

MCTSI in the Evaluation of Acute Pancreatitis and its Prognostic Correlation

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Abstract: Contrast Enhanced CT (CE-CT) is considered to be the gold standard imaging modality in the evaluation of patients with acute pancreatitis[1]. Multiple factor scoring systems are available which are difficult to use and have poor predictive powers. Imaging based scoring is found to be more relevant[2]. Modified CT severity index (MCTSI), proposed by Mortelet et al.[3], correlates more closely with the patient outcome measures like the occurrence of infections, organ failure, the need for surgical or percutaneous intervention, the length of hospital stay, and death. The aim of this study is to grade the CT findings of patients with acute pancreatitis according to the modified CT severity index and to correlate the grading system with patient outcome. Over a period of 24 months, 30 patients on clinical suspicion/diagnosis of acute pancreatitis referred to Department of Radio-diagnosis, K.S Hegde Medical Hospital for computed tomography scan of abdomen and pelvis were studied. They were included in the study if they met the inclusion and exclusion criteria. The severity of pancreatitis was scored using Modified CT severity index and the clinical outcome parameters were collected for correlation. Out of the 30 cases with acute pancreatitis, it was observed that males were more commonly affected than females. 56.7% had severe, 40% had moderate and only one patient in the sample had pancreatitis which was classified as mild according to MCTSI score. Duration of hospital stay, percentage of mortality and interventions that the patients had to undergo due to the complications was much higher among those patients who had higher severity according to MCTSI score. CECT was found to be an excellent imaging modality to diagnose acute pancreatitis and its complications. The Modified CT Severity Index is an easy tool which helps in grading the severity of acute pancreatitis, with statistically significant positive correlation of MCTSI score found with that of frequency of intervention and a trend of positive correlation with duration of hospital stay and mortality.

Keywords: Modified CT severity index (MCTSI), Acute pancreatitis, Computed tomography (CT).

1. Introduction

Acute Pancreatitis is a common pathology presenting as an acute abdomen in the emergency department. This condition is broadly classified into two types; edematous or mild acute pancreatitis and necrotizing or severe acute pancreatitis

Majority of patients have the mild form of interstitial pancreatitis which is often self-limiting. However 20% have severe acute form of pancreatitis which results in complications with significant morbidity and mortality.

The diagnosis of acute pancreatitis is made based on medical history, clinical presentation, laboratory investigations and radiological studies. Among the imaging modalities, Contrast Enhanced CT (CE-CT) is considered to be the first line imaging modality.

The CT imaging features of acute pancreatitis include focal or diffuse enlargement of the pancreas, peripancreatic fat stranding, peripancreatic fascial thickening and fluid collections. The role of imaging is not only to diagnose acute pancreatitis but to demonstrate the presence and extent of pancreatic necrosis and the complications of acute pancreatitis.

Ideally, doing CECT after 48-72 hours of onset of an acute attack, increases the chances of picking the necrotizing pancreatitis [4]. CT has an overall accuracy of 87% and sensitivity and specificity of 100% in the detection of pancreatic necrosis [5].

Treatment of patients with acute pancreatitis is predicated based on the initial assessment of the rigor of the disease. Multiple scoring systems are available which are difficult to use and have poor predictive powers. Clinical grading systems like RANSON and APACHE II scores are used today as indicators of disease severity. The RANSON score cannot be used for the first 48 hours and the APACHE score is complicated to utilize. Imaging based scoring is found to be more relevant.

The modified CT severity index (MCTSI) proposed by Mortelet et al.[3] (Table 1) which is easier to calculate & reproduce is found to correlate more closely with the patient outcome.

2. Aims and Objectives

- 1) To grade the CT findings of patients with acute pancreatitis according to the modified CT severity index
- 2) To correlate the grading system with patient outcome.

3. Methodology

3.1 Source of data

This was a hospital based prospective study done in the Department of Radio diagnosis, K.S.Hegde medical hospital for a period of two years from October 2015 to October 2017. Patients with acute pancreatitis referred for CECT abdomen and pelvis were included in this study.

3.2 Inclusion criteria

Patients admitted with clinical and laboratory diagnosis of acute pancreatitis

3.3 Exclusion criteria

- 1) Pancreatitis due to trauma.
- 2) Patients with history of allergy to iodinated contrast agents.
- 3) Patients with deranged Renal function test

3.4 Assessment of Severity of Acute Pancreatitis

The severity of pancreatitis was scored using Modified CT severity index and classified into
 Mild Pancreatitis MCTSI score 0-2
 Moderate Pancreatitis MCTSI score 4-6
 Severe Pancreatitis MCTSI score 8-10

Table 1: Modified CT severity index for severity of acute pancreatitis (MDCTSI)

Prognostic indicator		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%	2
	≥ 30%	4
Extra Pancreatic Complications	Pleural Effusion, ascites, vascular complications, parenchymal complications, gastrointestinal tract involvement	2

2.5 Clinical Outcome Parameters

Clinical outcome parameters were collected for correlation from respective referral departments included, the length of hospital stay (in days), need for surgical intervention and death.

4. Results

30 cases were diagnosed as acute form of pancreatitis and were included in this study. There were predominantly males and the mean age of our patients was 40.03 ± 15.97 years.

About 40% had moderate pancreatitis, 56.7% had severe pancreatitis according to MCSTI. Only one patient in the sample had pancreatitis which was mild in severity. This patient with mild pancreatitis was 38 years of age and the cause for pancreatitis was unknown.

