

# Evaluation of the Outcome of Acute Pancreatitis by Ranson's Criteria and Modified CT Severity Index

Prem Chand<sup>1</sup>, Rommel Singh<sup>2</sup>, DP Singh<sup>3</sup>, Nisha Rani<sup>4</sup>

<sup>1</sup>Associate Professor, <sup>2</sup>Assistant Professor, <sup>3</sup>Professor, <sup>4</sup>Junior Resident, Department of Surgery, GMC, Patiala, India

**Corresponding author:** Dr Rommel Singh, Assistant Professor, Department of Surgery, GMC, Patiala, India

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## A B S T R A C T

**Introduction:** Acute pancreatitis is a reversible pancreatic parenchymal injury associated with inflammation. Severe acute pancreatitis develops in about 25% of patients with acute pancreatitis. The present study was conducted to evaluate the outcome of acute pancreatitis by Ranson's criteria and modified CT severity index.

**Material and methods:** The study enrolled 30 patients with clinical diagnosis of acute pancreatitis presenting in the department of surgery, Rajindra Hospital, Govt. Medical College, Patiala. Routine laboratory investigations in all subjects including hemogram, liver function test, renal function test, serum calcium levels, serum amylase, serum electrolytes, ABG, ultrasonography abdomen, chest x ray, contrast enhanced CT of whole abdomen were done. All the data was recorded in a tabulated form and analysed using SPSS software. Chi square test was applied as a test of significance and p value of less than 0.05 was considered significant.

**Results:** In our study Ascites was the most common complication with 16 (34.4 %) patients, Pleural Effusion second most common with 9 (19.14%), 5 (10.6%) patients developed Pseudocyst, 4 (8.51%) patients infected pancreatic necrosis, 3 (6.38 %) patients each Paralytic ileus and ARDS, 2 (4.25 %) patients each developed Walled off necrosis, Renal failure, Multi organ failure and one (2.12%) patient developed Pancreatic fistula. Though most of the local complications were seen in patients with higher Ranson's score but the values were statistically non-significant.

**Conclusion:** We can conclude that both Ranson score and MCTSI plays a vital role in predicting patient's outcome of acute pancreatitis. There was statically insignificant difference amongst the systemic complications when Ranson score and MCTSI were compared but the local complications showed statically significant difference with MCTSI score.

**Keywords:** Hemogram, Pancreatitis, Ranson, Ultrasonography

## INTRODUCTION

Acute pancreatitis is a reversible pancreatic parenchymal injury associated with inflammation.<sup>1</sup> Severe acute pancreatitis develops in about 25% of patients with acute pancreatitis. Acute pancreatitis has widely variable clinical and systemic manifestations spanning the spectrum from a mild, self-limiting episode of epigastric pain to severe, life-threatening, multiorgan failure including sepsis, renal failure, acute respiratory distress syndrome and death. The 1992 Atlanta classification defined severe acute pancreatitis as the presence of organ failure or local complications such as pancreatic necrosis. Revised Atlanta classification defined interstitial and necrotizing pancreatitis based on CT scan also included peripancreatic necrosis.<sup>2</sup> Severity is linked to the presence of systemic organ dysfunction and pancreatic necrosis. Morbidity of severe acute pancreatitis is biphasic. In the first week it is strongly related to systemic inflammatory response while sepsis due to infected pancreatic necrosis leading to multiorgan failure syndrome occurs in the later course after the first week.<sup>3</sup>

Because of the variability and seeming unpredictability of acute pancreatitis, clinical scoring systems have been developed to predict the severity of acute pancreatitis and, as important, for patient stratification and enrollment in clinical trials.<sup>4</sup> The present study was conducted to evaluate the outcome of acute pancreatitis by Ranson's criteria and modified CT severity index.

## MATERIAL AND METHODS

The study enrolled 30 patients with clinical diagnosis of acute pancreatitis presenting in the department of surgery, Rajindra Hospital, Govt. Medical College, Patiala. Routine laboratory investigations in all subjects including hemogram, liver function test, renal function test, serum calcium levels, serum amylase, serum electrolytes, ABG, ultrasonography abdomen, chest x ray, contrast enhanced CT of whole abdomen were done. CECT abdomen was done to diagnose, to access complications and severity of pancreatitis.

Ranson's criteria is based on 11 clinical and laboratory parameters measured within the first 48 hours of

admission to the hospital. And for complete assessment of patients, 48 hours is required and Ranson score  $\geq 3$  defines severe pancreatitis. The CT findings of acute pancreatitis were graded according to modified CT severity index and categorized as mild (0-2 points), moderate (4-6 points), or severe (8-10 points) pancreatitis. Patients were followed up every 2 weeks on outpatient basis after discharge for upto 6 months. They were subjected to clinical examination and relevant investigations on every visit. Appropriate evaluation chest x ray, USG abdomen and CT scan were done if indicated clinically and appropriate management was done.

