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Original Article

Prognostic Factors and Clinical Outcomes in Patients with Acute Pancreatitis: A Prospective Observational Study

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ABSTRACT

Background: Acute pancreatitis is a common gastrointestinal emergency with a highly variable clinical course ranging from mild self-limiting inflammation to severe disease with organ failure, pancreatic necrosis, and death. Early identification of prognostic factors is essential for timely risk stratification and optimized management. Objective: To evaluate prognostic factors and clinical outcomes in patients with acute pancreatitis admitted to a tertiary care hospital. Methods: This prospective observational study was conducted at Fatima Memorial Hospital, Lahore, Pakistan, and included 22 adult patients diagnosed with acute pancreatitis. Demographic characteristics, etiological factors, clinical presentation, laboratory findings, BISAP scores, disease severity according to the Revised Atlanta Classification, complications, and in-hospital outcomes were recorded and analyzed. Associations between prognostic variables and outcomes were assessed using Chi-square or Fisher's exact tests, with odds ratios and 95% confidence intervals calculated where appropriate. Results: Gallstone-related pancreatitis was the most common etiology (45.5%). Mild, moderately severe, and severe pancreatitis were observed in 54.5%, 27.3%, and 18.2% of patients, respectively. Higher BISAP scores were significantly associated with greater disease severity (p=0.001). Pancreatic necrosis was strongly associated with ICU admission (75.0% vs 11.1%; p=0.024) and severe pancreatitis (75.0% vs 5.6%; p=0.010). One patient died, yielding an in-hospital mortality rate of 4.5%. Conclusion: BISAP score and pancreatic necrosis were important prognostic indicators of adverse clinical outcomes in acute pancreatitis. Early bedside risk stratification may facilitate timely recognition of high-risk patients and improve hospital-based management. Keywords: Acute pancreatitis, BISAP, pancreatic necrosis, prognostic factors, disease severity, prospective observational study.

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INTRODUCTION

Acute pancreatitis is an acute inflammatory disorder of the pancreas characterized by a wide spectrum of clinical manifestations ranging from mild, self-limiting disease to severe forms associated with organ failure, systemic complications, and significant mortality (1-7). The global incidence of acute pancreatitis has increased steadily over the past decades, largely due to rising prevalence of gallstone disease, metabolic disorders, and alcohol consumption (7). Although the majority of patients experience mild disease with favorable outcomes, approximately 15–20% develop moderately severe or severe pancreatitis, which may lead to local pancreatic complications, persistent organ dysfunction, prolonged hospitalization, and death (8-13). Early identification of patients at risk of severe disease remains one of the most critical challenges in the management of acute pancreatitis because clinical deterioration often occurs rapidly during the first few days of illness (3).

The pathophysiology of acute pancreatitis involves premature activation of pancreatic digestive enzymes within the pancreatic acinar cells, leading to autodigestion, inflammatory cascade activation, and systemic inflammatory response syndrome (SIRS) (7). This systemic inflammatory process may progress to multiorgan dysfunction involving the respiratory, renal, and cardiovascular systems, which significantly increases morbidity and mortality (14). Several etiological factors contribute to the onset

of acute pancreatitis, including gallstones, alcohol consumption, hypertriglyceridemia, medications, metabolic disorders, and idiopathic causes (6). Among these, gallstone disease and alcohol use account for the majority of cases worldwide (7).

Because of the highly variable clinical course of the disease, numerous prognostic scoring systems and biomarkers have been developed to predict severity and clinical outcomes. Traditional scoring systems such as Ranson criteria, Acute Physiology and Chronic Health Evaluation II (APACHE II), Glasgow score, and the Bedside Index of Severity in Acute Pancreatitis (BISAP) are widely used for risk stratification in clinical practice (3). Among these, BISAP has gained increasing attention due to its simplicity and ability to predict mortality and complications using readily available clinical and laboratory parameters within the first 24 hours of admission (3). Studies have demonstrated that higher BISAP scores are significantly associated with increased risk of severe pancreatitis, pancreatic necrosis, and mortality (12).

