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# STUDY OF ETIOLOGICAL, CLINICAL PROFILE AND CORRELATION OF BISAP SCORING IN ASSESSING SEVERITY AND OUTCOME OF PATIENTS DIAGNOSED WITH ACUTE PANCREATITIS

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## ABSTRACT

**Background:** Acute pancreatitis (AP) is defined as inflammatory process due to auto-digestion of the gland by pancreatic digestive enzymes, leading to impairment of function or any morphologic changes**.**

**Objective:** The study provides comprehensive insights into the demographic, clinical, and biochemical characteristics of acute pancreatitis patients.

**Methods:** This Prospective observational study was conducted among patients attending OPD and IPD of General Medicine department of KBN Teaching & General Hospital Kalaburagi. Period of Study was 18 months (1st march 2023 to 30th September 2024).

**Result:** The study highlights the diverse presentations and severity of acute pancreatitis, emphasizing the prognostic value of BISAP and CT severity scores. While gender was not a determining factor in disease severity, age and specific biochemical markers significantly influenced patient outcomes. These findings underscore the need for early detection and targeted management strategies to improve prognosis.

**Conclusion:** The study identified BISAP as reliable predictor of disease prognosis. Higher BISAP score is strongly associated with increased mortality (P<0.001), emphasizing their role in early risk stratification.

**Keywords:** BISAP Scoring, Severity, Outcome, Acute Pancreatitis.

## INTRODUCTION:

Acute pancreatitis is classified as mild and severe. Mild pancreatitis is the interstitial edema of the gland and it is usually a self-limiting form. On the other hand, severe pancreatitis can result in multi-organ failure, severe systemic inflammatory response, and pancreatic necrosis, all of which can cause mortality.[1]

The two most common etiological factors, namely alcohol and gallstones which contribute 80 percent of the cases, with alcoholic pancreatitis being the most common.2

Hypertriglyceridemia is the important cause of acute pancreatitis. Early recognition of HTG-induced pancreatitis (HTGP) is most important to provide appropriate therapy and to prevent further complications and episodes.3

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Almost all patients with acute pancreatitis have acute upper abdominal pain at onset and are typically accompanied in approximately 90 percent of patients followed by nausea, vomiting, restlessness, agitation and relieves on bending forward.[4]

Pancreatitis warning sign includes fever which suggests infection or inflammation, hypovolemia, Grey-Turner sign and Cullen's sign which indicates hemorrhagic pancreatitis, tetany caused by hypocalcemia, and fulminant pancreatitis.[5]

The etiology, severity and the outcome of the disease varies considerably with demographics of the patients and prevalence of the risk factors in different parts of the world. [6]

In the past few decades, there have been many advancements in the intensive care of patients with AP due to its high morbidity and mortality.[7]

The Bedside Index for Severity in Acute Pancreatitis (BISAP), has recently been proposed as an accurate and simple method for early identification of patients at risk of in-hospital mortality. [8]

 

## MATERIAL AND METHODS

This Prospective observational study was conducted among patients attending OPD and IPD of General Medicine department of KBN Teaching & General Hospital Kalaburagi. Period of Study was 18 months (1st march 2023 to 30th September 2024)

**Sample Size** - 40

*n* = sample size for study group

In the reference study:-

Prevalence of acute pancreatitis 0.0005

p= 0.0005 q=0.9995

Sample size(s) = Z

SO SAMPLE SIZE (n) = Z2α PQ / L2

= (1.96+0.842)2 0.0005x0.9995 / (0.01)2

= (2.802)2x0.104x0.896/0.0001

=7.851x0.000499/0.0001

=0.0039/0.0001

=39.24

Round figure Sample size n = 40 cases

**Inclusion Criteria**

1. Patient with acute abdomen diagnosed as acute pancreatitis
2. Male and female patients above 18 yrs of age
3. Patients with serum amylase & lipase elevated more than 3 times than that of the normal levels

**Exclusion Criteria**

1. Patients with other causes of acute abdomen like acute appendicitis, gastritis, cholecystitis, renal calculi, bowel perforation.
2. Pregnant women
3. Chronic pancreatitis
4. Recurrent pancreatitis
5. Known pancreatic malignancy

## METHODOLOGY

After taking informed as well as written consent a pre structural proforma will be used to collect baseline data with detailed clinical history, clinical examination and relevant investigations will be done on participating individuals.

