Section: General Surgery

Original Research Article

A CLINICAL STUDY OF ACUTE PANCREATITIS, AND EVALUATION OF RANSONS SCORE IN DIAGNOSIS, COMPLICATIONS, AND MANAGEMENT

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Received *: 06/02/2026*
Received in revised form *: 26/03/2026*
Accepted *: 12/04/2026*

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DOI: 10.70034/ijmedph.2026.2.119

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (2); 696-702

ABSTRACT

Background: Acute pancreatitis is a common gastrointestinal emergency with a wide spectrum of severity, ranging from mild self-limiting disease to severe life-threatening illness. Early prediction of disease severity is crucial for optimizing management and improving outcomes. Ranson's scoring system is one of the earliest and widely used tools for prognostication; however, its applicability in different populations remains debatable. To study the clinical profile, etiology, and natural history of acute pancreatitis and to evaluate the utility of Ranson's score in predicting disease severity, complications, and management outcomes.

Materials and Methods: This prospective observational study was conducted in the Department of General Surgery at Dr. D. Y. Patil Hospital, Navi Mumbai, over a period of two years (March 2022–March 2024). A total of 50 patients diagnosed with acute pancreatitis were included. Clinical evaluation, laboratory investigations, and imaging studies were performed. Ranson's score was calculated at admission and after 48 hours. Patients were managed according to standard protocols and followed for outcomes including complications, need for intervention, and mortality. Statistical analysis was performed using SPSS version 25.0, and associations were assessed using appropriate tests.

Results: The majority of patients were above 50 years (64%) with a male predominance (58%). Alcohol (46%) and gallstones (44%) were the leading etiological factors. Abdominal pain (96%) was the most common presenting symptom. Based on Ranson's score, 62% of patients were classified as having severe acute pancreatitis. Most patients (88%) were managed conservatively, and 82% did not develop complications. Among complications, pancreatic pseudocyst (8%) was the most common. No statistically significant association was observed between Ranson's score and etiology ($p = 0.66$), management ($p = 0.51$), or complications ($p = 0.14$).

Conclusion: Ranson's score, although useful in assessing severity, demonstrated limited predictive value for complications and management outcomes in this study. Conservative management was effective in the majority of cases, including those classified as severe. These findings suggest that Ranson's score should be used in conjunction with other clinical parameters and scoring systems for better prognostication in acute pancreatitis.

Keywords: Acute pancreatitis, Ranson's score, severity assessment, complications, conservative management.

INTRODUCTION

Acute pancreatitis is a complex inflammatory disorder of the pancreas that continues to pose a significant challenge in clinical practice. It is characterized by the sudden onset of severe abdominal pain, elevated levels of pancreatic enzymes, and varying degrees of local and systemic inflammatory response.[1] The global incidence of acute pancreatitis ranges from 13 to 45 cases per 100,000 population annually, with a noticeable upward trend in recent decades.[2] This increasing incidence has been attributed to improved diagnostic modalities, evolving lifestyle patterns, and heightened awareness among healthcare professionals.[3]

The etiology of acute pancreatitis is multifactorial, with gallstones and alcohol consumption being the most common causes, collectively accounting for approximately 60–80% of cases.[4]Other recognized causes include hypertriglyceridemia, drug-induced pancreatitis, autoimmune disorders, infections, and genetic predisposition.[5]Identification of the underlying etiology is crucial, as it not only guides management but also plays a vital role in preventing recurrence.

The clinical course of acute pancreatitis varies widely, ranging from a mild, self-limiting illness to a severe, life-threatening condition associated with significant morbidity and mortality.[6] Approximately 80–85% of cases are mild and respond well to conservative management; however, severe acute pancreatitis can result in persistent organ failure, systemic complications, and mortality rates as high as 30%.[7] Early identification of patients at risk of developing severe disease is therefore essential to optimize outcomes and reduce complications.

To address this need, several scoring systems have been developed to predict disease severity and prognosis. Among these, Ranson's criteria, introduced in 1974 and subsequently modified, remains one of the most widely used tools due to its simplicity and clinical applicability.[8] The Ranson's score incorporates 11 clinical and biochemical parameters assessed at admission and after 48 hours, providing an objective measure of disease severity.[9]Despite the emergence of newer scoring systems such as APACHE II, BISAP, and CTSI, Ranson's criteria continue to hold relevance, particularly in resource-limited settings where advanced monitoring tools may not be readily available.[10]

The management of acute pancreatitis has evolved considerably over time, with a paradigm shift toward conservative treatment strategies. Early aggressive fluid resuscitation, effective pain control, and timely initiation of nutritional support form the cornerstone of initial management. The role of prophylactic antibiotics remains controversial, and the timing as well as indications for interventional procedures have been refined based on contemporary evidence and guidelines.

