

COMPARATIVE STUDY OF MODIFIED ATLANTA CLASSIFICATION WITH MODIFIED CT SEVERITY INDEX IN ACUTE PANCREATITIS

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ABSTRACT

Aim: The aim of this study was to evaluate the severity of acute pancreatitis using modified Atlanta classification at admission and at 48 h and to compare severity of AP as assessed by modified Atlanta classification with modified CTSI in the second week.

Methods: The present study was conducted in patients admitted in BRD Medical College, Gorakhpur. The study was conducted for a period of 1 year and 3 months from September 2021 to December 2022. Thirty four patients with acute pancreatitis presenting to BRD Medical College, Gorakhpur, fulfilling the inclusion criteria were included in the study.

Results: A total of 35.2% patients belonged to age group of 30 years, 29.4% belonged to age group of 31-40 years, 14.8% belonged to age group of 41-50 years, 20.6% belonged to age group of >50 years. Mean age of different groups, the mean values of mild 42.4 years, moderate 37.18 years and severe 31.33 years. The study included out of 34 patients 21 (61.7%) male patients and 13 (38.3%) female patients. The Serum Amylase levels decreased sharply at 48 hrs. Serum Lipase values remained elevated till 48 hrs and come down at 48 hrs. Modified Atlanta Classification was repeated at 48 hrs which classified 9(26.4%) as mild, 19(55.9%) as moderate and 6(17.7%) severe AP out of 34 patients. Sensitivity and Specificity of 100% and 100% with PPV and NPV of 100% and 100% respectively was found for severe AP (p value=0.0004).

Conclusion: On the basis of the our study we concluded that Modified Atlanta Classification accurately classifies the patients at 48 hrs into mild, moderate and severe type of acute pancreatitis in comparison to the objective findings revealed at 14 days by using Modified CTSI.

Keywords: Modified Atlanta Classification (MAC), Modified CTSI, Acute Pancreatitis

1. INTRODUCTION

Acute pancreatitis is an acute inflammatory disease of the pancreas with variable involvement of other regional tissue or remote organ which can lead to a systemic inflammatory response syndrome with significant morbidity and mortality.¹ It can vary from mild self-limited disease with only minimal or transient systemic manifestations in approximately 80-90% of patients, to a clinically severe form in 10-20% with variety of local and systemic complications, a prolonged hospital course, significant morbidity and mortality.² Gallstone is the most common cause of acute pancreatitis followed by alcohol contributing to 38% and 36% cases respectively.³

To evaluate the severity early in the disease and initiate appropriate treatment as early as possible, several prognostic and severity scoring systems such as RANSON, IMRIE Scores, APACHE II Score Systems, Bedside Index, BISAP and Harmless Acute Pancreatitis Score (HAPS) have been developed, but these methods are time taking, complicated, cumbersome and insufficiently sensitive in predicting the development of Severe Acute Pancreatitis (SAP). Recently a web-based consultative process involving multiple international pancreatic societies, revised and updated the Original Atlanta Classification for Acute Pancreatitis according to which the severity of the disease has been classified as mild, moderately severe and severe types by using Modified Marshall scoring. as defined by the absence or presence of transient or persistent organ failure and local or systemic complications.⁴ Conventionally, contrast-enhanced computer tomography (CECT) has been used as the gold standard in classifying the severity of AP into mild, moderate, and severe using modified CT severity index (CTSI). Computed Tomography Severity Index (CTSI), developed by Balthazar and modified by Silverman and colleagues in 2004 is used to determine the morphological severity of Acute pancreatitis which is based on scoring the presence and degree of pancreatic inflammation and pancreatic necrosis, and also helps in prognostic outcome. It allows a confident non-invasive assessment of pancreatic necrosis and is considered. The reference standard for diagnosis of necrosis with accuracy of >90%.⁵

The original Atlanta Classification after being revised in 1992 received considerable criticism over the subsequent two decades. It was recognised that the persistence of organ failure mattered more than the mere presence of organ failure in determining the morbidity and mortality of Acute Pancreatitis.⁶⁻⁸ For the definition of organ failure, the revision of the Atlanta Classification suggested Modified Marshall scoring system. Recently a web-based consultative process involving multiple international pancreatic societies, revised and updated the Original Atlanta Classification for Acute Pancreatitis according to which the severity of the disease has been classified as mild, moderately severe and severe, as defined by the absence or presence of transient or persistent organ failure and local or systemic complications.