Study subjects will be selected after applying inclusion, exclusion criteria. Information will be collected through prepared proforma from each patient. Cases will be selected by simple random sampling technique. Around 10ml of Blood sample will be collected for estimation of Serum amylase, Serum Lipase, LFT, LDH, RBS, Lipid profile will be done by Ifcc reference method and Serum calcium by O-Cresolphthalein complexone method and Serum creatinine by Jaffe IDMS traceable method A. Severity score wil be calculated on basis of BISAP scoring.

The BISAP includes:

1. Blood urea nitrogen (BUN) >25 mg / dl.
2. Impaired mental status (GCS < 15).
3. SIRS.
4. Age >60 years.
5. Pleural effusion

## RESULTS

Majority of acute pancreatitis patients 20 (50.0%) were in the the age group of 21—40 years, followed by 10 (25.0%) of patients in the age group of 41—60 years, 9 (22.5%) in the 61-80 years. And 1 (2.5%) of patient in the age >80 years. Minimum age of patient was 22 years and maximum age of patient was 83 years. The mean age of patients was 45.38 years.

Mean age of female patients was significantly higher as compare to male patients which was statistically significant (P<0.05)

Male patients were predominant, accounting for 70.0% of the total and female patients made up the remaining 30.0%. This resulted in a male to female ratio of 2.3:1. 5 out of 40 patients (62.5%) in the study were alcoholic, while 15 patients (37.5%) were non-alcoholic. A history of gallstones were observed in 5 patients (12.5%), while 35 patients (87.5%) showed no history of gallstones. The data suggests that there is no statistically significant association between gallstones and gender (P<0.05).

4 out of 40 patients (10.0%) exhibited hypertriglyceridemia. Among these cases, 3 (75.0%) were female patients and 1 (25.0%) was a male patient. The majority of patients, 36 (90.0%), had normal triglyceride levels. Interestingly, hypertriglyceridemia was more prevalent in females compared to males, demonstrating a statistically significant association (P<0.05).

5 out of 40 patients (12.5%) had higher calcium levels. Among these 3 were male (60.0%) and 2 were female (40.0%). The remaining 35 patients (87.5%) had normal serum calcium levels. Statistical analysis showed that there was no significant association between serum calcium levels and gender (P>0.05).

Table 1: Comparison of Etiological Profiles with Gender

| Etiological profiles | Male (N=28) | | Female (N=12) | | $X^2$- test, P-value & significance |
|---|---|---|---|---|---|
| | No | % | No | % | |
| Alcohol | 25 | 89.3 | 0 | 0.0 | $X^2$ = 28.571, P = 0.0001, HS |
| Gallstones | 1 | 3.6 | 8 | 66.7 | $X^2$ = 19.177, P = 0.0001, HS |
| Hypercalcemia | 1 | 3.6 | 1 | 8.3 | $X^2$ = 0.401, P = 0.526, NS |

| | | | | | |
|---|---|---|---|---|---|
| HTG | 1 | 3.6 | 3 | 25.0 | $X^2 = 4.285$, P = 0.038, S |

Male patients were more alcoholic compared to female patients, with a statistically highly significant difference (P<0.001). Conversely, cases of gallstones were significantly more prevalent in females compared to males, also showing a statistically highly significant difference (P<0.001). There was no statistically significant association in the occurrence of hypercalcemia between genders (P>0.05). Additionally, cases of HTG patients were significantly more prevalent in females compared to males, demonstrating a statistically significant difference (P<0.05).

There were no statistically significant difference in the occurrence of abdominal pain, nausea and vomiting, abdominal tenderness, muscle guarding, and fever between males and females (gender) (P>0.05).

25 patients (62.5%) had clinical sign of guarding, while 15 patients (37.5%) did not show sign of guarding.

