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Original Research Article

PROSPECTIVE STUDY OF CLINICAL OUTCOME IN ALCOHOLIC ACUTE PANCREATITIS

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ABSTRACT

Background: Acute pancreatitis (AP) is a sudden inflammatory process of the pancreas with variable clinical presentation and outcomes. In India, alcohol is a prominent etiological factor, particularly among males. Risk stratification tools such as BISAP, HAPS, SIRS, and the Atlanta classification are valuable for early assessment of disease severity. **Objective:** To evaluate clinical outcomes, complications, and mortality among patients with alcoholic acute pancreatitis and assess the predictive value of established scoring systems. **Materials and Methods:** A prospective study was conducted at Thanjavur Medical College from June 2022 to December 2023. A total of 100 male patients with acute alcoholic pancreatitis were included. Clinical data, laboratory parameters, BISAP, SIRS, and HAPS scores, Atlanta classification, inflammatory markers, and outcomes were recorded and statistically analyzed. **Result:** Most patients (42%) were aged 31–40 years. Abdominal pain (100%) and vomiting (56%) were the most common symptoms. Conservative management was provided to 93% of patients. The mean CRP was 79.60±47.24 mg/L, and CTSI was 3.39±1.86. ICU admission was required in 29% of cases. Mortality rate was 7%. All patients with BISAP, SIRS, or HAPS scores of 3 or more had 100% mortality ($P < 0.001$). The Atlanta classification correlated with increasing mortality from mild (0%) to severe (100%). **Conclusion:** The study affirms the utility of BISAP, SIRS, HAPS, and Atlanta scores in prognosticating alcoholic acute pancreatitis. These tools are critical for identifying high-risk patients and tailoring clinical management to reduce morbidity and mortality.

INTRODUCTION

Acute pancreatitis (AP) is an acute inflammatory condition of the pancreas, often characterized by auto-digestion of pancreatic tissue due to premature activation of digestive enzymes. Clinically, AP presents a broad spectrum, from mild, self-limiting symptoms to severe systemic inflammation and multi-organ dysfunction syndrome (MODS), sometimes leading to death.[1] Globally, alcohol and gallstones are recognized as the primary causes of AP, together accounting for over 80% of all cases.[2] In India, alcoholic pancreatitis is notably prevalent among males, particularly in rural and semi-urban regions where unregulated liquor consumption is common.[3] Identifying the underlying aetiology is vital for preventing recurrence and guiding therapy. Alcoholic AP differs from other forms by its tendency to recur, often progressing into chronic pancreatitis, and by its unique pathophysiological mechanisms involving ethanol metabolites and oxidative stress.[4] Chronic alcohol use predisposes acinar cells to intracellular calcium dysregulation and endoplasmic reticulum (ER) stress, triggering enzyme activation and widespread tissue injury.[5] Despite extensive alcohol exposure, only a subset of individuals develop pancreatitis, indicating that genetic and environmental co-factors may influence susceptibility.[6] Risk stratification plays a crucial role in managing AP, especially during early admission when clinical deterioration can be rapid. Several scoring systems have been developed to assess severity and predict outcomes. Among these,

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the Bedside Index for Severity in Acute Pancreatitis (BISAP), the Harmless Acute Pancreatitis Score (HAPS), and the Systemic Inflammatory Response Syndrome (SIRS) criteria offer practical bedside tools for early prognosis.[7–9] The Revised Atlanta Classification provides an integrated clinical framework to categorize AP based on systemic and local complications.[10] High mortality rates are observed in severe AP, particularly when necrosis becomes infected or MODS develops. Early deaths are typically due to systemic inflammatory response, while later mortality is often associated with septic complications.[11] Studies indicate that early identification of high-risk patients, based on clinical scores and imaging, can significantly improve outcomes through timely critical care interventions.[12] This study was designed to evaluate the clinical outcomes of alcoholic acute pancreatitis in a tertiary care setting and to validate the prognostic accuracy of BISAP, HAPS, SIRS, and Atlanta classification systems in predicting morbidity and mortality in the Indian male population.

MATERIALS AND METHODS

Study Design and Duration: This was a prospective observational study conducted at the Department of General Surgery, Thanjavur Medical College, between June 2022 and December 2023.

Study Population: A total of 100 male patients diagnosed with acute alcoholic pancreatitis were enrolled consecutively during the study period.

Inclusion Criteria

1. Adult male patients with a clinical and radiological diagnosis of acute pancreatitis.
2. History of chronic alcohol intake as the primary etiological factor.