The aim of this study was to evaluate the severity of acute pancreatitis using modified Atlanta classification at admission and at 48 h and to compare severity of AP as assessed by modified Atlanta classification with modified CTSI in the second week.

2. MATERIALS AND METHODS

The present study was conducted in patients admitted in BRD Medical College, Gorakhpur. The study was conducted for a period of 1 year and 3 months from September 2021 to December 2022. Thirty four patients with acute pancreatitis presenting to BRD Medical College, Gorakhpur, fulfilling the inclusion criteria were included in the study.

Inclusion criteria

- Age 18-65 years.

- Acute pancreatitis irrespective of cause.
- Patient giving written informed consent.
- Patients presenting within 48 hours of onset of pain abdomen.

Exclusion Criteria:

1. AP presenting beyond 48 h of onset of pain abdomen.
2. Recurrent pancreatitis.
3. Allergy to contrast (Iohexol).
4. Treatment for pancreatitis already started.
5. Pregnant women.
6. Age below 18 years or above 65 years.
7. Patients with chronic pancreatitis suggested by intraductal calculi, ductal stricture and parenchymal calcification.
8. Other pancreatic pathology like pancreatic malignancy, cyst.
9. Any previous pancreatic surgery.

PRIMARY END POINT: The primary end point of our study was to determine the severity of acute pancreatitis according to Modified Atlanta Classification at 48 hours and Modified CT Severity Index at second week.

METHODOLOGY

Diagnosis of pancreatitis was made based on two of the following three features are present:

1. Abdominal pain consistent with acute pancreatitis (acute onset of a persistent, severe, epigastric pain often radiating to the back).
2. Serum amylase activity (or lipase activity) at least three times greater than the upper limit of normal.
3. Characteristic findings of acute pancreatitis on Ultrasound at admission and was confirmed at 48 hours.

All patients with diagnosis of acute pancreatitis were screened for the diagnosis of acute gallstone pancreatitis if gall stones are visualized on ultrasonography. All patients were admitted and detailed history, clinical examination were done and were managed conservatively. All patients underwent following investigation hemogram, renal function test, liver function test, serum electrolytes, serum lipase, and serum amylase, at admission and at 48 hours. Modified Marshall scoring was done at admission and at 48 hours to grade the severity of acute pancreatitis as per Modified Atlanta severity scoring system⁹⁵ which was shown in table 3.

GRADES OF SEVERITY (MODIFIED ATLANTA CLASSIFICATION)¹³

1. Mild Acute Pancreatitis
 - a. No organ failure
 - b. No local or systemic complications
2. Moderately severe acute pancreatitis
 - a. Organ failure that resolves within 48 hours (transient organ failure)
 - b. Local or systemic complications without persistent organ failure
3. Severe acute pancreatitis
 - a. Persistent organ failure (48 hours)
 - i) Single organ failure
 - ii) Multiple organ failure

Contrast enhanced computerized tomography (CECT) of abdomen was done at end of second week to assess CT Severity Index (MODIFIED CTSI/MORTELE).¹⁴ The Modified CTSI score was calculated by summing these values and the total score was then categorized as:

- 4) Mild pancreatitis -Modified CTSI score 0-2

- 5) Moderate pancreatitis -Modified CTSI score 4-6
- 6) Severe pancreatitis -Modified CTSI score 8-10

STATISTICAL METHODS

Quantitative data was expressed by mean and standard deviation and significance level of differences between the mean was observed by paired t-test. Qualitative data was expressed by percentages and again significance level of differences between the proportions was observed by Chi-square test. The results were expressed as percentages and a p value of <0.05 was considered for declaring the difference statistically significant Sensitivity, Specificity and Predictive value of Modified Atlanta Classification was calculated using Modified CT Severity Index as reference.

