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Role of CT in Evaluation of Acute Pancreatitis using Modified CT Severity Index: A Descriptive Study

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Abstract

Background: Acute pancreatitis is an inflammatory disease of the pancreas with variable severity ranging from mild interstitial inflammation to severe necrotizing pancreatitis. Contrast-enhanced computed tomography (CECT) plays a crucial role in evaluating pancreatic inflammation, necrosis and associated complications. Modified CT Severity Index (MCTSI) is widely used for severity assessment. Aim: To evaluate the role of CT in acute pancreatitis using Modified CT Severity Index and correlate with clinical outcome.

Materials and Methods: A descriptive observational study was conducted on 85 patients with clinically suspected acute pancreatitis who underwent contrast-enhanced CT examination using a multi detector CT scanner. CT findings were graded using CT Severity Index (CTSI) and Modified CT Severity Index (MCTSI).

Results: Diffuse pancreatic enlargement and peripancreatic inflammatory changes were the most common CT findings. Pleural effusion was the most frequent extra pancreatic complication. Higher MCTSI grades correlated with pancreatic necrosis and adverse clinical outcomes.

Conclusion: CECT is an essential imaging modality for evaluating acute pancreatitis. MCTSI is a reliable imaging-based scoring system for predicting disease severity and prognosis.

Keywords: Acute pancreatitis, CECT, CT severity index, Modified CT severity index, pancreatic necrosis

Introduction

Acute pancreatitis is an inflammatory condition characterized by sudden onset abdominal pain and elevated pancreatic enzyme levels. The clinical spectrum ranges from mild self-limiting inflammation to severe necrotizing pancreatitis with systemic complications and significant mortality.

Contrast-enhanced CT is the most widely used imaging modality for evaluating acute pancreatitis. It enables

assessment of pancreatic inflammation, detection of necrosis, evaluation of peripancreatic collections and identification of vascular complications.

The CT Severity Index proposed by Balthazar integrates pancreatic inflammation and necrosis. The Modified CT Severity Index further incorporates extra pancreatic complications and has shown improved correlation with clinical outcome. The present study evaluates CT findings in patients with acute pancreatitis and assesses the usefulness of MCTSI in predicting disease severity and outcome.

Materials and Methods

This descriptive observational study was conducted in the Department of Radiodiagnosis at MGM Medical College and Hospital, Navi Mumbai. Eighty-five patients with clinically suspected acute pancreatitis underwent contrast-enhanced CT examination.

CT imaging protocol included non-contrast scan followed by arterial phase, portal venous phase and delayed phase acquisitions after intravenous contrast administration.

CT findings including pancreatic enlargement, peripancreatic inflammatory changes, fluid collections, pancreatic necrosis and vascular complications were evaluated. Severity grading was performed using CT Severity Index and Modified CT Severity Index. Clinical outcomes including medical management, surgical intervention and mortality were recorded.

Results

Demographic and imaging findings are summarized in the following tables.

Age Distribution

Parameter	Frequency	Percentage
18–20	1	1.2%
20–40	39	45.9%
41–60	39	45.9%
>60	13	15.3%

Gender Distribution

Parameter	Frequency	Percentage
Male	47	55.3%
Female	38	44.7%

Pancreatic Size

Parameter	Frequency	Percentage
Focal enlargement	8	9.4%
Diffuse enlargement	77	90.6%

Pancreatic Contour

Parameter	Frequency	Percentage
Regular	3	3.5%
Irregular	82	96.5%

Fluid Collections

Parameter	Frequency	Percentage
Nil	61	71.7%
Single	13	15.2%
Multiple	11	12.9%

Pancreatic Necrosis

Parameter	Frequency	Percentage
None	42	48.2%
<30%	19	22.4%
30–50%	13	15.3%
>50%	11	12.9%

Main Pancreatic Duct

Parameter	Frequency	Percentage
Normal	79	92.9%
Dilated	6	7.1%

Complications

Parameter	Frequency	Percentage
Pseudocyst	7	8.2%
Abscess	2	2.4%
Pleural Effusion	63	74.1%

Vascular Complications

Parameter	Frequency	Percentage
Splenicvein thrombosis	26	30.6%
Portal vein thrombosis	14	16.5%
SMV thrombosis	6	7.1%

Ascites

Parameter	Frequency	Percentage
Present	81	95.3%
Absent	4	4.7%

CTSI Grade

Parameter	Frequency	Percentage
Mild	39	45.9%
Moderate	31	36.5%
Severe	15	17.6%

MCTSI Grade

Parameter	Frequency	Percentage
Moderate	59	69.4%
Severe	26	30.6%

Outcome

Parameter	Frequency	Percentage
Medical management	66	77.6%
Surgical management	9	10.6%
Death	10	11.8%