In addition to clinical scoring systems, several laboratory biomarkers have been investigated as predictors of disease severity and adverse outcomes. Elevated inflammatory markers such as C-reactive protein, leukocyte count, neutrophil-to-lymphocyte ratio, and platelet-to-lymphocyte ratio have shown significant associations with severe disease and complications (2). Furthermore, organ dysfunction scores such as the Sequential Organ Failure Assessment (SOFA) score have been reported to strongly predict in-hospital mortality among patients with acute pancreatitis, particularly when scores exceed specific thresholds (9). Metabolic comorbidities including type 2 diabetes mellitus, chronic kidney disease, obesity, and advanced age have also been identified as important prognostic factors that worsen clinical outcomes (8,11).

Recent large multicenter cohort studies have further highlighted the role of patient-related characteristics and comorbid conditions in determining disease severity and prognosis. In a nationwide prospective cohort study involving more than 1600 patients, obesity and comorbidity burden were significant predictors of persistent organ failure and mortality in acute pancreatitis (8). Similarly, systematic reviews and meta-analyses have identified early clinical indicators such as extensive pancreatic necrosis, organ failure, and need for mechanical ventilation as strong predictors of infected pancreatic necrosis and poor outcomes (16). Despite these advances, early prediction of disease progression remains difficult in routine clinical settings, particularly in resource-limited environments where advanced diagnostic tools may not always be available.

Another challenge in the clinical management of acute pancreatitis is the heterogeneity in patient presentation and the variability in disease course across different populations. Regional differences in etiological factors, comorbidities, and healthcare resources may influence disease severity and treatment outcomes (15). Consequently, locally generated clinical data are essential to better understand disease patterns and prognostic indicators within specific healthcare settings.

In Pakistan, there is limited prospective clinical data evaluating prognostic indicators and outcomes of acute pancreatitis in tertiary care hospitals. Most available evidence originates from retrospective analyses or studies conducted in different geographic populations, which may not fully reflect the clinical characteristics of patients presenting in local healthcare systems. Therefore, prospective observational studies are necessary to evaluate demographic characteristics, clinical features, laboratory parameters, and prognostic indicators that influence disease severity and outcomes among patients with acute pancreatitis in this region.

Given this background, the present prospective observational study was conducted to evaluate the clinical characteristics, laboratory parameters, and prognostic indicators associated with disease severity and outcomes in patients admitted with acute pancreatitis at a tertiary care hospital in Lahore, Pakistan. The study aimed to assess the distribution of etiological factors, evaluate the prognostic value of BISAP

scoring and laboratory markers, and examine their relationship with disease severity, complications, and clinical outcomes in hospitalized patients with acute pancreatitis.

MATERIALS AND METHODS

This prospective observational study was conducted to evaluate clinical characteristics, prognostic indicators, and outcomes among patients diagnosed with acute pancreatitis at Fatima Memorial Hospital, Lahore, Pakistan. The study followed an observational cohort design in which eligible patients admitted with acute pancreatitis were consecutively enrolled and followed during their hospital course to assess disease severity, complications, and clinical outcomes.

The study was carried out in the Department of Internal Medicine and Gastroenterology at Fatima Memorial Hospital, a tertiary care teaching hospital that receives referrals from both urban and surrounding regional healthcare facilities. Data collection was conducted during the study period in which patients presenting with acute pancreatitis were evaluated at the time of hospital admission and followed prospectively until discharge or in-hospital death. The clinical management of patients was performed according to standard hospital protocols for acute pancreatitis, including supportive management, fluid resuscitation, laboratory monitoring, and imaging evaluation when clinically indicated.

Participants included adult patients diagnosed with acute pancreatitis based on established clinical and biochemical diagnostic criteria. Diagnosis required the presence of at least two of the following three criteria: characteristic abdominal pain suggestive of acute pancreatitis, elevation of serum amylase or lipase levels to more than three times the upper limit of normal, and imaging findings consistent with pancreatic inflammation on abdominal ultrasonography or computed tomography (7). Adult patients aged 18 years and above who met these diagnostic criteria and were admitted during the study period were considered eligible for inclusion.

Patients were excluded if they had chronic pancreatitis, pancreatic malignancy, traumatic pancreatic injury, or incomplete clinical data preventing adequate assessment of prognostic indicators or outcomes. Patients who declined participation or were transferred to other healthcare facilities before completion of evaluation were also excluded from the study. All eligible patients were enrolled consecutively to minimize selection bias and ensure representative sampling of hospitalized acute pancreatitis cases.