Exclusion Criteria

1. Gallstone-induced pancreatitis
2. Pancreatic malignancy
3. Infections unrelated to pancreatitis
4. Metabolic causes such as hypertriglyceridemia, hypercalcemia, or hyperparathyroidism
5. Genetic conditions such as cystic fibrosis
6. Trauma-induced pancreatitis
7. Obesity as an independent risk factor

Sample Size Calculation: Based on previous literature reporting a 55% prevalence of conservative management in alcoholic acute pancreatitis, with 10% absolute precision and 95% confidence interval, the required sample size was calculated to be approximately 100, factoring in a 5% non-response rate.

Data Collection and Parameters Recorded: Demographic details, clinical symptoms, biochemical parameters (including serum amylase, lipase, CRP, LDH, lipid profile, and calcium), and radiological findings (CT and chest X-ray) were recorded. Severity was assessed using BISAP, HAPS, and SIRS scores on admission. All patients were followed for:

1. Duration of hospital stay
2. Need for ICU admission
3. Development of complications (MODS, ARDS, pleural effusion, pseudocyst, hypotension, DKA)
4. Mortality.

Outcome Measures: Primary outcomes included mortality and severity classification using Atlanta criteria. Secondary outcomes included correlations between severity scores and clinical course.

Statistical Analysis: Data were analysed using descriptive and inferential statistics. Continuous variables were expressed as mean ± standard deviation. Categorical variables were presented as frequencies and percentages. The chi-square test was used to assess associations between severity scores and outcomes. A P-value < 0.05 was considered statistically significant.

Ethical Considerations: The study was approved by the Institutional Ethics Committee. Written informed consent was obtained from all participants. There were no direct risks to participants, and confidentiality was maintained.

RESULTS

The study cohort comprised 100 male patients diagnosed with acute alcoholic pancreatitis. The mean age was 38.4 ± 9.2 years. The highest incidence was observed in the 31–40-year age group, accounting for 42% of the cohort, followed by 21% each in the <30 and 41–50 groups, and 16% in those aged above 51 (Table 1, Figure 1).

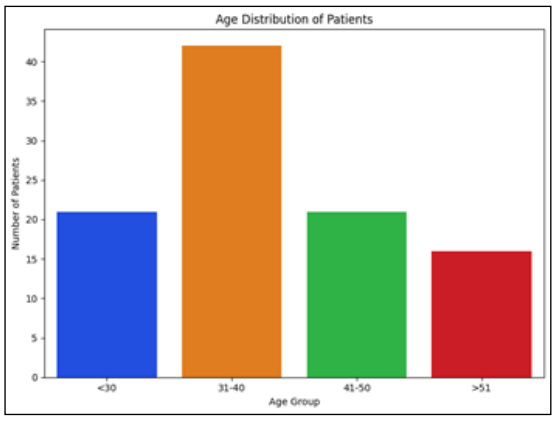

Figure 1: Age distribution of patients with alcoholic acute pancreatitis.

Age-wise distribution of alcoholic acute pancreatitis cases (n=100); highest prevalence noted in the 31–40 year group.

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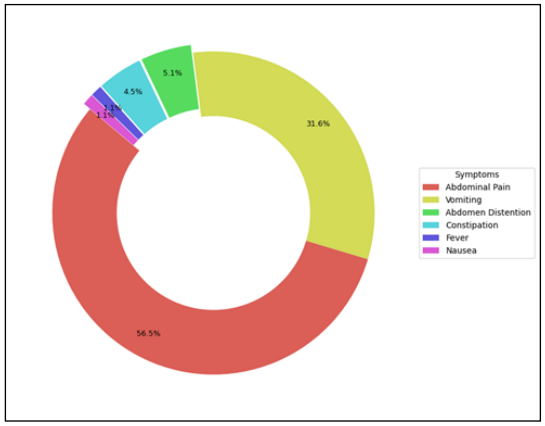

Figure 2: Pie chart showing distribution of symptoms among patients.
Proportional representation of clinical symptoms at presentation; abdominal pain was universal, followed by vomiting.

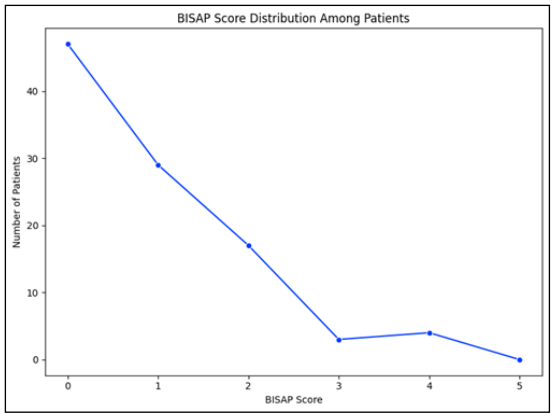

Figure 3: BISAP score distribution in the study population.
BISAP score distribution among patients; majority scored 0 or 1, indicating mild disease in most cases.

