



A STUDY OF CLINICAL PROFILE OF ACUTE PANCREATITIS PATIENTS WITH EMPHASIS ON MODIFIED CT SEVERITY INDEX AND SERUM PROCALCITONIN AS MARKERS FOR ASSESING SEVERITY

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ABSTRACT

Aim: To study the clinical profile of acute pancreatitis patients and MCTSI as an index for predicting severity, I.C.U admissions and mortality of acute pancreatitis cases and also to compare it with serum procalcitonin in predicting severity. **Material and Methods:** This study was conducted in the Department of Medicine and Gastroenterology, Gauhati Medical College and Hospital for a period of one year. A total 98 acute pancreatitis were included and their clinical profile was studied. MCTSI score was calculated for all the patients and used to predict severity, I.C.U admissions and mortality. MCTSI was also compared with serum procalcitonin in assessing severity. **Results:** Male preponderance was noted in the study. The peak incidence of disease was noted in the 3rd decade of life. Pain abdomen was found to be the most prominent clinical feature. Alcohol consumption was found to be the most common etiological factor. It was observed that mild, moderate and severe acute pancreatitis according to ATLANTA CLASSIFICATION correlated well with MCTSI scoring system. All the 19 severe acute pancreatitis cases had an MCTSI score in the severe range (p value of 0.0001 - statistically significant). The mortality rate was significantly higher in severe acute pancreatitis i.e. 57.89% as compared to mild and moderate acute pancreatitis (p value of 0.0001). The I.C.U admission rate in mild acute pancreatitis was 4.17% as compared to 100% in severe acute pancreatitis (p value 0.0001). Statistically significant difference was observed in serum procalcitonin levels (mean $\pm$ SD ng/dl) of mild, moderate and severe acute pancreatitis cases as per MCTSI scoring system (p value of 0.0001). **Conclusion:** Among the 98 cases, male to female ratio was 2.05:1. The most common cause of acute pancreatitis was ethanol abuse. The most prominent symptom was pain in the abdomen followed by vomiting. MCTSI fared well in predicting severity, mortality and I.C.U admissions in acute pancreatitis cases. The relationship of MCTSI score with serum procalcitonin in predicting severity was found to be significant.

KEYWORDS

Modified Computed tomography index (MCTSI), Acute pancreatitis, Intensive care unit (I.C.U), Procalcitonin

INTRODUCTION

Acute pancreatitis is an inflammatory process of the pancreas with involvement of local tissues and organ system. It is the 3rd leading cause of admission to hospitals for gastrointestinal diseases in the developed world and many other countries.¹

Acute pancreatitis (AP) is a common acute medical condition requiring emergent care. Yet, no prevalence data are available from India. Only some idea of incidence can be obtained from patients admitted in tertiary care centres. At the All India Institute of Medical Sciences (AIIMS), New Delhi, 276 patients with AP were hospitalized from January 2019 to June 2020, i.e. about 55 patients per year. This is about the same as in similar centres of England. The incidence of AP has, however, been reported to be much higher in the USA, Finland and Scotland (49.3, 46.6 and 41.9 per 100,000 population, respectively). Furthermore, it has been noted that the incidence of AP has been steadily rising during the last decade in European countries and the UK.²

Gallstones and alcohol are the most common causes of AP, gallstone diseases being about twice as common as alcohol in our population. Other causes include hypertriglyceridemia, hypercalcemia, post endoscopic retrograde cholangiopancreatography (ERCP) and drug-induced pancreatitis, but they are much less common. Microlithiasis is perhaps also fairly common especially in those who present with recurrent AP and should be looked for carefully using endoscopic ultrasound (EUS). Among toxin-induced pancreatitis, smoking is being increasingly incriminated as an important causative factor.