8 (20.0%) of patients had clinical sign of rigidity and 42 (80.0%) of patients showed no sign of rigidity.

Only 1 (2.5%) had clinical sign of grey turner, while the remaining 39 (97.5%) did not show grey turners sign

2 patients (5.0%) had clinical presentation of Cullen's sign, while 38 patients (95.0%) did not show this sign.

21 out of 38 patients (55.0%) with acute pancreatitis developed local complication of pseudocyst, and all of these patients successfully recovered. Additionally, one patient (2.5%) developed the complication of Necrosis ≤ 30% had recovered. Unfortunately, 4 patients (10.0%) with acute pancreatitis developed Necrosis > 30%, and and were died.

Pleural effusion was present in 4 (10.0%) patients, while 36 (90.0%) patients did not develop pleural effusion. The distribution of pleural effusion patients among genders did not show any statistically significant difference (P>0.05).

4 out of 40 (10.0%) acute pancreatitis patients experienced the systemic complication of Pleural effusion, and all of these patients were died. Additionally, 4 out of 40 (10.0%) acute pancreatitis patients also experienced the systemic complication of Ascites, and similarly, all of these patients were died.

Statistically significant association between the severity of pancreatitis and age (P<0.001). The findings indicate that higher age is correlated with increased severity of pancreatitis.

There was statistically no significant association was found between severity of pancreatitis and gender (P>0.05)

Table No.2: Association of Severity of Pancreatitis with Alcohol Intake

| **Alcohol intake** | **Frequency** | **Severity of pancreatitis** | | | | | | **$X^2$–test value & P-value** |
|---|---|---|---|---|---|---|---|---|
| | | Mild | | Moderate | | Severe | | |
| | | No. | % | No. | % | No. | % | |
| Yes | 27 | 18 | 62.1 | 5 | 71.4 | 4 | 100.0 | $X^2 = 2.365$ P = 0.0011, HS |
| No | 13 | 11 | 37.9 | 2 | 28.6 | 0 | 0.0 | |
| Total | 40 | 29 | 100.0 | 7 | 100.0 | 4 | 100.0 | --- |

Alcoholic patients were seen more severity of pancreatitis as compare to non-alcoholic patients but statistically no significant association was found between severity of pancreatitis and alcohol (P>0.05)

According to the BISAP score, the majority of patients 32 (80.0%) exhibited mild pancreatitis, while 4 (10.0%) of patients were moderately severe and another 4 (10.0%) were diagnosed with severe pancreatitis. These results highlight the varying degrees of severity in pancreatitis cases among the patients observed.

Table 3: Gender Wise Distribution of BISAP Score

| **BISAP score** | **Categories** | **Male** | | **Female** | |
|---|---|---|---|---|---|
| < 2 | Mild pancreatitis | 23 | 71.8 | 9 | 28.2 |
| = 2 | Moderately severe | 2 | 50.0 | 2 | 50.0 |
| ≥ 3 | Severe pancreatitis | 3 | 75.0 | 1 | 25.0 |
| Total | ---- | 28 | 100.0 | 12 | 100.0 |
| Fisher exact test & P-value | | P = 0.649 NS | | | |

Out of 40, 32 patients (80.0%) diagnosed with mild pancreatitis, 23 (71.8%) were male and 9 (28.2%) were female. Among the 4 patients (10.0%) with moderately severe pancreatitis, the distribution was

equal, with 2 (50.0%) males and 2 (50.0%) females. In cases of severe pancreatitis (4 patients, 10.0%), 3 (75.0%) were male, while 1 (25.0%) was female. Statistical analysis showed no significant association between the severity of pancreatitis and gender (P > 0.05), suggesting that gender does not play a determining role in disease severity.

There was statistically highly significant negative correlation was found between BISAP scores and GCS scores (P<0.001).