After admission, detailed demographic and clinical information was obtained through structured clinical assessment and review of patient medical records. Data collected included patient age, sex, body mass index category, smoking status, comorbidities such as diabetes mellitus and hypertension, previous history of pancreatitis, and suspected etiological factors including gallstones, alcohol use, hypertriglyceridemia, medication exposure, or idiopathic causes. Clinical presentation at admission was documented including symptoms such as epigastric pain, radiation of pain to the back, nausea, vomiting, fever, abdominal distension, and hemodynamic parameters including hypotension, tachycardia, dehydration status, and altered mental status.

Laboratory investigations were performed at the time of admission as part of routine clinical care. These included serum amylase, serum lipase, complete blood count, blood urea nitrogen, serum creatinine, serum calcium, and inflammatory markers such as C-reactive protein. The presence of systemic inflammatory response syndrome was evaluated based on standard diagnostic criteria including body temperature abnormalities, tachycardia, tachypnea, and leukocyte count alterations (7). Radiological findings such as pleural effusion and pancreatic necrosis were assessed using abdominal imaging studies performed according to clinical indications.

Disease severity was classified using the Revised Atlanta Classification, which categorizes acute pancreatitis into mild, moderately severe, and severe disease based on the presence of local complications and persistent organ failure (13). Prognostic risk was assessed using the Bedside Index for

Severity in Acute Pancreatitis (BISAP) score calculated within the first 24 hours of admission. The BISAP score incorporates five clinical parameters including blood urea nitrogen level, impaired mental status, systemic inflammatory response syndrome, age greater than 60 years, and presence of pleural effusion, with higher scores indicating increased risk of severe disease and mortality (3). Clinical outcomes evaluated during hospitalization included intensive care unit admission, requirement for vasopressor support, mechanical ventilation, endoscopic retrograde cholangiopancreatography (ERCP), intervention for pancreatic collections or necrosis, length of hospital stay, and in-hospital mortality.

Measures were taken during study design and analysis to minimize potential sources of bias and confounding. Consecutive patient enrollment reduced selection bias, while standardized diagnostic criteria ensured consistency in patient identification. Data collection was performed using structured forms to minimize information bias, and laboratory investigations were conducted in the hospital's accredited clinical laboratory using standardized protocols. Potential confounding factors such as comorbidities and etiological factors were recorded to allow evaluation of their relationship with disease severity and outcomes.

The sample size consisted of all eligible patients admitted with acute pancreatitis during the study period who fulfilled inclusion criteria and consented to participate, resulting in a final cohort of 22 patients. Although modest in size, this sample provided preliminary observational data describing clinical characteristics, prognostic indicators, and outcomes within the hospital setting and allowed exploratory assessment of associations between severity indicators and clinical outcomes.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) software version 26. Descriptive statistics were used to summarize demographic, clinical, and laboratory variables. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations or medians with interquartile ranges where appropriate. Associations between prognostic indicators and disease severity or clinical outcomes were assessed using Chi-square or Fisher's exact tests for categorical variables. Odds ratios with 95% confidence intervals were calculated where applicable to estimate the strength of associations. A p-value of less than 0.05 was considered statistically significant.

Ethical approval for the study was obtained from the institutional ethical review committee of Fatima Memorial Hospital prior to initiation of data collection. Written informed consent was obtained from all participants or their legally authorized representatives before enrollment. Patient confidentiality was maintained by anonymizing all collected data and restricting access to research investigators only. All study procedures were conducted in accordance with established ethical principles for medical research involving human participants.

To ensure reproducibility and data integrity, standardized data collection forms were used for all participants, and data entry was independently verified by two investigators. Any discrepancies identified during data verification were resolved through review of original clinical records. All statistical analyses were documented to allow replication of the analytical process.

RESULTS

All 22 consecutively enrolled patients fulfilled the eligibility criteria and were included in the final analysis. There were no missing data for the variables analyzed in the present dataset. The cohort showed a broad adult age distribution, with the largest proportion belonging to the 31–45-year group (31.8%), followed by 46–60 years (27.3%), >60 years (22.7%), and 18–30 years (18.2%). Males constituted 59.1% of the sample, while females accounted for 40.9%. Overweight and obesity were common, together comprising 63.6% of patients. Diabetes mellitus was present in 27.3%, hypertension in 36.4%, smoking in 31.8%, and a prior history of pancreatitis in 22.7%. Gallstone-related pancreatitis was the most frequent etiology (45.5%), followed by alcohol-related disease (22.7%), hypertriglyceridemia (13.6%), idiopathic

disease (13.6%), and drug-induced pancreatitis (4.5%). Epigastric pain was universal (100.0%), while nausea or vomiting occurred in 81.8% and radiation of pain to the back in 72.7% of patients. At admission, tachycardia was observed in 50.0%, dehydration in 40.9%, and hypotension in 22.7% of cases (Table 1).