The diagnosis of acute pancreatitis involves combination of symptoms, physical examination and focused laboratory values and requires 2 of the following 3 features: (1) Typical pancreatic type of acute upper abdominal pain often radiating through to the back, (2) serum amylase or lipase activity greater than 3 times the upper limit of normal, (3) findings on abdominal imaging consistent with acute pancreatitis.³

First, on admission it is important to identify patients with potentially

severe acute pancreatitis who require aggressive early treatment. Second, in a secondary care setting, clinicians need to identify such patients for possible transfer to specialist care. Third, for specialists who receive such referrals, there are advantages to stratifying these patients into subgroups based on the presence of persistent organ failure and local or systemic complications.⁴

Since the morbidity and mortality of AP differ markedly between mild and severe disease (mild < 5% vs severe 20–25%), it is very important to assess severity as early as possible.⁵ Although severe pancreatitis occurs in less than 30% of cases, it accounts for more than 90% of the mortality attributed to acute pancreatitis.

Balthazar et al⁶ described the utility of contrast enhanced computed tomography (CT) for evaluating the severity of AP and developed the Balthazar computed tomography index (BCTSI) based on contrast-enhanced CT, but this system was based on local complications and did not reflect systemic inflammatory response syndrome.

Many other single prognostic markers have been suggested. They include obesity (BMI > 30), plasma glucose greater than 190 mg/dL, SIRS greater than or equal to 2, serum procalcitonin (> 3.8 ng/ml), C-reactive protein greater than 150 mg/L.⁶

Due to the paucity of literature regarding similar studies conducted in North East India, this subject is taken up for the present study in which we will be studying the clinical profile of acute pancreatitis patients in our hospital and will also be comparing MCTSI in assessing severity, ICU admission and mortality in acute pancreatitis cases.

AIM

1. To study the clinical profile of acute pancreatitis patients
2. To compare modified computed tomography severity index (MCTSI) with serum procalcitonin in predicting severity of acute pancreatitis and to study modified computed tomography severity index (MCTSI) in predicting severity, ICU admissions and mortality of acute pancreatitis.

MATERIAL AND METHODS

This is a hospital based prospective type of observational study which was conducted in medicine and gastroenterology department of Gauhati medical college & hospital from 1st June 2021 to 30th May, 2022 after taking informed consent from each case before the study. All patients of age ≥ 13 years and diagnosed as acute pancreatitis as per the Atlanta classification were included in the study. The patients with pancreatic malignancy, pregnant women, chronic pancreatitis, connective tissue disorders, chronic kidney disease, chronic liver disease were excluded from the study. For all included cases proper history was taken and recorded in a pretested proforma which included age, sex and etiological factor. The subjects were then divided as mild, moderate and severe acute pancreatitis according to the ATLANTA CLASSIFICATION. All the included subjects underwent CT scan of whole abdomen and were categorised as mild, moderate and severe acute pancreatitis according to MCTSI scoring system and this scoring system was used to predict severity, ICU admissions and mortality of the patients. A laboratory investigation serum procalcitonin was also done for the patients and it was studied as a marker to predict severity by comparing it with MCTSI score. The study protocol was approved by the institutional ethical committee.

RESULTS

The present study comprised of 98 patients of acute pancreatitis out of which 66(67.3%) were males and 32(32.7%) were females. It was observed that the highest distribution of cases was in the age group 23-32 years. The mean age observed in this study was 38 years. The peak incidence of disease was noted in the 3rd decade of life. In this study, pain abdomen was found to be the most prominent clinical feature. Alcohol consumption was found to be the most common etiological factor associated with acute pancreatitis followed by gallstone disease. In 43.9 % of the patients, alcohol was found to be the cause of the disease and in 23.5% of cases gallstones were found to be the etiological factor which is the second most common cause followed by common bile duct stones accounting for 7.1% of the cases. Out of 98 cases, 49% of cases were diagnosed as mild, 31.6 % of the cases were diagnosed as moderate and 19.4% were diagnosed as severe acute pancreatitis according to Atlanta 2012 severity classification.