3. RESULTS

Table 1: Demographic data

Age Group (in years)	N	%
<30	12	35.2
31-40	10	29.4
41-50	5	14.8
>50	7	20.6
Total	34	100
Mean±SD	36.7 ± 11.8	
Gender		
Male	21	61.7
Female	13	38.3

Average age of the patient in the study was 34.62 years. A total of 35.2% patients belonged to age group of 30 years, 29.4% belonged to age group of 31-40 years, 14.8% belonged to age group of 41-50 years, 20.6% belonged to age group of >50 years. The study included out of 34 patients 21 (61.7%) male patients and 13 (38.3%) female patients.

Table 2: Serum Amylase and Serum Lipase value at admission and 48 hrs

Serum Amylase		
GRADING	ADMISSION	AT 48 HRS
MILD	1087	871

MODERATE	2162	944
SEVERE	2278	1010
Serum Lipase		
GRADING	ADMISSION	AT 48 HRS
MILD	1143	991
MODERATE	1121	374
SEVERE	5306	1351

Mean values of mild AP at admission, 48 hrs were 1087 and 871 respectively. Mean values of moderate AP at admission and 48 hrs were 2162 and 944 respectively. Mean values of severe AP at admission and 48 hrs were 2278 and 1010 respectively. No significance was found between Serum Amylase levels and Severity of AP (p-0.821). The Serum Amylase levels decreased sharply at 48 hrs. Mean values of moderate AP at admission and 48 hrs were 1121 and 374 respectively. Mean values of severe AP at admission and 48 hrs were 5306 and 1351 respectively. No significance was found between serum Lipase levels and severity of AP (p-0.631). Serum Lipase values remained elevated till 48 hrs and come down at 48 hrs.

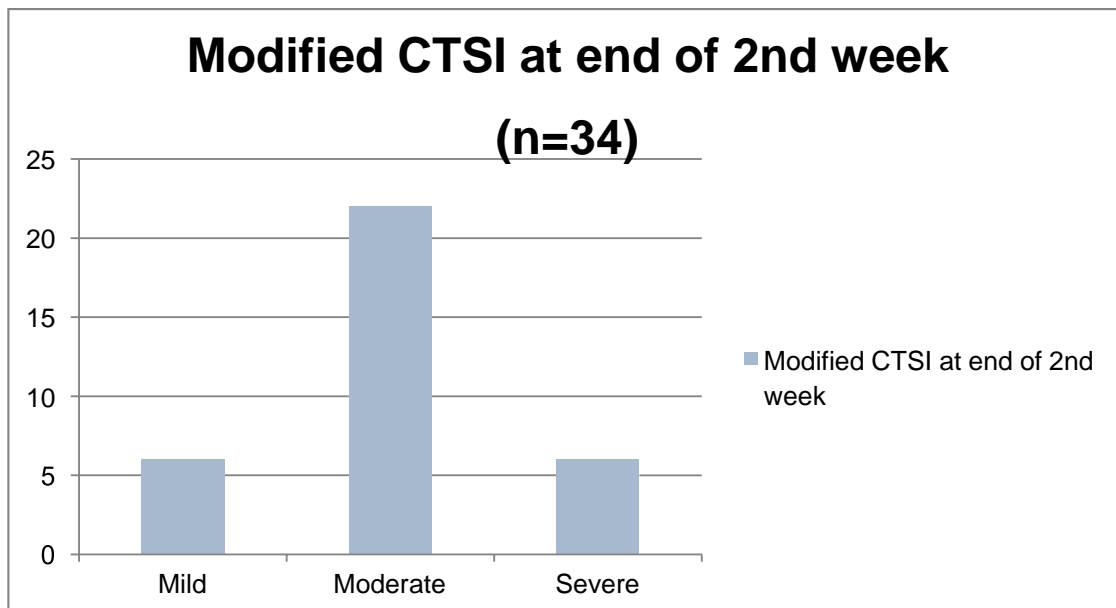


Fig. 1: Modified CTSI at end of 2 week

CECT was done at 2 week and Modified CTSI scoring was calculated as per Mortelet et al. Out of all 34 patients studied, 6 patients showed mild AP, 22 patients had moderate AP and 6 patients had severe AP.