Complications of acute pancreatitis may be classified as local or systemic and can occur early or late in the disease course. Local complications include pancreatic necrosis, pseudocyst formation, and pancreatic fistula, whereas systemic complications may involve acute respiratory distress syndrome, renal failure, sepsis, and multi-organ dysfunction. The occurrence of such complications significantly worsens prognosis and often necessitates a multidisciplinary approach to management.

Despite substantial advances in the understanding and management of acute pancreatitis, several challenges persist. These include the absence of targeted therapies addressing the underlying pathophysiology, uncertainties regarding the optimal timing of interventions in necrotizing pancreatitis, and limitations of existing scoring systems in accurately predicting disease severity and outcomes. Furthermore, there remains ongoing debate regarding the most reliable and practical prognostic tool for guiding clinical decision-making.

Rationale of the Study

Although Ranson's score is widely used in clinical practice, its predictive accuracy for complications, management decisions, and outcomes has been questioned in recent literature. Additionally, most available studies have been conducted in Western populations, with limited data from Indian settings, where etiological patterns and patient profiles may differ. Therefore, there is a need to evaluate the applicability and reliability of Ranson's scoring system in the local population.

This study was undertaken to analyze the clinical profile of acute pancreatitis and to assess the role of Ranson's score in predicting disease severity, complications, and management outcomes in patients presenting to our institution.

Aims and Objectives

The present study was undertaken to evaluate the clinical profile of acute pancreatitis and to assess the utility of Ranson's scoring system in predicting disease severity, associated complications, and management outcomes. The objectives of the study were to analyze the natural history, clinical presentation, and etiology of acute pancreatitis; to diagnose patients and evaluate complications using Ranson's score; to assess treatment outcomes and identify risk factors associated with mortality in severe acute pancreatitis; and to evaluate the effectiveness of different management strategies along with their associated complications.

MATERIALS AND METHODS

This study was conducted as a prospective observational study in the Department of General Surgery at Dr. D. Y. Patil University School of Medicine, Nerul, Navi Mumbai, over a period of

two years from March 2022 to March 2024. A total of 50 patients diagnosed with acute pancreatitis were included in the study. Patients aged 18 years and above of either sex were enrolled, while those with chronic pancreatitis, pancreatic malignancy, a history of recent pancreatic surgery, or pregnancy were excluded.

The study included 50 consecutive patients who met the diagnostic criteria for acute pancreatitis. Ethical approval was obtained from the Institutional Ethics Committee prior to the commencement of the study, and informed consent was secured from all participants or their legal representatives. The diagnosis of acute pancreatitis was established based on the presence of at least two of the following: characteristic abdominal pain, elevation of serum amylase and/or lipase levels to at least three times the upper limit of normal, and radiological findings consistent with acute pancreatitis on contrast-enhanced computed tomography (CECT).

Upon admission, a detailed history was obtained, including demographic details, presenting symptoms, duration of illness, and potential etiological factors such as alcohol consumption, gallstone disease, and drug intake. A thorough physical examination was performed, focusing on vital parameters and signs of systemic involvement. Laboratory investigations were carried out at admission and repeated at 48 hours, including complete blood count, renal function tests, liver function tests, serum electrolytes, arterial blood gas analysis, serum calcium, and lactate dehydrogenase. These parameters were used to calculate the Ranson's score for each patient. Additional investigations such as serum triglycerides, IgG4 levels, and viral markers were performed when clinically indicated to determine the underlying etiology.

All patients underwent ultrasonography of the abdomen to evaluate for gallstones and biliary tract pathology. Contrast-enhanced computed tomography of the abdomen was performed within 72 hours of admission, unless contraindicated, and the CT Severity Index (CTSI) was calculated based on pancreatic inflammation, necrosis, and extrapancreatic complications.

All patients were managed according to standard treatment protocols, which included nil per oral status, aggressive intravenous fluid resuscitation, adequate analgesia, and nutritional support. Enteral nutrition was initiated as early as clinically feasible, preferably within 48 to 72 hours. The use of antibiotics, requirement for intensive care unit admission, and the need for interventional or surgical procedures were documented.

