluate the various complications of acute pancreatitis using modified computed tomography severity index.

MATERIALS & METHODOLOGY

Type of study: CROSS-SECTIONAL STUDY

Sample size: 50.

Inclusion Criteria

All the patients suspected/diagnosed with acute pancreatitis based on clinical and laboratory findings (serum amylase & serum lipase). Patients who are diagnosed with acute pancreatitis on ultrasonography. Patients who present as acute on chronic pancreatitis.

Exclusion Criteria

Congenital pancreatic lesion.
Pancreatic carcinoma and metastasis.
Pancreatic trauma.

Equipment

GE BRIGHTSPEED SELECT ELITE 16 SLICE CT MACHINE.
Contrast material (Omnipaque / Iohexol), used when required.
In case of any emergency, necessary care will be taken.

RESULTS

In this study of 50 cases, 44 patients were male, and six were female of age group 20-55 years. Patients presented with epigastric pain symptoms, radiating to back, nausea, vomiting & diffuse abdominal pain. 13 patients presented with pseudocyst. AP was divided into edematous and necrotizing pancreatitis based on morphology and pancreatic parenchyma.

TYPES OF AP	NO.OF PATIENTS	TOTAL	PERCENTAGE %
EDEMATOUS	8	8	16%
NECROTIZING	7	11	22%
<30%			
>30%	4		

CT findings	NO. OF PATIENTS	
	PRESENT	ABSENT
Peri-pancreatic fat stranding	40	10
Diffuse/Focal pancreatic enlargement	35	15
Peri-pancreatic fluid collection	31	19

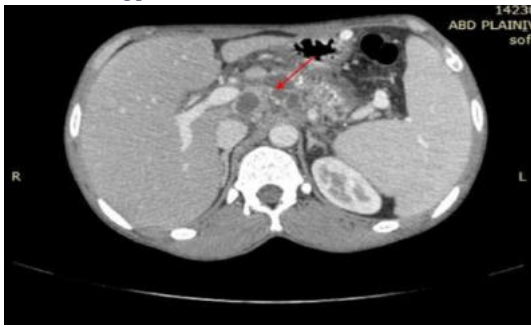
Extra pancreatic complications include ascites (most common), bilateral pleural effusion, splenic vein thrombosis & portal vein thrombosis.

MCTSI Total Score	No. of Patients
2	12
4	13
6	19
8	4
10	2

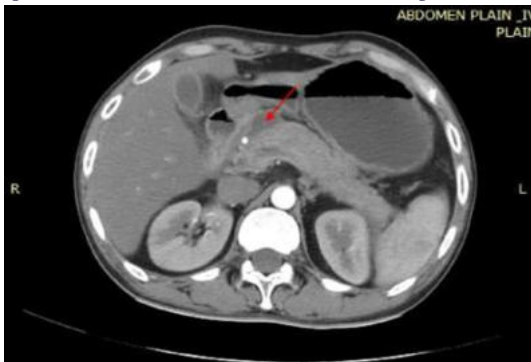
Mesenteric fat stranding and fluid collection



Axial contrast-enhanced CT image of the abdomen in arterial phase at the lumbar level showing significant mesenteric fat stranding (arrow) on the left side with fluid collection in a case of acute pancreatitis

Acute necrotizing pancreatitis

Axial contrast-enhanced (parenchymal phase) CT images of abdomen showing multiple well defined peripherally enhancing irregular hypodense areas (arrow) involving the head and body of pancreas in a case of acute necrotizing pancreatitis.

Peripancreatic fluid collection in acute edematous pancreatitis

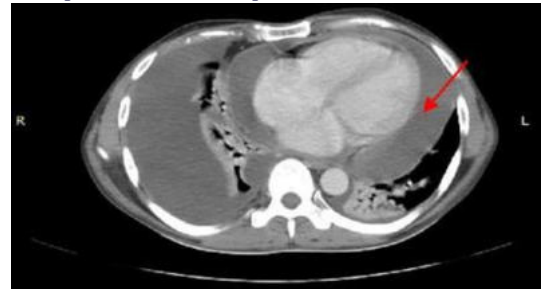
Axial contrast-enhanced CT image of abdomen at upper lumbar level in parenchymal phase showing well defined peripherally enhancing hypodense collection at the head of pancreas (arrow) in a case of edematous pancreatitis.

Pseudocyst

Axial plain CT examination of abdomen showing two well defined thin-walled hypodense lesions abutting the liver (pseudocysts) (arrows), ascites, and bilateral pleural effusions.

Splenic vein thrombosis

Axial contrast-enhanced CT image of abdomen in venous phase demonstrating absent flow within the splenic vein (arrow), focal enlargement of tail of pancreas, peripancreatic fat stranding and non-enhancing hypodense area at the spleen.

Bilateral pleural effusion with pericardial effusion

Axial contrast-enhanced CT image of the thorax in arterial phase showing right moderate pleural effusion, minimal left pleural effusion and mild pericardial effusion (arrow) developed in consequence to acute pancreatitis.

DISCUSSION

50 cases presented with clinical and/or laboratory features suggestive of pancreatitis were studied. The patients underwent CECT examination of the abdomen and pelvis and were classified according to the modified CT severity index. In our study, no association of age and gender was noted with severity of pancreatitis. It was mentioned in reports that differences in age and sex distribution of AP in various geographic areas are likely due to differences in etiology. CT plays an important role in differentiating edematous and necrotizing form of AP since clinical assessment alone cannot predict the severity of disease. Ideally, conducting CECT after 48-72 hours of an acute attack, increases the probability of identifying necrotizing pancreatitis. CT, in particular, has an overall accuracy of about 87% and sensitivity and specificity of 100% in recognition of pancreatic necrosis.

CT findings of these patients showed 100% accuracy and sensitivity, which helps in early diagnosis and predicting the severity of AP. CECT is the gold standard investigation for diagnosis and staging of AP, due to its ability to demonstrate early inflammatory changes as well as development of a complication. The use of combination of prognostic signs with initial CT examination results in superior prognostic accuracy and outcome. Early CT examination in patients of acute pancreatitis is thus a helpful prognostic marker of morbidity and mortality. The extra-pancreatic complications were seen in 25 patients (50%) in our study. Ascites was seen in 15 patients (30%), bilateral pleural effusion in 11 patients (22%), left pleural effusion alone in 12 patients (24%), right pleural effusion alone in 1 patient (2%), splenic vein thrombosis in 2 patients (4%) and portal vein thrombosis in 1 patient (2%). There are no cases with findings of splenic artery pseudoaneurysm.

Pseudocyst was seen in 13 patients (26 %) in our study. Out of them, one was identified in the gastric wall, and two are intrahepatic. However, no pseudocysts were observed dissecting the posterior mediastinum or spleen. In this study, 34% of patients developed local complications. Presence of local complications was positively associated with CT grading. There was evidence of development of local complications in patients with mild pancreatitis. In our study, radiological intervention was needed in 4 patients (8 %) of grade 4, 6 and 10. Aspiration of ascites and pleural effusion was needed in 10 patients (20%) with grade 4 to 10 of pancreatitis. Thus, patients who need intervention have more moderate and severe CT grades.

CONCLUSION

CECT is useful to differentiate between edematous and necrotizing types of pancreatitis. The MCTSI score helps in better evaluation of pancreatic necrosis grading.

MCTSI grading correlates more accurately with the development of local and systemic complications in AP.

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