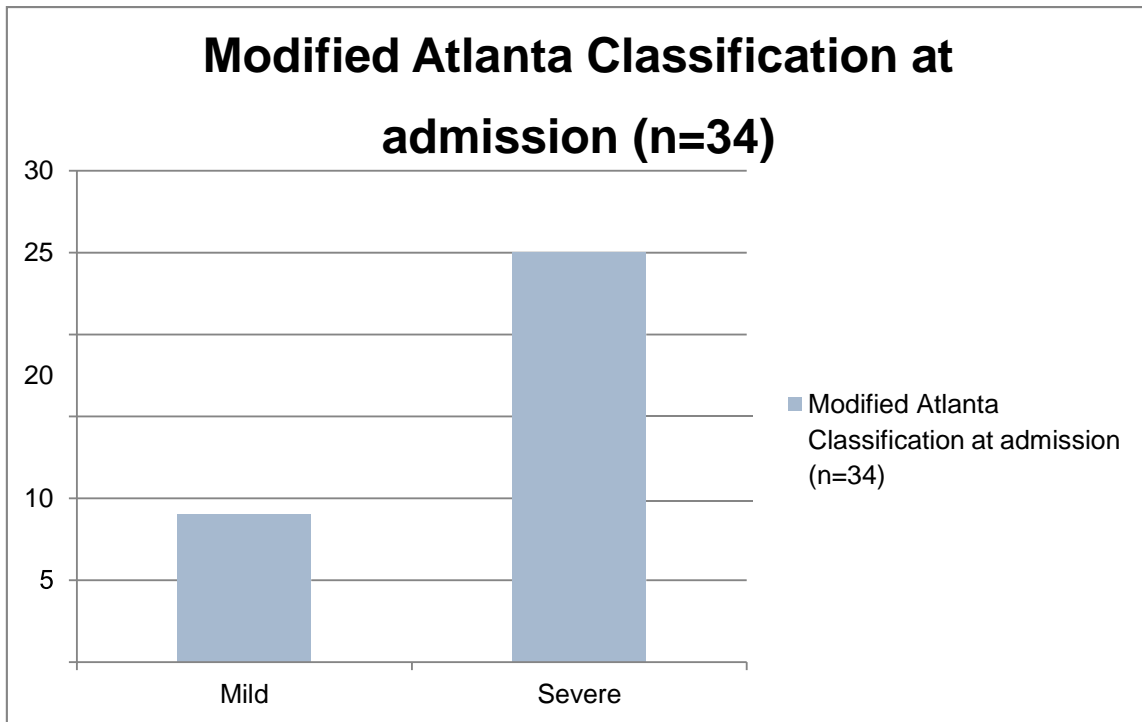


Fig. 2: Modified Atlanta classification (MAC) at admission

Modified Atlanta Classification at admission was done which classified 9 (26.4%) as mild and 25 (73.6%) as severe AP out of 34 patients. Modified Atlanta Classification at admission was not adequate to distinguish the patients of acute pancreatitis into mild, moderate and severe AP. Hence Modified Atlanta Classification at admission alone cannot be relied.