Table 1. Baseline characteristics, etiology, and clinical presentation of patients with acute pancreatitis (n = 22)

Variable	Category	n	%
Age group (years)	18–30	4	18.2
	31–45	7	31.8
	46–60	6	27.3
	>60	5	22.7
Sex	Male	13	59.1
	Female	9	40.9
BMI category	Normal	8	36.4
	Overweight	9	40.9
	Obese	5	22.7
Smoking status	Yes	7	31.8
	No	15	68.2
Diabetes mellitus	Yes	6	27.3
	No	16	72.7
Hypertension	Yes	8	36.4
	No	14	63.6
Previous pancreatitis	Yes	5	22.7
	No	17	77.3
Etiology	Gallstone-related	10	45.5
	Alcohol-related	5	22.7
	Hypertriglyceridemia	3	13.6
	Drug-induced	1	4.5
	Idiopathic	3	13.6
Presenting symptoms	Epigastric pain	22	100.0
	Pain radiating to back	16	72.7
	Nausea/vomiting	18	81.8
	Fever	7	31.8
	Abdominal distension	6	27.3
Hemodynamic/clinical status at admission	Hypotension	5	22.7
	Tachycardia	11	50.0
	Dehydration	9	40.9
	Altered mental status	2	9.1

Admission laboratory findings showed that serum lipase was more than three times the upper limit of normal in 90.9% of patients and serum amylase in 77.3%. Elevated white blood cell count was seen in 54.5%, elevated C-reactive protein in 59.1%, elevated blood urea nitrogen in 27.3%, elevated creatinine in 18.2%, and low serum calcium in 22.7%. Pleural effusion was present in 18.2% and systemic inflammatory response syndrome in 36.4% of cases. BISAP scoring demonstrated that half of the patients were categorized as low risk with scores of 0–1, whereas 27.3% had scores ≥3, indicating a clinically important subgroup with higher predicted risk of severe disease and adverse outcomes (Table 2).

Table 2. Admission laboratory profile and BISAP score distribution (n = 22)

Variable	Category	n	%
Serum lipase	>3 times upper limit	20	90.9
Serum amylase	>3 times upper limit	17	77.3
White blood cell count	Elevated	12	54.5
Blood urea nitrogen	>25 mg/dL	6	27.3
Serum creatinine	Elevated	4	18.2
Serum calcium	Low	5	22.7
CRP	Elevated	13	59.1
Pleural effusion	Present	4	18.2
SIRS	Present	8	36.4
BISAP score	0–1	11	50.0
	2	5	22.7
	3	4	18.2
	4–5	2	9.1

According to the Revised Atlanta Classification, 54.5% of patients had mild acute pancreatitis, 27.3% had moderately severe disease, and 18.2% had severe acute pancreatitis. Local and systemic complications were not uncommon. Acute peripancreatic fluid collection was documented in 27.3%, pancreatic necrosis in 18.2%, pleural effusion in 18.2%, acute kidney injury in 13.6%, and respiratory failure in 13.6%. Cardiovascular failure or shock occurred in 9.1%, while infected necrosis and multiorgan failure were each observed in 4.5% of the cohort (Table 3). These data indicate that although most patients had

mild disease, a clinically meaningful minority progressed to severe disease with organ dysfunction and complex local complications.