Patients were closely monitored throughout their hospital stay for the development of local and systemic complications. Local complications such as pancreatic necrosis, pseudocyst formation, and pancreatic ascites were recorded, while systemic complications including respiratory failure, cardiovascular instability, renal failure, acute respiratory distress syndrome, and sepsis were also documented and managed accordingly.

The primary outcome measures included the correlation between Ranson's score and disease severity, length of hospital stay, need for ICU admission, development of complications, and mortality. Secondary outcomes included the accuracy of Ranson's score in predicting severe acute pancreatitis, defined as persistent organ failure for more than 48 hours, and comparison of Ranson's score with the CT Severity Index in predicting outcomes.

All patients were followed up for a minimum period of 30 days after discharge or until death, whichever occurred earlier. Follow-up included clinical evaluation, laboratory investigations, and imaging studies where necessary, and any readmissions or delayed complications were recorded.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages. The association between categorical variables, including Ranson's score with etiology, management, and complications, was assessed using the Chi-square test or Fisher's exact test wherever appropriate. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The Study was conducted among 50 patients admitted for acute pancreatitis in the department of General Surgery, Dr. D. Y. Patil Hospital, Nerul, Navi Mumbai between March 2022 and March 2024 to study acute pancreatitis and evaluate ransons score in diagnosis, complications and management of acute pancreatitis.

Following are the study findings:

Table 1: Demographic characteristics of study participants (n = 50)

Variable	Category	Number of patients (n)	Percentage (%)
Age (years)	30–40	8	16.0
	41–50	10	20.0
	51–60	13	26.0
	>60	19	38.0
Gender	Male	29	58.0
	Female	21	42.0

Legend: Distribution of patients according to age group and gender.
Footnotes: Values are expressed as number (percentage).

The majority of patients were above 50 years of age (64%), with the highest proportion in those older than 60 years (38%). A male predominance was observed, with males accounting for 58% of the study population.

Table 2: Etiology and clinical presentation (n = 50)

Variable	Category	Number of patients (n)	Percentage (%)
Etiology	Alcohol	23	46.0
	Gallstones	22	44.0
	Hypertriglyceridemia	3	6.0
	Post-ERCP	2	4.0
Clinical features	Abdominal pain	48	96.0
	Nausea/vomiting	42	84.0
	Fever	25	50.0

Legend: Etiological factors and presenting clinical features of acute pancreatitis.
Footnotes: ERCP = Endoscopic retrograde cholangiopancreatography; values expressed as number (percentage).

Alcohol (46%) and gallstones (44%) were the most common etiological factors, together accounting for 90% of cases. Abdominal pain was the predominant presenting symptom (96%), followed by nausea and vomiting (84%) and fever (50%).

Table 3: Laboratory and biochemical investigations

Parameter	Mean ± SD	Minimum	Maximum
Hemoglobin (g/dL)	12.4 ± 1.2	10.4	14.6
RBC ($\times 10^6$ /µL)	4.51 ± 0.41	3.8	5.2
WBC ($\times 10^3$/µL)	16.11 ± 2.05	12.5	19.8
Total bilirubin (mg/dL)	2.3 ± 1.1	0.7	4.5
Direct bilirubin (mg/dL)	0.83 ± 0.52	0.2	2.0
Indirect bilirubin (mg/dL)	1.47 ± 0.62	0.5	2.6
SGOT (U/L)	126.6 ± 46.5	60	220
SGPT (U/L)	118.0 ± 42.8	55	205
Albumin (g/dL)	3.2 ± 0.31	2.6	3.8
Serum amylase (U/L)	584.2 ± 217.1	230	970
Serum lipase (U/L)	968.4 ± 354.9	420	1620
LDH (U/L)	461.8 ± 127.3	270	700
CRP (mg/dL)	126.7 ± 46.7	60	220

Legend: Summary of hematological, liver function, and biochemical parameters in study participants.
Footnotes: Values expressed as mean ± standard deviation; RBC = Red blood cells; WBC = White blood cells; LDH = Lactate dehydrogenase; CRP = C-reactive protein.

Laboratory findings showed elevated inflammatory markers, including WBC, LDH, and CRP, indicating systemic inflammation. Serum amylase and lipase levels were markedly elevated, confirming the diagnosis of acute pancreatitis. Mild derangement in liver function tests was also observed.

Table 4: Severity of acute pancreatitis based on Ranson's score (n = 50)

Severity category	Number of patients (n)	Percentage (%)
Mild (≤2)	19	38.0
Severe (≥3)	31	62.0
Total	**50**	**100.0**

Legend: Classification of patients based on Ranson's scoring system.
Footnotes: Mild = Ranson's score ≤2; Severe = Ranson's score ≥3.