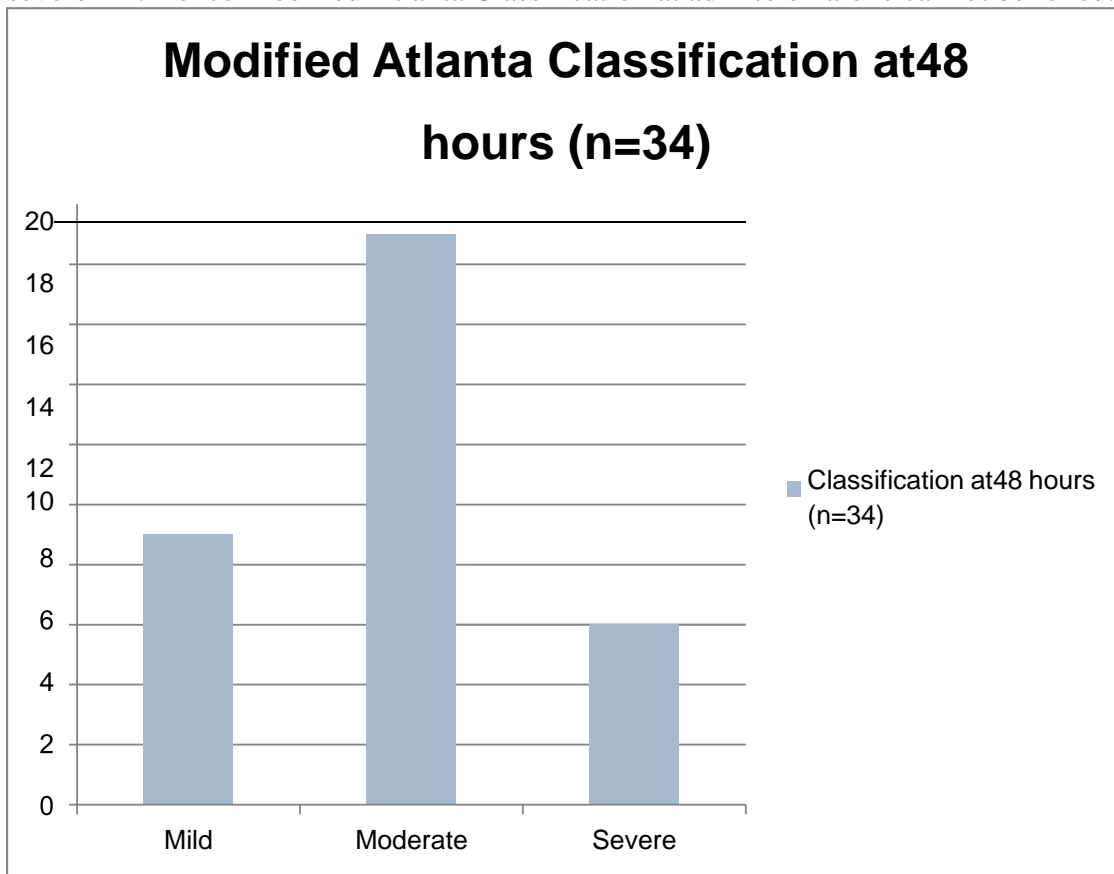


Fig. 3: Modified Atlanta classification (MAC) at 48 hours

Modified Atlanta Classification was repeated at 48 hrs which classified 9(26.4%) as mild, 19(55.9%) as moderate and 6(17.7%) severe AP out of 34 patients. Therefore, Modified Atlanta Classification at 48 hrs was able to differentiate between moderate and severe acute pancreatitis at 48 hrs.

Table 3: Correlation between Modified Atlanta Classification at 48 hrs and Modified CTSI at end of 2nd week

	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
Mild/Not Mild	89.47%	85.71%	94.44%	75.00%
95% CI	66.86% to 98.70%	42.13% to 99.64%	72.71% to 99.86%	34.91% to 96.81%
Moderate/Not Moderate	75.00%	90.91%	60.00%	95.24%
95% CI	19.41% to 99.37%	70.84% to 98.88%	14.66% to 94.73%	76.18% to 99.88%
Severe/Not Severe	100.00%	100.00%	100.00%	100.00%
95% CI	29.24% to 100.00%	85.18% to 100.00%	29.24% to 100.00%	85.18% to 100.00%

Modified Atlanta Classification has sensitivity and specificity of 89.47 % and 9.44% with positive predictive value (PPV) and negative predictive value (NPV) of 94.44% and 75.00% respectively for mild AP. Sensitivity and Specificity of 75.00% and 90.91% with PPV and NPV of 60.00% and 95.24% respectively for moderate AP. Sensitivity and Specificity of 100% and 100% with PPV and NPV of 100% and 100% respectively was found for severe AP (p value=0.0004).

4. DISCUSSION

Acute pancreatitis is a common ailment encountered by the physicians and surgeons, in any part of the world, and forms a good proportion of emergency admissions in emergency unit. The most common cause of acute pancreatitis in many western and Asian countries is cholelithiasis, accounting for 35%-60% of cases which is followed by alcohol intake. It is of utmost importance to make an early diagnosis and assess the severity of acute pancreatitis in the beginning and to identify those patients with severe disease who will benefit from an early intensive care therapy. Additionally, in view of new therapeutical concepts, patients should be staged into mild, moderate and severe AP as early as possible. In most cases, it is difficult to assess the severity clinically on hospital admission.