Table 3. Disease severity and complications among patients with acute pancreatitis (n = 22)

Variable	Category	n	%
Severity (Revised Atlanta Classification)	Mild acute pancreatitis	12	54.5
	Moderately severe acute pancreatitis	6	27.3
	Severe acute pancreatitis	4	18.2
Local and systemic complications	Pancreatic necrosis	4	18.2
	Acute peripancreatic fluid collection	6	27.3
	Pleural effusion	4	18.2
	Acute kidney injury	3	13.6
	Respiratory failure	3	13.6
	Cardiovascular failure/shock	2	9.1
	Infected necrosis	1	4.5
	Multiorgan failure	1	4.5

With respect to hospital course, 22.7% of patients required ICU admission, 9.1% required vasopressor support, and 9.1% required mechanical ventilation. ERCP was performed in 18.2%, reflecting the substantial proportion of gallstone-related pancreatitis, while intervention for collections or necrosis was required in 9.1%. Most patients (59.1%) had a hospital stay of 7 days or less, but 40.9% required hospitalization beyond 7 days. Overall survival was favorable, with 21 of 22 patients discharged alive and one in-hospital death, yielding a mortality rate of 4.5% (Table 4).

Table 4. Hospital course and final outcomes of patients with acute pancreatitis (n = 22)

Variable	Category	n	%
ICU admission	Yes	5	22.7
	No	17	77.3
Vasopressor support	Yes	2	9.1
	No	20	90.9
Mechanical ventilation	Yes	2	9.1
	No	20	90.9
ERCP performed	Yes	4	18.2
	No	18	81.8
Intervention for collections/necrosis	Yes	2	9.1
	No	20	90.9
Length of stay	≤7 days	13	59.1
	>7 days	9	40.9
Final status	Discharged alive	21	95.5
	Died	1	4.5

A strong association was observed between BISAP score category and disease severity. Among patients with BISAP scores of 0–1, 90.9% had mild pancreatitis and none developed severe disease. In contrast, among those with BISAP scores of 4–5, all patients developed severe acute pancreatitis. Patients with BISAP score 3 also showed marked risk escalation, with 50.0% classified as severe and the remaining 50.0% as moderately severe. Overall, the distribution of disease severity differed significantly across BISAP categories (Pearson chi-square = 23.23, df = 6, p = 0.001), supporting BISAP as a clinically useful early prognostic indicator in this cohort (Table 5A).

Pancreatic necrosis was also strongly associated with worse clinical outcomes. Patients with necrosis had substantially higher ICU admission rates than those without necrosis (75.0% vs 11.1%; OR 24.00, 95% CI 1.62–356.65; Fisher's exact p = 0.024). Severe acute pancreatitis was present in 75.0% of patients with necrosis compared with only 5.6% of those without necrosis (OR 51.00, 95% CI 2.46–1057.09; Fisher's exact p = 0.010). Mortality occurred only among patients with necrosis (25.0% vs 0.0%); however, this association did not reach statistical significance, likely due to the small sample size and low event count (Fisher's exact p = 0.182) (Table 5B).

Table 5A. Association of BISAP score with severity of acute pancreatitis (n = 22)

BISAP score	Mild n (%)	Moderately severe n (%)	Severe n (%)	Total	p-value
0–1	10 (90.9)	1 (9.1)	0 (0.0)	11	
2	2 (40.0)	3 (60.0)	0 (0.0)	5	
3	0 (0.0)	2 (50.0)	2 (50.0)	4	
4–5	0 (0.0)	0 (0.0)	2 (100.0)	2	
Overall association				22	0.001*

*Pearson chi-square test, $\chi^2 = 23.23$, df = 6.

Table 5B. Association of pancreatic necrosis with major outcomes (n = 22)

Outcome	Necrosis present (n = 4)	Necrosis absent (n = 18)	Odds ratio (95% CI)	p-value
ICU admission	3 (75.0)	2 (11.1)	24.00 (1.62–356.65)	0.024†
Severe pancreatitis	3 (75.0)	1 (5.6)	51.00 (2.46–1057.09)	0.010†
Mortality	1 (25.0)	0 (0.0)	15.86 (0.53–474.41)‡	0.182†

† Fisher's exact test. ‡ Odds ratio estimated with continuity correction because of a zero cell.

All 22 enrolled patients were included in the final analysis, with no missing observations in the analyzed variables. The study population was predominantly male (59.1%), and the most represented age group was 31–45 years (31.8%). Overweight and obesity together were observed in 63.6% of patients, while diabetes mellitus and hypertension were present in 27.3% and 36.4%, respectively. Gallstones were the leading etiology of acute pancreatitis (45.5%), followed by alcohol use (22.7%), indicating that biliary and metabolic risk profiles were dominant in this cohort. Clinically, all patients presented with epigastric pain, and high frequencies of nausea or vomiting (81.8%) and pain radiating to the back (72.7%) further reflected the typical symptomatic pattern of acute pancreatitis.