It was observed that mild, moderate and severe acute pancreatitis according to ATLANTA CLASSIFICATION correlated well with MCTSI scoring system. Out of 48 cases of mild acute pancreatitis, 91.67% had a mild MCTSI score. 86.21% cases of moderate acute pancreatitis had a moderate MCTSI score and 100 % cases of severe acute pancreatitis had a MCTSI score in the severe range. After calculating their difference, the p value was found to be 0.0001 which is statistically significant (table:1). The mortality rate was significantly higher in severe acute pancreatitis i.e. 57.89% as compared to mild and moderate acute pancreatitis according MCTSI scoring system (p value of 0.0001). Thus MCTSI score helps in predicting mortality of acute pancreatitis (table:2). The I.C.U. admission rate in mild acute pancreatitis was 4.17% as compared to 100 % in severe acute pancreatitis as per MCTSI (p value 0.0001). Thus, MCTSI also helps in predicting ICU admissions. The relationship of serum procalcitonin was observed with MCTSI scoring system. The mean for mild acute pancreatitis was 0.8 ± 2.1 ng/ml, mean for moderate acute pancreatitis was 2.1 ± 4.5 ng/ml and mean for severe acute pancreatitis was 13.9 ± 22.5 ng/ml. There is a significant difference in the mean $\pm$ SD with a p value of 0.0001.

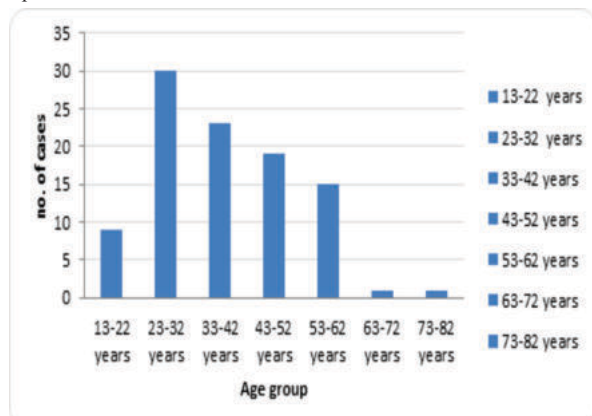


Fig :1 (Distribution Of Cases According To Age)

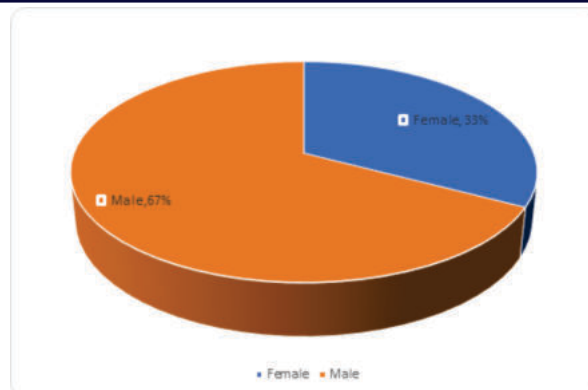


Fig :2 (A Pie Diagram Showing Gender-based Distribution)

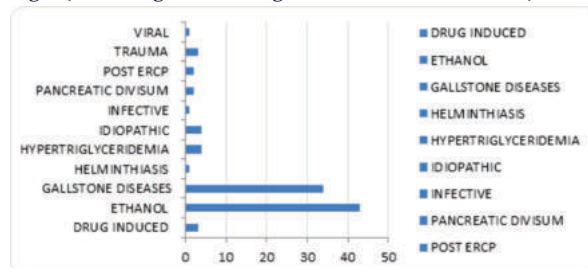


Fig :3 (Distribution Of Cases According To Etiology)