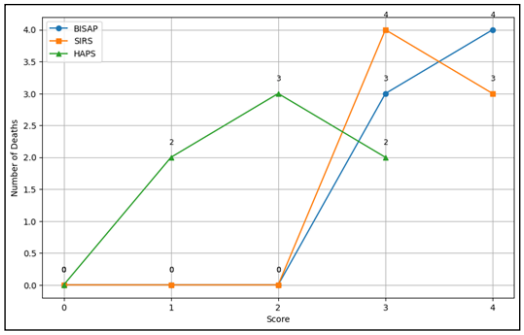

Figure 4: Comparative mortality rates across BISAP, SIRS, and HAPS scores
Comparative mortality across BISAP, SIRS, and HAPS scores; all patients with a score ≥3 in any system succumbed.

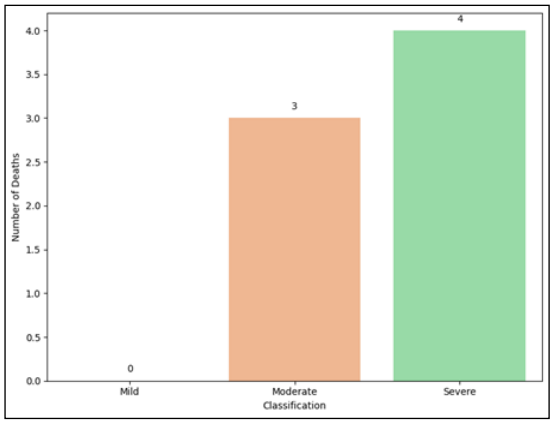

Figure 5: Mortality distribution stratified by Atlanta severity classification.
Mortality stratified by Revised Atlanta Classification; all deaths occurred in the severe pancreatitis group.

Table 1: Age Distribution of Patients

Age Group	Number of Patients
<30	21
31–40	42
41–50	21
>51	16

Abdominal pain was the universal symptom, reported by 100% of participants. Vomiting was the next most common (56%), while less frequent symptoms included abdominal distention (9%), constipation (8%), fever (2%), and nausea (2%) (Table 2, Figure 2).

Table 2. Symptoms Reported by Patients

Symptom	Percentage (%)
Abdominal Pain	100
Vomiting	56
Abdomen Distention	9
Constipation	8
Fever	2
Nausea	2

The BISAP score was used for early severity assessment. Nearly half the patients (47%) had a score of 0, 29% had a score of 1, and 17% had a score of 2. Higher scores of 3 and 4 were noted in 3% and 4% of patients respectively, with no patients having a score of 5 (Table 3, Figure 3).

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Additional findings include:

1. ICU admission was required in 29% of cases; the remaining 71% were managed in general wards.
2. The mean C-reactive protein level was 79.60 ± 47.24 mg/L.
3. The average Computed Tomography Severity Index (CTSI) was 3.39 ± 1.86.
4. The average hospital stay was 7.02 ± 1.91 days.
5. Conservative management was sufficient in 93% of cases.
6. The mortality rate was 7%, all of whom had high-risk scores (BISAP ≥3, SIRS ≥3, or HAPS = 3).
7. The Revised Atlanta classification identified 56% with mild, 40% with moderate, and 4% with severe pancreatitis.

Mortality analysis showed a statistically significant association ($P < 0.001$) between higher BISAP, SIRS, HAPS scores, and increased death rates, as detailed in later tables and figures (to follow in the full section).

Table 3: Distribution of BISAP Scores among Patients.

BISAP Score	Number of Patients
0	47
1	29
2	17
3	3
4	4
5	0

Table 4 Mortality Outcomes Stratified by Clinical Scores

A strong association was observed between increasing severity scores and mortality. None of the patients with lower BISAP (≤2), SIRS (≤2), or HAPS (=0) scores died. In contrast, mortality rose dramatically at threshold values of 3 and above across all indices.

Table 4: Mortality Analysis Based on BISAP, SIRS, and HAPS Scores.

Score Type	Score	Mortality (n)	Survival (n)	Mortality Rate (%)	P-value
BISAP	0	0	47	0%	
	1	0	29	0%	
	2	0	17	0%	
	3	3	0	100%	
	4	4	0	100%	**<0.0001**
SIRS	0	0	28	0%	
	1	0	37	0%	
	2	0	28	0%	
	3	4	0	100%	
	4	3	0	100%	**0.001**
HAPS	0	0	44	0%	
	1	2	34	5.6%	
	2	3	15	16.7%	
	3	2	0	100%	**0.004**

Table 5. Mortality Outcomes by Atlanta Classification

The Revised Atlanta Classification was also predictive of clinical outcome. All patients categorized as having mild pancreatitis survived, whereas all those in the severe group succumbed to the illness.