## STATISTICAL ANALYSIS

All the data was recorded in a tabulated form and analysed using SPSS software. Chi square test was applied as a test of significance and p value of less than 0.05 was considered significant.

## RESULTS

The study consisted of 30 subjects with the age range of 28-45 years.

Table 1 shows the distribution of various complications. In our study Ascites was the most common complication with 16 (34.4 %) patients, Pleural Effusion second most common with 9 (19.14%), 5 (10.6%) patients developed Pseudocyst, 4 (8.51%) patients infected pancreatic necrosis, 3 (6.38 %) patients each Paralytic ileus and ARDS, 2 (4.25 %) patients each developed Walled off necrosis, Renal failure, Multi organ failure and one (2.12%) patient developed Pancreatic fistula.

Table 2 shows the local complications being evaluated by MCTSI score and Ranson score. In our study of thirty patients, as per Ranson's score, 11 out of 30 (36.6%) patients were diagnosed as having mild pancreatitis and 19 out of 30 (63.3) were diagnosed as having severe pancreatitis. Out of 19 patients of severe pancreatitis four patients developed infected pancreatic necrosis, two patients developed walled off necrosis, one patient developed pancreatic fistula and 4 developed pseudocyst and out of 11 patients of mild pancreatitis, one patient developed pseudocyst. Though most of the local complications were seen in patients with higher Ranson's score but the values were statistically non-significant. Three patients had mild, eighteen patients had moderate and 9 patients have severe pancreatitis on basis of modified CTSI score. Four patients developed infected pancreatic necrosis, two patients developed walled off necrosis, one patients each developed pancreatic fistula and pseudocyst belongs to severe pancreatitis and four patients developed pseudocyst belonged to moderate pancreatitis. None of the patient in mild group developed local complication. Values were statistically significant and defining role of MCTSI in identifying local complications.

Table 3 shows the systemic complications being evaluated

by MCTSI score and Ranson score. In our study, as per Ranson's score, out of 11 patients of mild pancreatitis, 2 patients had ascites and 2 had pleural effusion. Out of 19 patients of severe pancreatitis, 3 patients each had paralytic ileus and ARDS, 2 patients each had MOF and renal failure, 14 patients had ascites and 7 patients had pleural effusion. Values were statistically non-significant. As MCTSI score, out of 3 patients of mild pancreatitis, no patient developed systemic complication. Out of 18 patients of moderate pancreatitis, 2 patients had ARDS, 1 had renal failure 8 had ascites and 4 pleural effusion. Out of 9 patients of severe pancreatitis, 3 had paralytic ileus, 2 patients had MOF, 1 patient had ARDS, 1 had renal failure, 8 had ascites and 5 had pleural effusion. Values

Complication	Frequency	Percentage
Ascites	16	34.4%
Pleural effusion	9	9.14%
Pseudocyst	5	10.6%
Pancreatic necrosis	4	8.52%
Paralytic ileus	3	6.38%
ARDS	3	6.38%
Renal failure	2	4.25%
Multiorgan failure	2	4.25%
Pancreatic fistula	1	2.12%

**Table-1:** Distribution of various complications

LC	Ranson Score		MCTSI		
	<3	$\geq 3$	0-2	4-6	8-10
Absent	10	8	3	14	1
IPN	0	4	0	0	4
WON	0	2	0	0	2
Pan fistula	0	1	0	0	1
Pseudocyst	1	4	0	4	1
Total	11	19	3	18	09
Chi Square	7.416		22.667		
P value	0.115		0.004		
Significance	NS		HS		

**Table-2:** Evaluation of MCTSI score and Ranson score in predicting local complications

SC	Ranson Score		MCTSI		
	<3	$\geq 3$	0-2	4-6	8-10
Absent	11	11	3	16	3
MOF	0	2	0	0	2
ILEUS	0	3	0	0	3
ARDS	0	3	0	2	1
Renal	0	2	0	1	1
Ascites	2	14	0	8	8
PE	2	7	0	4	5
Total	15	42	3	31	23
Chi Square	11.588		18.431		
P value	0.072		0.103		
Significance	NS		NS		

**Table-3:** Evaluation of Ranson's score and MCTSI score in predicting systemic complications

were statistically non-significant.

Table 4 shows correlation between MCTSI score and patient outcome. In our study, average length of hospital stay was  $5.33 \pm 0.58$  days in mild pancreatitis group patients. Patients with moderate and severe pancreatitis had average length of hospital stay of  $6.83 \pm 2.18$  and  $10.0 \pm 7.62$  days respectively. As per MCTSI score, out of 3 patients of mild pancreatitis, 2 patients underwent intervention and all 3 discharged in satisfactory condition. Out of 18 patients with moderate pancreatitis, 4 had local complications, 2 had systemic complications, 9 patients underwent intervention, 1 patient is referred and 17 patients discharged in satisfactory condition. Out of 9 patients of severe pancreatitis, 8 patients had local complications, 6 had systemic complications, 2 had ICU stay, 2 underwent intervention, 2 died, 1 referred and 6 discharged in satisfactory condition.