CT Imaging Findings

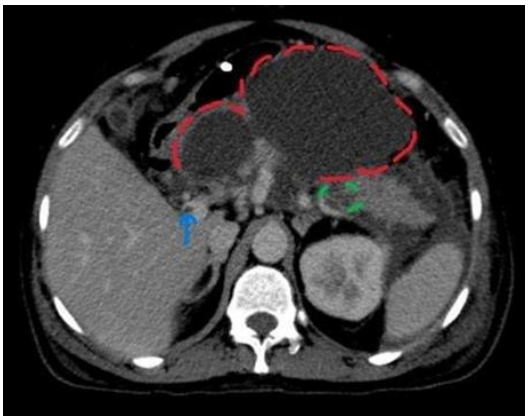

Figure 1: Blue Arrow : Portal Vein Thrombosis, Red Lin: Acute Necrotic Collection & Green Line : Necrotic Pancreatic Parenchyma

Figure 2: Blue Arrow : Superior Mesenteric Vein Thrombosis

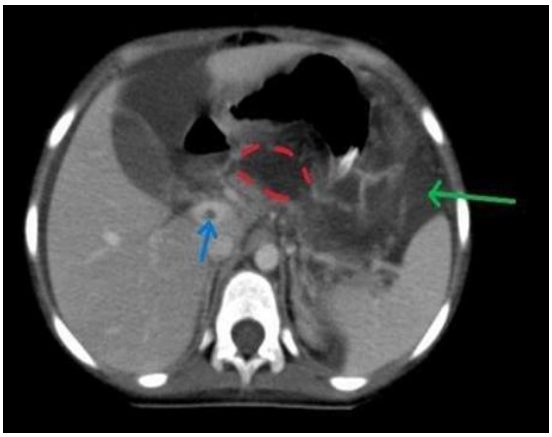

Figure 3: Blue Arrow: Portal Vein Thrombosis, Red Line : Necrotic Pancreatic Parenchyma & Green Arrow : Ascites

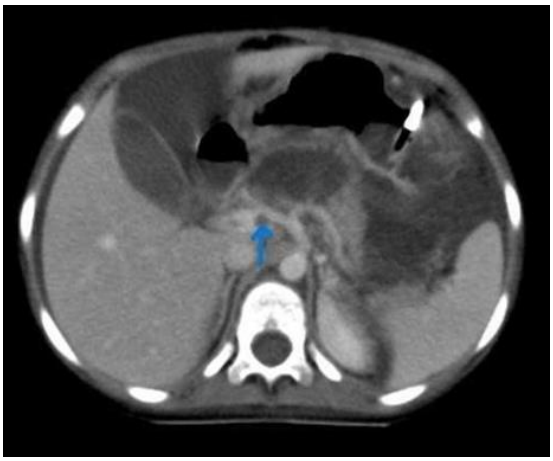

Figure 4: Blue Arrow: Spleno- Portal Venous Thrombosis

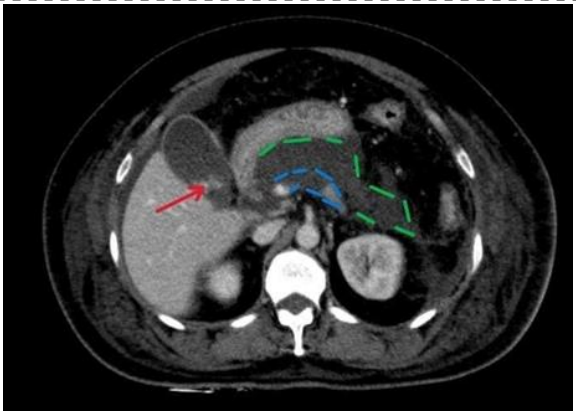

Figure 5: Blue Arrow: Splenic Vein Thrombosis, Green Line : Necrotic Pancreatic Parenchyma & Red Line : Gall Bladder Stones

Figures 6 & 7: CT demonstrating emphysematous splenic abscess with rupture and collection

Figures 8: CT demonstrating pseudocyst of pancreas

Parameters	Score
Pancreatic inflammation	
• Normal pancreas	0
• Intrinsic pancreatic abnormalities with or without inflammatory changes in peripancreatic fat	2
• Pancreatic or peripancreatic fluid collection or peripancreatic fat necrosis	4
Pancreatic necrosis	
None	0
30% or less	2
More than 30%	4
Extra-pancreatic complications	
One or more extra pancreatic complications	2
Total	10

0-2→mild pancreatitis.
4-6→ moderate pancreatitis.
8-10→severe pancreatitis.

Figure 9: Modified CT Severity Index

Discussion

Contrast-enhanced CT plays a crucial role in the evaluation of acute pancreatitis. Diffuse pancreatic enlargement and peripancreatic inflammatory changes were the most frequent imaging findings in this study. Pleural effusion represented the most common extra pancreatic manifestation.

The Modified CT Severity Index demonstrated correlation with severity parameters including pancreatic necrosis and fluid collections. Several studies have

reported that MCTSI provides improved prognostic value compared with the conventional CT Severity Index because it incorporates extra pancreatic complications.

Early CT evaluation therefore assists clinicians in identifying high-risk patients and planning appropriate management strategies.

Conclusion

Contrast-enhanced CT is an essential imaging modality for evaluating acute pancreatitis. Modified CT Severity Index is a reliable scoring system for assessing disease severity and predicting clinical outcomes.

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