Laboratory findings at presentation showed that elevated pancreatic enzymes were common, with serum lipase exceeding three times the upper limit of normal in 90.9% and serum amylase in 77.3% of patients. Inflammatory and severity-related markers were also notable: white blood cell count was elevated in 54.5%, CRP in 59.1%, and SIRS was present in 36.4%. Half of the patients had a BISAP score of 0–1, whereas 27.3% had a BISAP score of 3 or higher, suggesting a smaller but clinically relevant subgroup at increased early risk of severe disease.

Severity classification demonstrated that 54.5% of patients had mild disease, 27.3% had moderately severe disease, and 18.2% had severe acute pancreatitis. Acute peripancreatic fluid collection was the most frequent complication (27.3%), followed by pancreatic necrosis (18.2%), pleural effusion (18.2%), acute kidney injury (13.6%), and respiratory failure (13.6%). During hospitalization, 22.7% of patients required ICU admission, 9.1% required vasopressors, and 9.1% required mechanical ventilation. Although most patients were discharged alive (95.5%), one patient died, resulting in an in-hospital mortality rate of 4.5%.

A statistically significant association was observed between BISAP score and disease severity. Among patients with BISAP scores of 0–1, 90.9% had mild disease and none developed severe pancreatitis, whereas all patients with BISAP scores of 4–5 developed severe pancreatitis. This gradient across risk strata was significant on chi-square testing ($p = 0.001$), supporting the discriminatory value of BISAP in early severity assessment. Pancreatic necrosis also showed strong adverse prognostic significance. Patients with necrosis had markedly higher ICU admission rates (75.0% vs 11.1%; $p = 0.024$) and much greater frequency of severe pancreatitis (75.0% vs 5.6%; $p = 0.010$) than those without necrosis. Mortality occurred only in the necrosis group (25.0% vs 0.0%), but this did not achieve statistical significance ($p = 0.182$), most likely because only one death occurred in the study population.

DISCUSSION

The present prospective observational study evaluated prognostic factors and clinical outcomes among patients admitted with acute pancreatitis at a tertiary care hospital in Lahore, Pakistan, and demonstrated that most patients had mild disease, while a smaller but clinically important subgroup developed moderately severe or severe pancreatitis with local and systemic complications. Gallstone-related pancreatitis was the most frequent etiology, followed by alcohol-related disease, which is consistent with the etiologic pattern reported in contemporary clinical literature describing biliary and alcohol-related causes as the dominant contributors to acute pancreatitis worldwide (7). The predominance of epigastric pain, nausea or vomiting, and back-radiating pain in the present cohort also reflects the classic symptomatic profile described in standard clinical reviews and cohort studies of acute pancreatitis (7,15).

A key finding of this study was the strong association between BISAP score and disease severity. Patients with low BISAP scores of 0–1 were overwhelmingly represented in the mild disease category, whereas

all patients with BISAP scores of 4–5 developed severe acute pancreatitis. This graded relationship supports the clinical utility of BISAP as an early bedside prognostic tool in acute pancreatitis, particularly in settings where rapid risk stratification is necessary. These findings are in agreement with prior prospective and observational studies showing that BISAP performs well in identifying patients at increased risk of severe disease, organ failure, and mortality by integrating simple variables available within the first 24 hours of admission (3,12). The practical value of BISAP is especially relevant in resource-constrained hospital environments because it requires no advanced imaging or complex calculations, thereby facilitating timely clinical decision-making.

The present data also highlighted the adverse prognostic significance of pancreatic necrosis. Patients with necrosis had markedly higher rates of ICU admission and severe pancreatitis than those without necrosis, and the only death in the cohort occurred in a patient with necrosis. This pattern is clinically plausible and consistent with prior evidence showing that necrosis, particularly when extensive or infected, is strongly associated with organ dysfunction, prolonged hospitalization, and mortality in acute pancreatitis (16). Although the mortality association in this study did not reach statistical significance, this was most likely due to the limited sample size and the occurrence of only one death event. The direction of effect nevertheless supports the broader literature indicating that pancreatic necrosis represents an important marker of poor prognosis and a potential driver of clinical deterioration (16).