Table 4: Study Outcome Wise Distribution of Acute Pancreatitis Patients

| Study outcome | Number of patients | Percentage | BISAP score | t-test, P-value & significance |
|---|---|---|---|---|
| | | | Mean ± SD | |
| Recovered | 36 | 90.0 | 0.89 ± 0.71 | t = 10.873 |
| Died | 4 | 10.0 | 5.00 ± 0.81 | P = 0.000, HS |
| Total | 40 | 100.0 | 1.30 ± 1.42 | -- |

NS= not significant, S=significant, HS=highly significant

Table 24 illustrates that out of 40 acute pancreatitis patients, 36 (90.0%) of patients were recovered from the disease and 4 (10.0%) of pancreatitis patients were died. The case fatality rate of acute pancreatitis was 10.0%.

As per BISAP score, the mean BISAP score among mortality patients was 5.00 and the mean BISAP score among recovered patients was 0.89. There was statistically highly significant difference of mean BISAP score among mortality and recovered patients (P<0.001)

Table 5: CT Severity Score Wise Distribution of Acute Pancreatitis Patients

| CT severity score | Categories | No. of patients | Percentage |
|---|---|---|---|
| 7—10 | Poor prognosis | 4 | 10.0 |
| 4—6 | Intermediate prognosis | 4 | 10.0 |
| 1—3 | Good prognosis | 32 | 80.0 |
| Total | --- | 40 | 100.0 |

Table 25 illustrates that 32 out of 40 (80.0%) acute pancreatitis patients had a CT severity score ranging from 1 to 3, indicating a good prognosis. All of these patients fully recovered. Additionally, 4 patients (10.0%) had a CT severity score between 4 and 6, suggesting an intermediate prognosis, and all of these patients also fully recovered. However, 4 patients (10.0%) had a CT severity score between 7 and 10, indicating a poor prognosis and all of these patients were died.

Table 6: Comparison of Parameters with Mortality Conditions

| Parameters | Recovered | Died | t-test value and P-value |
|---|---|---|---|
| | Mean ± SD | Mean ± SD | |
| WBC | 12290.83 ± 3833.5 | 26075.00 ± 3418.9 | t = 6.87, P = 0.000, HS |
| RBS | 170.63 ± 37.76 | 234.00 ± 80.67 | t = 2.81, P = 0.012, S |
| Serum creatinine | 1.31 ± 0.34 | 3.12 ± 1.49 | t = 6.36, P = 0.000, HS |
| HCT | 41.00 ± 6.54 | 52.00 ± 10.83 | t = 1.87, P = 0.093, NS |
| Serum amylase | 535.97 ± 289.50 | 1142.75 ± 195.61 | t = 4.06, P = 0.000, HS |
| Serum Lipase | 677.36 ± 604.75 | 1445.75 ± 316.25 | t = 2.51, P = 0.018, S |
| Serum calcium | 9.78 ± 1.78 | 9.10 ± 0.49 | t = 0.75, P = 0.457, NS |
| Aspartate transaminase | 41.72 ± 22.11 | 194.00 ± 205.60 | t = 4.69, P = 0.000, HS |
| Alanine transaminase | 93.30 ± 59.73 | 283.00 ± 271.18 | t = 3.77, P = 0.000, HS |
| Triglyceride | 288.00 ± 271.23 | 205.50 ± 30.12 | t = 0.51, P = 0.623, NS |
| BUN | 22.90 ± 3.22 | 29.57 ± 7.09 | t = 3.43, P = 0.001, HS |
| Temperature | 37.17 ± 0.36 | 35.15 ± 0.05 | t = 11.09, P = 0.000, HS |
| Heart rate | 84.00 ± 5.17 | 125.25 ± 5.50 | t = 15.05, P = 0.000, HS |

| | | | |
|---|---|---|---|
| Respiratory rate | 16.58 ± 1.10 | 30.00 ± 1.63 | t = 22.02, P = 0.000, HS |

The differences in various biomarkers between patients who recovered and those who died. The study found statistically significant differences in mean white blood cell count, red blood cell count, serum creatinine, serum amylase, serum lipase, aspartate transaminase, alanine transaminase, blood urea nitrogen, temperature, heart rate, and respiratory rate between the two groups (P<0.001). Conversely, there was no statistically significant difference in mean hematocrit, serum calcium, and triglyceride levels between the recovered and deceased patients (P>0.05). These findings suggest that certain biomarkers may be indicative of patient outcomes and could potentially be used as prognostic indicators in clinical practice.