Patients in our study were in the age range of 18-65 years. Mean age was 34.62 ± 11.8 years. Antonio Carnovale included patients with age range of 18-93 years with a median age of 61.5 years. W. Uhl reported the mean age in the study as 50 years.¹⁰ In the study conducted by Arshad M Malik et al, in 2015, mean age of patients with acute biliary pancreatitis was 52.38 with maximum number of patients in the age group of 50-60 years.¹¹ In our study, male patients outnumbered female with ratio of male to female 1.61:1. Female to male ratio was found as 2:1, 1:0.6 by Arshad M. Malik et al¹¹, Sandholm G et al¹² respectively. Gallstone disease is more common in female and it is seen more frequently in women between 50 and 70 years of age in the western country. However the incidence of gallstone induced AP in India is much higher in the female group. The demographic distribution of acute pancreatitis according to sex in our study shows male preponderance which is in sharp contrast to various studies conducted worldwide.

Serum amylase and lipase levels are used for the diagnosis of AP in the emergency setting. Serum amylase levels were measured at admission and 48 hrs. The value was consistently high at the time of admission after which its level decreased sharply at 48 hrs to below 1000 units. Serum lipase levels were measured at admission and 48 hrs. The values remained elevated till 48 hrs. Serum lipase offers a larger diagnostic window than amylase since it is elevated for a longer time, thus allowing it to be a useful diagnostic biomarker in early and late stages of acute pancreatitis. Hence from this it was seen that serum amylase measurement were elevated in first 24 hrs, while serum lipase levels can be used for diagnosis of AP till 48 hrs. In our study serum amylase and serum lipase measurement did not correlate with severity of AP. This was also shown in the study done by Pezzilli et al.¹³

Modified CTSI is considered as the gold standard scoring system to objectively categorized the patients of AP into mild, moderate and severe AP. CECT was done at end of 2nd week and Modified CT Severity Index (M. CTSI) was calculated on all the 34 patients out of which 6 showed mild AP, 22 showed moderate AP and 6 had severe AP. This corresponds with the study conducted by Bollen et al.¹⁴ where 196 patients were taken out of which 136 (66.9%) patients showed mild pancreatitis, 41 (21%) patients had moderate and 19 patients (10%) had severe AP. The Modified CTSI thus helped to categorize our 34 patients into the three category of mild, moderate and severe and thus enable us to compare the clinical Modified Atlanta Classification with the objective category determined by modified CTSI.

Out of 34 patients, 6 patients were having mild, 22 moderate and 6 severe according to Modified CTSI at end of 2nd week. Modified Atlanta Classification was performed at admission which showed 9 patients were having mild and 25 patients were with severe AP. The scoring was repeated at 48 hrs which showed that, out of 34 Patients, 9 were mild AP, 19 were moderate AP and 6 were severe AP. Modified Atlanta Classification performed at 48 hrs showed 100% sensitivity and 100% specificity for prediction of severe AP as comparing with modified CTSI. However, sensitivity and specificity for moderate AP was 75.00% and 90.91% respectively. Yang et al.¹⁵ showed Modified Atlanta Classification has sensitivity and specificity of 80.9% and 90.0%, respectively for severe AP at 48 hrs. Our study showed higher sensitivity and specificity of Modified Atlanta Classification for severe AP. There is paucity of literature regarding the establishment of clinical assessment of severity of pancreatitis using Modified Atlanta Classification from Indian subcontinent and its comparison with Modified CTSI. Further prospecting studies with large number of patients would be required for assessing the validity of Modified Atlanta Classification in severe acute pancreatitis and comparing with objective index study Modified CTSI.

5. CONCLUSION

On the basis of the our study we concluded that Modified Atlanta Classification accurately classifies the patients at 48 hrs into mild, moderate and severe type of acute pancreatitis in comparison to the objective findings revealed at 14 days by using Modified CTSI.

6. REFERENCES

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