A majority of patients (62%) were classified as having severe acute pancreatitis, while 38% had mild disease based on Ranson's score.

Table 5: Management and complications (n = 50)

Variable	Category	Number of patients (n)	Percentage (%)
Management	Conservative	44	88.0
	Surgical	6	12.0
Complications	Pancreatic necrosis	2	4.0
	Pancreatic pseudocyst	4	8.0
	Acute kidney injury	3	6.0
	No complications	41	82.0

Legend: Treatment modalities and complications observed among study participants.
Footnotes: Conservative management includes fluid resuscitation, analgesia, and nutritional support.

The majority of patients (88%) were managed conservatively, while only 12% required surgical intervention. Most patients (82%) did not develop complications. Among those who developed complications, pancreatic pseudocyst was the most common.

Table 6: Association between Ranson's score and etiology

Etiology	Mild (≤2) n (%)	Severe (≥3) n (%)	p-value
Alcohol	10 (52.6)	13 (41.9)	
Gallstones	8 (42.1)	14 (45.2)	
Hypertriglyceridemia	1 (5.3)	2 (6.5)	
Post-ERCP	0	2 (6.5)	**0.66**
Total	**19 (100)**	**31 (100)**	

Legend: Association between etiological factors and severity of acute pancreatitis based on Ranson's score. **Footnotes:** p-value calculated using Chi-square test; not statistically significant ($p > 0.05$).

No statistically significant association was observed between etiology and severity of acute pancreatitis ($p = 0.66$).

Table 7: Association between Ranson's score and management

Management	Mild (≤2) n (%)	Severe (≥3) n (%)	p-value
Conservative	16 (84.2)	28 (90.3)	
Surgical	3 (15.8)	3 (9.7)	**0.51**
Total	**19 (100)**	**31 (100)**	

Legend: Relationship between severity of pancreatitis and type of management. **Footnotes:** No statistically significant association observed ($p > 0.05$).

There was no statistically significant difference in management approach between mild and severe cases ($p = 0.51$), indicating that most patients were managed conservatively irrespective of severity

Table 8: Association between Ranson's score and complications

Complication	Mild (≤2) n (%)	Severe (≥3) n (%)	p-value
Pancreatic necrosis	0	2 (6.5)	
Pancreatic pseudocyst	3 (15.8)	1 (3.2)	
Acute kidney injury	0	3 (9.7)	
No complications	16 (84.2)	25 (80.6)	**0.14**
Total	**19 (100)**	**31 (100)**	

Legend: Association between Ranson's score and occurrence of complications. **Footnotes:** p-value calculated using Chi-square test; not statistically significant ($p > 0.05$).

Although complications were more frequently observed in severe cases, the association was not statistically significant ($p = 0.14$), suggesting limited predictive ability of Ranson's score for complications in this study.

DISCUSSION

This clinical study on acute pancreatitis provides valuable insights into the demographics, etiology, clinical presentation, diagnostic parameters, and management outcomes of patients with acute pancreatitis, as well as the utility of Ranson's score in predicting disease severity and complications.

Demographics and Etiology: The study population showed a predominance of older patients, with 64% of participants being over 50 years old. This age distribution aligns with previous research indicating that the risk of acute pancreatitis increases with age.[11]The slight male preponderance (58%) observed in this study is consistent with other reports, which have shown that men are at a higher risk for acute pancreatitis, particularly alcohol-induced cases.[5] The etiology of acute pancreatitis in this study mirrors the global trend, with alcohol (46%) and gallstones (44%) being the two most common causes.[4]This finding underscores the importance of lifestyle factors and biliary disease in the pathogenesis of acute pancreatitis. The lower prevalence of hypertriglyceridemia-induced (6%) and post-ERCP (4%) pancreatitis is also in line with existing literature.[12]

Clinical Presentation and Laboratory Findings: The classic triad of acute pancreatitis - abdominal pain (96%), nausea and vomiting (84%), and fever (50%) - was well represented in this study population. These symptoms are consistent with the typical clinical presentation described in standard texts.[1]

The laboratory findings, including elevated white blood cell count, mildly deranged liver function tests, and significantly raised levels of amylase, lipase, LDH, and CRP, are characteristic of acute pancreatitis.[13] The mean serum amylase (584.2 U/L) and lipase (968.4 U/L) levels were well above the diagnostic threshold, confirming their utility in diagnosing acute pancreatitis.