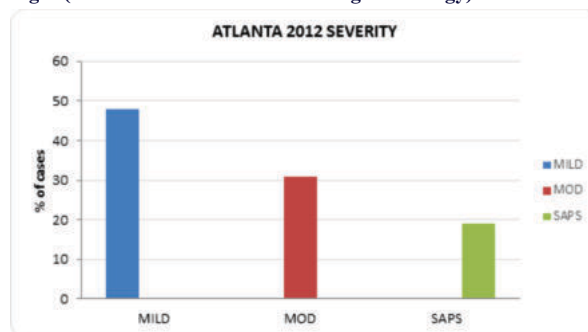


Fig:4 (Distribution Of Cases According To Atlanta Classification)

Table:1(Comparison Of MCTSI With Atlanta Classification In Predicting Severity)

		Mild		Mod		Saps		Total		
		N	%	N	%	N	%	N	%	
MCTSI Score	Mild	44	91.67%	4	13.79%	0	0.00%	48	50.00%	0.0001
	Moderate	4	8.33%	27	86.21%	0	0.00%	31	30.21%	
	Severe	0	0.00%	0	0.00%	19	100.00%	19	19.79%	

Table :2 (Comparison Of MCTSI With Atlanta Classification In Predicting Mortality)

		MCTSI Category								
		Mild		Moderate		Severe		Total		
		N	%	N	%	N	%	N	%	p-value
Mortality	No	47	97.92%	27	86.21%	8	42.11%	80	83.33%	0.0001
	Yes	1	2.08%	4	13.79%	11	57.89%	16	16.67%	

Table:3(Comparison Of MCTSI With Atlanta Classification In Predicting I.C.U Admissions)

		MCTSI Category								
		Mild		Moderate		Severe		Total		
		N	%	N	%	N	%	N	%	p-value
I.C.U admission	no	46	95.83%	21	65.00%	0	0.00%	67	67.14%	0.0001
	yes	2	4.17%	10	34.48%	19	100.00%	31	32.92%	

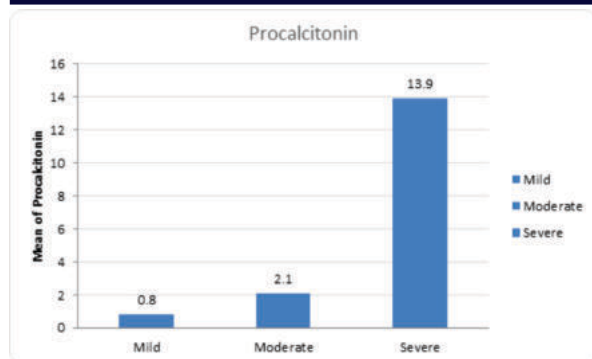


Fig:5 (Bar Diagram Showing Mean Values Of Serum Procalcitonin In Mild, Moderate And Severe Acute Pancreatitis)

Table:4 (Comparison Of Mctsi With Serum Procalcitonin)

	MCTSI Category								
	Mild		Moderate		Severe		Total		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	p-value
Procalcitonin	0.8	2.1	2.1	4.5	13.9	22.5	3.8	11.4	0.0001

DISCUSSION

Many studies have been carried out regarding severity of acute pancreatitis. The conclusion reached depends upon the number of cases studied, the geographic areas encompassed, the type of researchers and the scope of diagnostic modalities used to evaluate the patients enrolled in series. Out of 98 patients, 66(67.3%) were males and 32(32.7%) were females. The male to female ratio comes out to be 2.05:1. Senapati et al 2014⁷ found the male:female ratio of 1.6:1. Cho et al 2013⁸ found a similar ratio of 2.3:1. This is in contrast to most western studies where both sexes were equally affected. An Indian study conducted by Vaidya et al⁹ revealed similar age and sex distribution. This male preponderance in the present study is due to the significant prevalence of alcohol consumption in men in this part of India. F. Wylie et al 1977¹⁰ have also found results with male preponderance.

All patients of acute pancreatitis present with pain abdomen. In this study pain abdomen was found to be the most prominent clinical feature. 77.6% of the patients had pain abdomen as the most prominent feature followed by vomiting as the second most common feature. John Trapnell et al 1977¹¹ found vomiting as the second commonest symptom. Difficulty in breathing was found to be the most prominent feature in 2% of the patients and fever was found to be the most prominent feature in 2% of patients. Khanna et al 2013¹² found breathlessness in 22(30.6%) patients.