Inflammatory and biochemical abnormalities at admission further reinforce the concept that early systemic response influences disease progression. Elevated white blood cell count, elevated CRP, SIRS, pleural effusion, and derangements in renal parameters were present in a substantial proportion of patients. Previous research has shown that inflammatory markers, including leukocyte count, neutrophil-based ratios, and CRP, correlate with severity and may complement formal scoring systems in early prognostic assessment (2,12). Similarly, organ dysfunction-related indicators such as creatinine and blood urea nitrogen have been linked to worse outcomes and are often incorporated into prognostic models because they reflect evolving systemic compromise (5,9). The present results do not establish causality, but they support clinical relevance of combining bedside scoring with routine laboratory evaluation to improve early identification of high-risk patients.

The observed frequency of obesity, obesity, diabetes mellitus, and hypertension in this cohort also deserves attention. More than half of the study population was overweight or obese, and over one-quarter had diabetes mellitus. These findings are relevant because metabolic comorbidities are increasingly recognized as modifiers of disease severity in acute pancreatitis. Prior large prospective studies have shown that obesity and comorbidity burden are associated with persistent organ failure and mortality, while narrative evidence has suggested that diabetes and chronic kidney disease may worsen inflammatory response, delay recovery, and prolong hospitalization (6,8,11). Although the current sample was too small to support robust multivariable adjustment for these comorbidities, their frequency within the cohort suggests that they may meaningfully contribute to adverse outcomes and should be explored in larger local studies.

The hospital-course data in the present study showed that nearly one-quarter of patients required ICU admission, while smaller proportions required vasopressor support, mechanical ventilation, ERCP, or intervention for collections or necrosis. These findings indicate that a non-negligible subset of patients progressed beyond uncomplicated disease and required advanced supportive care or procedure-based management. Such observations are consistent with tertiary-care studies demonstrating that even when most acute pancreatitis cases are mild, severe presentations consume disproportionately greater critical care resources and are associated with more complicated clinical trajectories (14,15). The relatively low mortality observed in the present study may reflect timely hospital-based management, the predominance of mild disease, and the limited sample size rather than absence of prognostic risk.

This study has several strengths. It used prospective observational design, consecutive patient inclusion, standardized diagnostic criteria, and clinically relevant severity classification based on the Revised

Atlanta framework. In addition, the study evaluated a combination of demographic, clinical, laboratory, and outcome variables within a real-world tertiary-care setting, which improves its practical clinical relevance. At the same time, several limitations should be acknowledged. The study was conducted at a single center and included only 22 patients, which limits external validity and statistical power. The small number of severe cases and the occurrence of only one death restricted the precision of effect estimates and widened confidence intervals for several associations. The modest sample also limited the ability to perform adjusted multivariable analyses to account for potential confounding by age, comorbidity burden, etiology, or obesity. In addition, some laboratory and imaging markers reported in broader prognostic literature were not evaluated in sufficient depth for comparative modeling. These limitations should be considered when interpreting the results, and the present findings should be viewed as clinically informative but preliminary.

Despite these constraints, the study provides useful local evidence indicating that BISAP score and pancreatic necrosis are important early indicators of severe disease and adverse hospital outcomes in patients with acute pancreatitis. The findings support the incorporation of simple bedside prognostic assessment into early routine care and underscore the importance of close monitoring in patients presenting with higher BISAP scores, necrosis, inflammatory response, or comorbid metabolic disease. Future multicenter prospective studies with larger sample sizes, longer follow-up, and multivariable prognostic modeling are needed to validate these findings and develop context-specific risk stratification strategies for acute pancreatitis in Pakistani tertiary-care settings (13,18-20).

CONCLUSION

In this prospective observational study of patients with acute pancreatitis at Fatima Memorial Hospital, Lahore, most patients had mild disease, but a clinically important proportion developed moderately severe or severe pancreatitis with significant complications and need for critical care support. Higher BISAP scores showed a clear association with increasing disease severity, while pancreatic necrosis was strongly associated with ICU admission and severe pancreatitis. Gallstone disease was the leading etiology, and inflammatory, renal, and systemic response markers were frequently abnormal at presentation. These findings suggest that early bedside risk stratification using BISAP, combined with careful assessment of complications such as pancreatic necrosis, may improve identification of high-risk patients and support timely clinical management in tertiary-care practice.

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