Table 5: Mortality Analysis Based on Atlanta Classification.

Severity Category	Mortality (n)	Survival (n)	Mortality Rate (%)	P-value
Mild	0	56	0%	
Moderate	3	37	7.5%	
Severe	4	0	100%	**<0.0001**

DISCUSSION

Alcoholic acute pancreatitis (AAP) remains a significant clinical challenge, particularly in low- and middle-income countries like India where alcohol abuse is under regulated and often underreported. This prospective study highlights the demographic profile, clinical course, complication burden, and predictive validity of various scoring systems in AAP among a male cohort from South India.

The age distribution showed the highest incidence in the 31–40 age group, aligning with national patterns of alcohol-related morbidity in adult males.[13] All patients were male, reflecting the sociocultural context in India, where alcohol use is predominantly

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concentrated among men in rural and peri-urban populations.[14]

Abdominal pain and vomiting were the most frequent presenting symptoms, consistent with previous literature.[15] The universal presence of pain underscores its diagnostic significance, while vomiting suggests early gastrointestinal involvement. Mean CRP values and CTSI scores indicated a moderate inflammatory state in most cases, affirming the utility of CRP as an accessible inflammatory marker in resource-limited settings.[16]

ICU admission was required in 29% of patients, and conservative management was successful in 93%, corroborating global evidence that early supportive therapy, including fluid resuscitation and nutritional support, can prevent complications in mild to moderate cases.[17]

The mortality rate in this cohort (7%) was exclusively associated with high-risk scores. Patients with BISAP ≥3, SIRS ≥3, and HAPS =3 had 100% mortality, echoing findings from international meta-analyses that validate the predictive accuracy of these bedside scores.[18,19] The statistical significance ($P < 0.001$) further strengthens the argument for early stratification using simple clinical indices, which are particularly valuable in Indian public hospitals where access to imaging and intensive monitoring may be limited.[20]

The Revised Atlanta Classification also correlated strongly with clinical outcomes. No deaths were reported in mild cases, while 100% mortality occurred in the severe category. These findings mirror studies from similar Indian cohorts where Atlanta staging was directly proportional to complication risk and resource utilization.[21]

The complications observed, such as MODS, ARDS, and metabolic acidosis, were in line with known sequelae of severe AP. MODS, reported in 5% of patients, remains the most feared systemic complication and a major determinant of early mortality.[22] Similar rates were noted by Vengadakrishnan et al. and Bollen et al., who emphasized that the severity of local necrosis often correlates with systemic failure and death.[23,24]

In our cohort, all deaths occurred in patients with severe systemic involvement and delayed presentation. These patients typically had high CRP levels, deranged vital parameters, and imaging consistent with necrotizing disease, which is in keeping with global evidence that supports the "dual peak" mortality pattern of AP, early deaths due to inflammatory cytokine storm and late deaths from infected necrosis.[25]

The mean hospital stay (7.02 ± 1.91 days) was shorter than that reported in studies from Western settings, possibly due to earlier discharges in India driven by economic constraints and bed turnover pressures.[26] Nonetheless, this parameter was longer in patients with moderate-to-severe disease, consistent with data from Patel et al. and Rao et al.[27,28]

Our study's findings reinforce the importance of integrating clinical scoring tools into early triage and monitoring protocols. These tools, BISAP, SIRS, HAPS, are rapid, cost-effective, and reliable, particularly in primary and secondary healthcare settings across India where advanced imaging may be unavailable. Early recognition of high-risk cases allows for timely ICU referral, aggressive resuscitation, and close monitoring, thereby improving survival.[29]

Limitations: This was a single-centre study limited to male patients, potentially affecting the generalizability of findings. The modest sample size, while adequate for exploratory analysis, limits the extrapolation of subgroup outcomes. Additionally, biochemical markers such as procalcitonin, which may enhance predictive models, were not included due to resource constraints.

Future Directions: Future multicentre studies should aim to include female patients, wider age ranges, and longitudinal follow-up to assess progression to chronic pancreatitis. Integrating genetic and lifestyle factors may further refine risk prediction models. Interventional trials focusing on early nutrition, antioxidant therapy, and alcohol de-addiction counselling in AP may also improve long-term outcomes.

CONCLUSION

This prospective study highlights that early clinical stratification using BISAP, HAPS, SIRS, and Atlanta classification significantly correlates with mortality and complications in alcoholic acute pancreatitis. The highest risk was observed in patients scoring ≥3 across these indices, with 100% mortality in severe cases. Conservative management remains effective in mild-to-moderate disease, but high-risk patients require prompt ICU care and close monitoring. These findings emphasize the need for routine use of bedside scoring systems in resource-limited Indian settings to guide timely interventions and improve patient outcomes.

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