In this study alcohol consumption was found to be the most common etiological factor associated with acute pancreatitis. In 43.9% of the patients, alcohol was found to be the cause of the disease. In 23.5% of cases, gallstones were found to be the etiological factor which is the second most common cause followed by common bile duct stones accounting for 7.1%. Baig et al 2008¹³ also found alcoholism to be the main etiological factor. In the BISAP study by Wu et al¹⁴, gallstone contributed 23.8% cases and alcohol was responsible in 21.1% cases. In the study done by Koushik AK et al 2015¹⁵, alcohol induced pancreatitis was higher (51%) than gallstone induced pancreatitis.

MCTSI For Predicting Clinical Severity And Mortality

We have observed the correlation of mild, moderate and severe acute pancreatitis as per ATLANTA CLASSIFICATION with MCTSI scoring system. Out of 48 cases of mild acute pancreatitis, 91.67% (44 cases) had mild MCTSI score. Out of 31 cases of moderate acute pancreatitis, 86.21% had a moderate MCTSI score and of the 19 cases of severe acute pancreatitis, all the 19 cases had a MCTSI score in the severe range. After calculating their difference, the p value was 0.0001 which is statistically significant.

It was found that the mortality rate was significantly higher in severe acute pancreatitis i.e. 57.89% as compared to mild and moderate acute pancreatitis as per the MCTSI scoring system (p value of 0.0001). Thus, MCTSI score helps in predicting mortality of acute pancreatitis. It was also found that I.C.U. admission rate in mild acute pancreatitis was 4.17% as compared to 100% in severe acute pancreatitis as per MCTSI (p value 0.0001). Thus, MCTSI also helps in predicting ICU

admissions.

Balthazar et al⁵ introduced the CT severity index for assessment of AP, which correlates well with morbidity, mortality, and length of hospital stay. Simchuk EJ et al¹⁶ reported significant correlation with mortality and MCTSI. As the MCTSI increases, the mortality rates also increase. Balthazar et al⁵ and Mortelet et al¹⁷ showed a significant association between the CT scoring systems and clinical severity of disease and all severity parameters.

For assessing severe acute pancreatitis, the cut off for serum procalcitonin according to ROC was ≥ 0.5 ng/dl with AUC of 0.817 and with a sensitivity 82.35% and specificity of 72.84%. In this study, the mean for predicting severe AP came out to be 13.9 ± 22.5 ng/dl. Disa Brendon et al¹⁸ have found that using ROC curves, a cut off value of >0.5 ng/mL at admission for plasma procalcitonin was 100% sensitive and 80% specific for predicting antibiotic requirement in patients with pancreatitis. Plasma PCT is an excellent marker of sepsis. However, many non-infectious, pro-inflammatory states such as major trauma, drugs stimulating release of proinflammatory cytokines, prolonged cardiogenic shock, and prolonged organ hypoperfusion can all cause raised plasma levels of PCT. Pancreatitis, if severe, can also cause massive release of proinflammatory cytokines with a corresponding rise in plasma PCT levels. Studies have proved that this rise in plasma PCT values is a predictor of disease severity. Plasma PCT value within 24 h of admission can be used as a predictor of prognosis and subsequent values predict the development of infected pancreatic necrosis.

CONCLUSION

It has been observed that the highest distribution of cases was noted in the 3rd decade of life. Among the 98 patients, male to female ratio was 2.05:1. In this study, the most common cause of acute pancreatitis was ethanol abuse. The most common and most prominent symptom was pain in the abdomen followed by vomiting. MCTSI helps in predicting severity, mortality and I.C.U admissions in acute pancreatitis cases. The relationship of MCTSI score with serum procalcitonin in predicting severity was found to be significant.

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