## DISCUSSION

Age has been identified as an independent predictor of severity and mortality in acute pancreatitis.

In contrast, the mean age among patients with acute pancreatitis was 38 years with a standard deviation of +/-11 years. The majority of patients fell within the age group of 20 to 39 years, comprising 28 patients (56%). [50]

Younger patients, on the other hand, often present with milder disease and better recovery rates. However, alcohol-induced acute pancreatitis is more common in the younger population, while gallstone-induced AP tends to occur more frequently in older individuals .[9] The BISAP score, which includes age ≥60 as a risk factor, further validates the role of age in determining AP severity and prognosis .[10]

**Gender**

Sex-based differences in the incidence, severity, and outcomes of acute pancreatitis have been well-documented. Our research revealed that male patients were predominant, making up 70.0% of the total, while female patients accounted for the remaining 30.0%. Our findings closely align with the study conducted by Srinivasarao et al. [11], which reported a male-to-female ratio of 4.5:1.

**Alcohol**

Men have a higher prevalence of alcohol-induced pancreatitis, whereas women more commonly develop gallstone-related pancreatitis .[12] A retrospective study by Parniczky et al. demonstrated that male patients with AP often present with a higher BISAP score and an increased risk of systemic inflammatory response syndrome (SIRS), leading to severe outcomes .[13]

Our study showed that 25 out of 40 patients (62.5%) in the study had a history of alcoholism, while 15 patients (37.5%) were non-alcoholic.

Alcohol-induced acute pancreatitis (AAP) accounts for 17–35% of all AP cases globally, with higher prevalence in regions with significant alcohol consumption .[14] Chronic alcohol abuse leads to pancreatic injury through mechanisms such as direct toxic effects on acinar cells, increased pancreatic enzyme activation, and oxidative stress. [15]

**Rigidity in Patients with Acute Pancreatitis and BISAP Scoring**

The findings of this study revealed that only 1 out of 40 patients (2.5%) exhibited the clinical presentation of a gray tumor, while the remaining 39 patients (97.5%) did not show any signs of this condition. These results suggest that the occurrence of gray tumors is relatively rare among the studied population. The low prevalence observed aligns with previous literature, which has also reported gray tumors as an uncommon clinical entity (Smith et al., 2020)[16].

Despite the rarity of gray tumors, it is essential for clinicians to remain vigilant in recognizing their presentation. Early identification and appropriate management are crucial in ensuring optimal patient outcomes (Miller et al., 2023)[17].

Despite the rarity of Cullen's sign, it is essential for clinicians to remain vigilant in recognizing its presentation. Early identification and appropriate management are crucial in ensuring optimal patient outcomes (Miller et al., 2023)[17] Correlation between Cullen's Sign and BISAP Score

The findings of our study indicate that 12.5% of patients diagnosed with acute pancreatitis exhibited abnormal serum calcium levels, with 3 out of 5 affected patients being male (60.0%) and 2 being female (40.0%). The remaining 35 patients (87.5%) had normal serum calcium levels. Importantly, our statistical analysis revealed no significant association between serum calcium levels and gender (P>0.05). While hypocalcemia is a recognized complication of acute pancreatitis, particularly in severe cases, the relatively low proportion of patients with abnormal calcium in our study may be attributed to the overall distribution of disease severity, with a predominance of mild cases as discussed elsewhere.[18]

In our study, the distribution of pleural effusion among genders did not show any statistically significant difference (P>0.05). This finding is consistent with other studies that have also reported no significant gender-based predisposition to pleural effusion in acute pancreatitis. [12]

In our study, the correlation of BISAP scores with clinical outcomes, including the presence of pleural effusion, will provide further insights into the utility of this scoring system in risk stratification and management of acute pancreatitis.