Ranson's Score and Disease Severity: Using Ranson's score, 62% of cases were classified as severe acute pancreatitis (score ≥3). This proportion is higher than typically reported in the literature, where severe acute pancreatitis usually accounts for

15-20% of cases.[14]This discrepancy could be due to referral bias, with more severe cases being admitted to the study center, or it might reflect a need for re-evaluation of Ranson's score cutoffs in the local population.

Management and Complications: The study showed that conservative management was the mainstay of treatment (88% of cases), which aligns with current guidelines recommendingnon-surgical management for most cases of acute pancreatitis.[15]Only 12% of patients required surgical intervention, which is consistent with the evolving trend towards minimally invasive and non-operative management of acute pancreatitis.[16]

The complication rate in this study was relatively low, with 82% of patients not developing any complications. Among those who did, pancreatic pseudocyst (8%) was the most common, followed by acute kidney injury (6%) and pancreatic necrosis (4%). These rates are generally lower than those reported in some studies, which have shown complication rates of up to 30-40% in acute pancreatitis.[7] This difference could be due to effective early management or could suggest a need for longer follow-up to capture late complications.

Association of Ranson's Score with Etiology, Management, and Complications: Interestingly, the study found no significant association between Ranson's score and etiology (p=0.66), management approach (p=0.51), or complication rates (p=0.14). This lack of association is somewhat surprising and contrasts with some previous studies that have shown Ranson's score to be predictive of severity and outcomes.[8]

However, these findings align with more recent research suggesting that Ranson's score may have limitations in predicting individual patient outcomes.[17] The observation that 90.3% of patients with severe pancreatitis (according to Ranson's score) were managed conservatively, and 80.6% did not develop complications, suggests that Ranson's score might overestimate severity in this population.

Implications and Future Directions: This study highlights the need for a more nuanced approach to severity assessment in acute pancreatitis. While Ranson's score remains a widely used tool, its limitations in this study population suggest that it should be used in conjunction with other scoring systems or biomarkers for more accurate prognostication.[18]

The high proportion of alcohol-induced pancreatitis underscores the need for public health interventions targeting alcohol abuse. Similarly, the significant contribution of gallstone disease to acute pancreatitis cases emphasizes the importance of timely management of cholelithiasis.

The success of conservative management in a high proportion of cases, including those classified as severe by Ranson's score, supports the current trend towards non-operative management of acute pancreatitis. However, the lack of association between Ranson's score and outcomes suggests a need for more refined predictive tools to guide management decisions.

Limitations and Future Research: The relatively small sample size (n=50) and the single-center nature of this study limit its generalizability. Future multi-center studies withlarger sample sizes could provide more robust data. Additionally, longer follow-up periods could help capture late complications and provide insights into long-term outcomes.

Further research could focus on comparing Ranson's score with other scoring systems (e.g., APACHE II, BISAP) in this population, and exploring novel biomarkers or imaging techniques for more accurate severity assessment and outcome prediction in acute pancreatitis. In conclusion, this study provides valuable insights into the clinical profile and management outcomes of acute pancreatitis in the local population, while also highlighting the need for refined prognostic tools in guiding clinical decision-making.

CONCLUSION

This study provides valuable insights into the clinical profile, etiology, and management outcomes of acute pancreatitis in a tertiary care setting. Alcohol and gallstones were identified as the predominant etiological factors, together accounting for the majority of cases. The disease was more common in older individuals, with a slight male predominance, consistent with existing literature.

The findings reaffirm that conservative management remains the cornerstone of treatment in acute pancreatitis, with a high success rate even in patients classified as having severe disease. The low complication rate observed in this study further highlights the effectiveness of early diagnosis and appropriate supportive care.

Although Ranson’s scoring system continues to be widely used for severity assessment, its limited association with complications, management decisions, and outcomes in this study raises concerns regarding its predictive accuracy. The lack of statistically significant correlations suggests that Ranson’s score alone may not be sufficient for guiding clinical decision-making.

Therefore, a more comprehensive approach incorporating clinical judgment, imaging findings, and newer scoring systems such as BISAP or APACHE II may provide better prognostic accuracy. Further large-scale, multicentric studies are recommended to validate these findings and to develop more reliable predictive models tailored to the local population.

In conclusion, while Ranson’s score remains a useful tool, its role should be complementary rather than definitive in the management of acute pancreatitis.

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