Table 2: Demographics and MCTSI score of the sample

		Frequency (%)
Gender	Male	25 (83.3)
	Female	05 (16.7)
Severity of Pancreatitis	Mild	01 (3.3)
	Moderate	12 (40.0)
	Severe	17 (56.7)

None of the patients had normal pancreas on CT scan. Intrinsic pancreatic abnormality was seen in 06 (20%) & pancreatic fluid collection or fat necrosis was seen in 24 (80%) of patients. Pancreatic necrosis was seen in 20 (66.7%) of whom majority 12 (40%) had necrosis involving more than 30% of the pancreas. 28 (93.3%) of our patients had extrapancreatic complications. Among these complications effusion and ascites was seen in 19 (63.3%) & 21 (70%) of patients. Other complications were splenic vein thrombosis, pancreatic pseudocyst, duodenal wall thickening, intestinal obstruction and subdiaphragmatic abscess.

Table 3: Individual parameters of MCTSI score

Variables	Frequency (%)
Normal Pancreas	0
Intrinsic pancreatic abnormality	06 (20)
Pancreatic fluid collection / fat necrosis	24 (80)
Pancreatic Necrosis	20 (66.7)
Necrosis < 30%	08 (26.7)
Necrosis > 30%	12 (40)
Extra Pancreatic Complication	28 (93.3)

Duration of hospital stay was longer (table 3) [18.53 ± 14.37 vs 13.0 ± 7.27] among severe cases with most of the patients being admitted for more than 2 weeks.

Table 4: Duration of hospital stay

Variables	Moderate Pancreatitis	Severe Pancreatitis
Hospital stay in days (Mean ± SD)	13.0 ± 7.27	18.53 ± 14.37

The percentage of mortality [04 (23.5%) vs 01 (8.3%)] and interventions [06 (35.3) vs 01 (8.3)] that the patients had to undergo due to the complications was much higher among those patients who had higher severity according to MCTSI score. But these differences were not statistically significant. With regards to that of complication there were no differences between the groups. However diabetes was seen in patients with moderate disease. Cardiac arrest, Spontaneous bacterial peritonitis, cystopleural fistula and multiorgan dysfunction syndromewas seen only in patients with severe pancreatitis. There were 2 patients with sepsis in shock, one in moderate and the other belonged to severe disease.

Table 5: Comparison of outcomes in moderate and severe pancreatitis

Variables	Moderate Pancreatitis N=12 n (%)	Severe Pancreatitis N=17 n (%)	p- value
Death	01 (08.3)	04 (23.5)	0.370
Intervention done	01 (08.3)	06 (35.3)	0.187
Dialysis	00	01 (05.9)	1.00
Tracheostomy	00	03 (17.6)	0.246
Cystogastrostomy	00	02 (11.8)	0.498
ICD insertion	00	02 (11.8)	0.498
Cholecystectomy	01 (8.3)	00	0.414

5. Discussion

This study was a prospective observational study conducted in a tertiary care center located in coastal region of South India where the majority of our patient input is from Kerala where pancreatitis is quite prevalent.

The mean age of our sample was 40.03 ± 15.97 years with male: female ratio of 5:1. This in contrast to other studies where the male: female ratio was much lower. A prospective study by Block et al [6] consisted of 61 (65.6%) males and 32 (34.4%) with a male to female ratio of 2:1. Silverstein et al [7], in his prospective study of 102 patients, also had a male to female ratio of 2:1.

All the patients who underwent CECT of the abdomen and pelvis were graded according to the Modified CT severity index. The modified CT severity index score depicted that our sample had higher severity of pancreatitis. The severity of our patients was in according to studies conducted elsewhere in India where severe forms of pancreatitis constituted majority of patients. 44% severe pancreatitis and 38% moderate pancreatitis constituted the number of cases in a study by Sameer Raghuwanshi et al [8] in Northern India.

None of the patients had normal pancreas on CT scan. Pancreatic necrosis involving more than 30% was common. Extrapancreatic complications included effusion, ascites, splenic vein thrombosis, pancreatic pseudocyst, duodenal wall thickening, intestinal obstruction and subdiaphragmatic abscess.

Majority of patients in this study group were admitted for more than 2 weeks duration, more so in severe variety. Study conducted by Sameer Raghuwanshi et al [8] showed length of hospital stay was more in moderate variety of pancreatitis. This is in contrast to this study. However even though the duration of hospital stay and mortality was higher among patients with severe pancreatitis, it did not reach any statistical significance. But there was a positive trend of higher MCTSI score.

The percentage of mortality was higher in the group with higher disease severity. This again showed a trend of positive correlation when we compared MCTSI score with that of mortality.

According to Bollen et al [9] the MCTSI accurately correlated with extrapancreatic complication and the need

for intervention compared with clinical score indices (APACHE II). With regards to that of complication there were higher complications in higher disease severity group but was not statistically significant.

With respect to the interventions that the patients had to undergo due to the complications, it was much higher among those patients who had higher disease severity. There was a statistically significant positive correlation of MCTSI score with that of frequency of intervention.

6. Conclusion

- 1) CECT of was found to be an excellent imaging modality to to diagnose acute pancreatitis and to depict local complications.
- 2) The Modified CT Severity Index helps in accurately grading the severity of acute pancreatitis and predicting the clinical outcome. In this study, it had shown that the duration of hospital stay was higher among severe cases of pancreatitis and the percentage of mortality, interventions that the patients had to undergo due to the complications was much higher among those patients who had higher severity.

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Author Profile



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