Table 5 shows correlation between Ranson score and patient outcome. In our study, the average length of hospital stay in patients with Ranson's less than 3 was  $6.36 \pm 1.86$  days and with Ranson's score more than/equal to 3 was  $8.37 \pm 5.58$  days. As per Ranson's score, out of 11 patients of Ranson's score less than 3 (mild pancreatitis), 1 had local complication, 7 underwent intervention and 11 died in satisfactory condition. Out of 19 patients who had Ranson's score more than/equal to 3 (severe pancreatitis), 11 had local complications, 8 had systemic complications, 2 had ICU stay, 2 referred, 6 underwent intervention, 2 died and 15 discharged in satisfactory condition.

## DISCUSSION

In the present study it is seen that though patient with higher Ranson's score had more local complication but it is not statistically significant and CT scan is needed to actually see them and there is significant increase in incidence of local complications with the increase in the MCTSI score. Thus MCTSI is a good prognostic indicator in predicting the incidence of local complications in acute pancreatitis. In a study done by Balthazar EJ et al<sup>5</sup> in 1985 on 83 patients with acute pancreatitis, it was concluded that early CT examination of patients with acute pancreatitis is a useful prognostic indicator of local complications, overall morbidity and mortality. In a study done by Leung TK et al<sup>6</sup> (2005) concluded that complications are often the major reasons that resulted in the death of AP patients. The management of complications is important to reduce the mortality rate. In this study, they found that the higher CTSI associated with higher complication rate and the CTSI  $\geq 5$  is an index. However, they did not find the same relation in Ranson's score

In our study, Ranson score showed that it plays an important role in predicting patient outcome in acute pancreatitis. In a study done by Khanna A K et al<sup>7</sup> (2013), showed that Ranson's score plays an important role in predicting the patients outcome in acute pancreatitis. In

Outcome factor	Mild (0-2)	Moderate (4-6)	Severe (8-10)
Number of patients	3	18	9
Avg length of hosp stay	$5.33 \pm 0.58$	$6.83 \pm 2.18$	$10.0 \pm 7.62$
Local compl	0	4	8
Systemic compl	0	2	6
ICU stay	0	0	2
Referred	0	1	1
Intervention	2	9	2
Death	0	0	2
Discharge satisfactorily	3	17	6

**Table-4:** Correlation Of MCTSI And Patient Outcome

Outcome factor	Ranson <3	Ranson > 3
Number of patients	11	19
Avg length of hosp stay	$6.36 \pm 1.86$	$8.37 \pm 5.58$
Local compl	1	11
Systemic compl	0	8
ICU stay	0	2
Referred	0	2
Intervention	7	6
Death	0	2
Discharge satisfactorily	11	15

**Table-5:** Correlation of ranson score and patient outcome

our study, the average length of hospital stay in patients with Ranson's less than 3 was  $6.36 \pm 1.86$  days and with Ranson's score more than/equal to 3 was  $8.37 \pm 5.58$  days. In a study done by Williams et al<sup>8</sup> (1999), the mean length of stay in this study was 61.8 (range, 7-201) days. The mean Ranson's criteria was 4.3 (range, 1-9). This shows that the length of hospital stay is more in patients with severe pancreatitis. and length of hospital stay in an important outcome parameter.

In our study it is clear that MCTSI has important role in predicting the patient outcome of acute pancreatitis. In a study done by Mortele et al<sup>9</sup> (2004), and Simchuk EJ et al<sup>10</sup> (2000) also that MCTSI has important role in predicting the patient outcome of acute pancreatitis. From above data, the average length of hospital stay was  $5.33 \pm 0.58$  days in mild pancreatitis group patients. Patients with moderate and severe pancreatitis had average length of hospital stay of  $6.83 \pm 2.18$  and  $10.0 \pm 7.62$  days respectively. In a study done by Ahmad Irshad et al<sup>11</sup> (2015), the average length of hospital stay in mild pancreatitis (0-2 MCTSI) was 1.5 days, in moderate pancreatitis (4-6 MCTSI) was 6.9 days, in severe pancreatitis (8-10) was 14.2 days. This shows that the length of hospital stay increase with increase in the MCTSI score in acute pancreatitis and length of hospital stay in an important outcome parameter.

## CONCLUSION

We can conclude that both Ranson score and MCTSI plays a vital role in predicting patient's outcome of acute pancreatitis. There was statically insignificant difference

amongst the systemic complications when Ranson score and MCTSI were compared but the local complications showed statically significant difference with MCTSI score.

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