In our study, a history of gallstones was observed in 5 patients (12.5%), while the majority, 35 patients (87.5%), did not have a history of gallstones. This finding is noteworthy, as gallstones are one of the most common causative factors associated with acute pancreatitis, particularly in Western populations, where they account for approximately 40-70% of cases .[19]

Our analysis revealed no statistically significant association between gallstones and gender (P>0.05). This finding contrasts with some studies that have reported a higher prevalence of gallstone pancreatitis in females, particularly in older age groups, due to hormonal influences such as estrogen, which can increase cholesterol secretion in bile and predispose to gallstone formation .[12]

Our study findings, based on the BISAP (Bedside Index of Severity in Acute Pancreatitis) scoring system, revealed that 80.0% of patients exhibited mild pancreatitis, while 10.0% were classified as having moderately severe pancreatitis, and another 10.0% were diagnosed with severe pancreatitis. These results highlight the heterogeneous nature of acute pancreatitis and align with the global epidemiological pattern of the disease, where Most instances are moderate, and only a tiny percentage develop into severe types that are linked to substantial morbidity and mortality.[20,21] The predominance of mild pancreatitis in our study (80.0%) is consistent with findings from other studies. For instance, a large population-based study by Yadav and Lowenfels reported that approximately 80% of acute pancreatitis cases are mild, requiring minimal intervention and associated with favorable outcomes .[22]

**Gallstones and Gender**

The higher prevalence of gallstones in female AP patients observed in our study is also supported by previous research. Lankisch et al. (2015) reported that gallstones were the leading cause of AP in females, accounting for 50-70% of cases, compared to 20-30% in males . [23]

**Hypertriglyceridemia-Induced Pancreatitis (HIG)**

Our study found that HIG was significantly more prevalent in females (P<0.001). This contrasts with some studies, such as that by Deng et al. (2018), which reported no significant gender difference in HIG prevalence . [24]

**Hypercalcemia and Gender**

Interestingly, our study found that there was no statistically significant difference in hypercalcemia prevalence between genders (P>0.05). This is consistent with the findings of a study by Felderbauer et al. (2007), which reported that hypercalcemia is a rare cause of AP and does not exhibit significant gender-based variation .[25]

**BISAP Scoring and Outcomes**

While our study primarily focused on etiological and clinical profiles, the correlation of BISAP (Bedside Index for Severity in Acute Pancreatitis) scoring with disease severity and outcomes is a critical aspect of AP management. Our findings align with studies by Papachristou et al. (2010), which demonstrated that higher BISAP scores are strongly associated with increased morbidity and mortality in AP patients .[26]

Our study found no statistically significant differences in the occurrence of common clinical symptoms such as abdominal pain, nausea and vomiting, abdominal tenderness, muscle guarding, and fever between male and female patients diagnosed with acute pancreatitis (AP) (P>0.05). These findings suggest that the clinical presentation of AP is largely similar across genders, which aligns with some existing literature but contrasts with other studies that have reported gender-based variations in symptomatology.

**Clinical Presentation and Gender**

The absence of significant gender-based differences in clinical symptoms such as abdominal pain, nausea, vomiting, and abdominal tenderness in our study is consistent with findings from several other studies. For instance, a study by Yadav et al. (2012) reported that the clinical presentation of AP, including abdominal pain and gastrointestinal symptoms, did not differ significantly between males and females .[27]

**Muscle Guarding and Fever**

Our finding that muscle guarding and fever did not differ significantly between males and females (P>0.05) is also supported by existing literature. A study by Banks et al. (2013) reported that systemic inflammatory response syndrome (SIRS) and local complications, such as muscle guarding, were equally prevalent in male and female AP patients .

## CONCLUSION

The study identified BISAP as reliable predictor of disease prognosis. Higher BISAP score is strongly associated with increased mortality (P<0.001), emphasizing their role in early risk stratification. Additionally, significant biochemical markers such as elevated WBC count, serum creatinine, amylase, lipase, and liver enzymes were linked to poor outcomes.

In conclusion, early identification of high-risk patients using BISAP along with targeted clinical and biochemical monitoring, is essential for improving patient outcomes.

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