

# Validity of Ranson's Score for Predicting Mortality and Morbidity in Acute Pancreatitis

Shandana Tarique, Shahid Sarwar and Farrukh Iqbal

Department of Medicine Jinnah Hospital Lahore and

Department of Gastroenterology and Hepatology Shaikh Zayed Hospital Lahore

## SUMMARY

Acute pancreatitis is one of the acute abdominal emergencies that need protracted hospital stay and intensive care. Degree of severity has to be assessed to gauge the severity of illness. Ranson scoring system is used to assess the severity and predict prognosis. Study was carried out to assess the validity of Ranson's criteria in patients with acute pancreatitis. Thirty patients of acute pancreatitis were enrolled. Ranson's criteria were applied to all of them. Patients were monitored and managed according to their condition. Out of thirty patients, 46.6% were above 55 years of age. Thirteen (43.3%) patients did not develop any complication. Ranson's score of 0-2 was found in 15 (50%) patients, of which 2 (13.3%) died. Complications occurred in 5 (33.3%). A score of 3-4 was seen in 9 (30%) cases and survival rate was 100% despite complications. Score of 5-6 was seen in 5 (16.66%) cases. All had complications and 3 (60%) died. A score of 7-8 was found in one patient who survived. The score was insignificant in predicting the mortality with a p-value of 0.371, but had comparatively significant p-value of 0.062 in predicting development of complications. Ranson's criteria is not significant in predicting the outcome in the form of death from acute pancreatitis though there is some significance in predicting the occurrence of complications.

## INTRODUCTION

Acute pancreatitis is a common abdominal catastrophe. Serious complications may supervene in 25% of cases. Lord Moynihan in 1925 described acute pancreatitis as "the most terrible of all the calamities that occur in connection with abdominal viscera."<sup>1</sup>

Severity of the disease is often underestimated as suggested by McMahon et al who pointed out that only one out of three severe cases of acute pancreatitis is recognized to be severe in early stage of the disease<sup>2</sup>.

Conservative treatment does result in recovery but certain number of patients develops devastating illness leading to multiple organ failure. Patients need protracted hospital stay and intensive care and few patients require surgery to deal with the consequences of pancreatic necrosis.

Assessment of severity is the key determinant in management of patients. Ranson's criteria is a

multifactor scoring system specifically designed for acute pancreatitis. It is meant for predicting the prognosis and to identify severely ill patients. In 1974 Ranson identified eleven factors measured during initial 48 hours after admission. Five of them are measured at admission and they reflect the intensity of local inflammation. Six factors are measured within initial 48 hours of admission. They reflect the development of systemic complications<sup>3</sup> (Table 1).

### Study objective

To check the validity of Ranson's criteria for acute pancreatitis and to correlate the score with outcome.

### Study design

It was an observational cohort study.

### Place of study

This study was carried out at Department of Medicine Shaikh Zayed Hospital Lahore.

**Table 1: Ranson's score of severity****At Admission**

- Age > 55 years
- White blood cells > 16,000/mm<sup>3</sup>
- Glucose > 200mg/dl
- Lactate dehydrogenase > 350IU/L
- Aspartate transaminase > 250IU/L

**During Initial 48 Hours**

- Hematocrit decrease of > 10mg/dl
- Blood urea nitrogen increase of > 5mg/dl
- Calcium < 8mg/dl
- Partial pressure of oxygen < 60mmHg
- Base deficit > 4mEq/l
- Fluid sequestration > 6 litres

**PATIENTS AND METHODS**

It was a cohort study and was carried out at Shaikh Zayed Hospital, Lahore from September 1998 to January 2000. Patients were admitted in General Medical wards and in the Department of Gastroenterology. A total of thirty patients were enrolled. All patients presenting with acute epigastric pain requiring hospital admission, associated with raised serum amylase or lipase levels more than three times the upper limit and /or ultrasound or CT scan evidence of acute pancreatitis were included.

Complete history regarding the clinical features of acute pancreatitis was taken. Patients were fully examined and monitored. Volume status was assessed by examining for signs of volume depletion or overload, recording for postural drop in blood pressure and maintaining input and output record. Laboratory investigations carried out at admission included complete blood count with hematocrit, blood sugar level, lactate dehydrogenase, liver function tests, serum amylase, serum lipase, serum creatinine, blood urea nitrogen, serum calcium and arterial blood gases. Tests were repeated within 48 hours. Radiographs of chest and abdomen were carried out to look for evidence of complications i.e., effusions, obstruction etc. Ultrasound of abdomen was also carried out. CT scan of abdomen was carried out at day five of admission to review the situation. All data was recorded.

Applying t-test (two tailed), we carried out statistical analysis of the results.

**RESULTS**

Out of thirty patients studied fifteen were above 55 years (50%). Mean age was 51.533±12.50. Sex distribution was found to be equal.

Thirteen (43.3%) patients did not develop any complication. Pleural effusion was found to be present in 7 patients (23.3%) and hypocalcemia was also noted in 7 (23.3%). Both were the most common complications.

Ranson's criteria were applied to all patients. In five variables studied at admission, age above 55 years was found to be most frequent i.e. 46.6% (Table 2). Values studied in 48 hours showed base deficit to be the most frequent. The least frequency was of rise in blood urea nitrogen (Table 3).

**Table 2: Ranson's score (Studied at Admission)**

Values	Number	Percentage
Age >55 years	15	50
White blood cells >16,000/cmm	13	43.3
Blood glucose >200mg/dl	8	26.6
Serum LDH >350U/L	13	43.3
Serum AST >250U/L	1	3.33

**Table 3: Ranson's score (Values Studied Within 48 Hrs)**

Values	Number	Percentage
Drop in Hematocrit of >10%	6	20
Rise in blood urea nitrogen >5mg/dl	5	16.6
Serum calcium <8mg/dl	8	26.6
Arterial PO <sub>2</sub> <60mmHg	6	20
Base deficit > 4mg/dl	10	33.3
Estimated fluid sequestration of > 6 liters	7	23.3

Ranson's score of 0-2 was found in 15(50%) of patients, of which two (13.3%) died. Complications occurred in 5 (33.3%) cases.

Score of 3-4 was seen in nine cases (30%). Survival rate was 100% despite complications that occurred in seven cases (77.7%).

Score of 5-6 was seen in five cases (16.6 %). All of them had complication and three (60.0%) patients died in this group.

Score of 7-8 was found in one patient (3.3%) who developed multiple complications but survived.

Score of above 8 was not observed in any case. Details of result are given in Table 4.

Statistical analysis showed that Ranson's score is insignificant in predicting the outcome with p-value of 0.371 (Table 5). Criteria was found to have comparatively significant value of 0.062 in predicting the occurrence of complications (Table-6).

**Table 4: Ranson's score and outcome**

Ranson's score	No. Of patients	Death	Discharge	Complications
0-2	15(50%)	2(13%)	13(86.6%)	5(33.3%)
3-4	9(30%)	-	9(100%)	7(77.7%)
5-6	5(16.6%)	3(60%)	2(40%)	5(100%)
7-8	1(3.33%)	-	1(100%)	1(100%)
9-11	-	-	-	-

**Table 5: Statistical analysis of outcome on basis of Ranson's score.**

No.		Survived	Dead
1.	Number	25	5
2.	Mean	2.8000	4.2000
3.	Standard deviation	1.7078	2.0494
4.	Standard error mean	0.3416	0.9165

Significance 0.371

**Table 6: Statistical analysis of complications on basis of Ranson's score.**

No.		Survived	Dead
1.	Number	15	15
2.	Mean	4.2667	1.8000
3.	Standard deviation	1.6676	0.8619
4.	Standard error mean	0.4306	0.2225

Significance 0.062

## DISCUSSION

Acute pancreatitis presents as a clinical condition that warrants urgent and intensive care to prevent the complications or to deal with them and thus reducing the morbidity and mortality.

Assessment of severity and prognosis is important to decide about the management and spare those with mild disease from costly and

invasive protocol. Ranson's criteria are easy as all biochemical and hematological tests can be done easily and are economical. Multi centre trials have questioned the sensitivity and specificity of this scoring system in predicting the severity.

Mayeaux has mentioned that presence of less than three signs had better prognosis with mortality being less than 1%. In case of more than three signs mortality may be around 25 %<sup>4</sup>.

Toth has mentioned that presence of 3 or 4 signs at admission is associated with mortality of 15-20%. If 7 or more signs are present, mortality approaches 100%<sup>5</sup>. In our study, survival was 100% at score of 3-4 though deaths occurred at lower and higher scores.

Horzic et al. reported a study of 43 patients. Those with less than 3 signs were classified as mild. Those having 3 or more factors were considered as having severe disease. Sixty percent of patients in the latter group survived. Those who died had more than 6 prognostic factors. Eight patients developed multi organ failure. It was concluded that Ranson's criteria was more certain in predicting the outcome when more factors were present<sup>6</sup>. In our study complication rate was found to increase with number of scores.

Robert and Chatleston have reported a case of forty year old man who had score of 8 and developed pseudocyst and despite treatment, he died. They concluded that complications occurred most frequently in patients with a greater number of Ranson's prognostic criteria<sup>7</sup>. This finding was similar to our study.

Pezilli et al in their study of 181 patients have mentioned that score of 3 or more was found in 45% with severe acute pancreatitis and 16% with mild form of severe disease. Positive predictive value was 54%<sup>8</sup>.

Manocha et al have reported the sensitivity of Ranson's criteria in patients with AIDS, which is comparable to that in immuno-competent patients. Patients with at least score of nine had severe course of disease with sensitivity of 80% and specificity of 54%<sup>9</sup>.

A study was conducted by Marek et al concluded that Ranson's score has sensitivity of 46% with specificity of 92%. It is 80% accurate in predicting the prognosis<sup>10</sup>.

A meta-analytic study was carried out by De Bernardinis et al in 1999. It compared 211 studies carried out since 1974. The authors concluded that Ranson's score have poor predictive value<sup>11</sup>.

In comparison to above mentioned studies, our study shows that Ranson's criteria have significant value in predicting the chances of developing complications. Fifty percent of patients developed some sort of complications. The criteria were found to have poor predictive value as far as mortality is concerned.

### CONCLUSION

We conclude that Ranson's criteria have comparatively significant value in predicting the chances of developing complications as regard morbidity and mortality. Although there is a great controversy as regards its sensitivity and specificity, therefore, more refined system has to be devised. There is still considerable potential for developing an accurate system for assessing the outcome in acute pancreatitis.

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### The Authors:

Shandana Tarique  
Senior Registrar  
Department of Medicine Jinnah Hospital  
Lahore

Shahid Sarwar  
Trainee Registrar  
Department of Gastroenterology and Hepatology  
Shaikh Zayed Hospital  
Lahore

Farrukh Iqbal  
Professor of Medicine  
Department of Medicine  
Shaikh Zayed Hospital  
Lahore