

A Prospective Study of the BISAP Score in Predicting Severity and Prognosis of Acute Pancreatitis in a Tertiary Care Hospital in Southern Bihar Region

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Abstract

Aim: A prospective study of the bedside index for severity in acute pancreatitis (BISAP) score in predicting severity and prognosis of acute pancreatitis.

Methods: The present Prospective study was conducted in the Department of General Surgery, Narayan Medical College and Hospital, Sasaram, Bihar, India. The total number of patients included in the study was 50. Individual components of the BISAP scoring system were BUN >25mg/dl, impaired mental status (Glasgow Coma Scale Score <15) and SIRS (systemic inflammatory response syndrome).

Results: Out of 50 patients 45 (90%) were males and 5 (10%) were females. Thus, a male preponderance was observed in this disease. Out of 50 patients, 40 had BISAP score <2. Among them, 37 patients (92.5%) had a hospital stay for ≤7 days and only 3 patients (7.5%) had a hospital stay for >7 days. 10 patients had BISAP score ≥2. Among them, 9 patients (90%) had a hospital stay for >7 days and only 1 patient (10%) had a hospital stay for ≤7 days. Hence, BISAP Score ≥2 was associated with prolonged hospital stay. In this study, BISAP score had a sensitivity of 70%, specificity of 92.5%, positive predictive value of 70, negative predictive value of 92.5%, false positive rate of 7.5% and false negative rate of 30% in predicting severe acute pancreatitis and poor prognosis.

Conclusion: It can be concluded that BISAP score is accurate in predicting severity and prognosis of acute pancreatitis. Patients diagnosed with acute pancreatitis having BISAP score ≥2 are prone to develop severe pancreatitis and carried poor prognosis while patients with BISAP score <2 develop only mild pancreatitis and have better prognosis.

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Introduction

Acute pancreatitis is the most common gastrointestinal cause of hospitalization. [1] The rate of hospitalization continues to grow. [2] Analysis of national inpatient sample databases showed a 33% increase in acute pancreatitis-related hospitalization over a 7-year period from 1997 to 2003. [3] The rise in incidence of acute pancreatitis is probably a result of a combination of increasing incidence of risk factors such as obesity (gallstone disease) and more testing. [4]

The severity of acute pancreatitis is the major determinant of clinical outcomes with mortality ranging from 1–3% in mild to over 20% in severe acute pancreatitis (SAP), defined by the presence and persistence of organ failure. [5,6] A major challenge for care providers is to predict the development of severe pancreatitis early in the course, which would improve patient management and resource utilization. But most of the patients who develop severe pancreatitis during hospitalization present to the emergency room without organ failure initially, and no single laboratory test has been shown to reliably predict subsequent progression to severe pancreatitis. Therefore, an accurate clinical prediction rule has the potential to dramatically improve the management of acute pancreatitis. The Bedside Index for Severity in Acute Pancreatitis (BISAP) was developed in 2008. [7] It is an easy to calculate from data points available in the first 24 hours of presentation to emergency department. Other clinical prediction scores reported in the literature are cumbersome to calculate, need clinical and laboratory data from 48 hours of hospitalization and do not outperform BISAP in predicting severe pancreatitis. [8] This is all the more relevant since the first 24–48-hour period is the most crucial time window in management of pancreatitis, and by the end of 48 hours most patients have revealed the severity of their illness with clinical improvement or development of organ failure.

Material and Methods

The present Prospective study was conducted in the Department of General Surgery, Narayan Medical College and Hospital, Sasaram, Bihar, India. The total number of patients included in the study was 50. Patients with incomplete clinical data, doubtful diagnosis and patients with chronic pancreatitis were excluded. The diagnostic tools used for study was history and clinical examination, laboratory tests such as serum amylase, serum lipase, serum creatinine, blood urea, total WBC count and imaging modalities like chest X-ray, trans-abdominal ultrasonography, CECT abdomen.

Diagnosis of acute pancreatitis was based on the presence of two of the following three features:

1. Abdominal pain consistent with acute pancreatitis (acute onset of a persistent, severe, epigastric pain often radiating to the back,
2. Serum amylase and/or lipase at least three times greater than the upper limit of normal value,
3. Characteristic manifestations of acute pancreatitis on CECT or transabdominal ultrasonography. [9] For all the patients diagnosed with acute pancreatitis, BISAP score was calculated within 24 hours of presentation.

Individual components of the BISAP scoring system were BUN >25mg/dl, impaired mental status (Glasgow Coma Scale Score <15) and SIRS (systemic inflammatory response syndrome). [10]

SIRS is defined as two or more of the Temperature of <36 or >38°C, Respiratory rate >20 breaths/min or Pa CO₂ <32mmHg, Pulse >90beats/min, WBC <4,000 or >12,000 cells/mm³ or >10% immature bands, Age > 60 years, Pleural effusion detected on imaging (CT scan, chest radiograph, or abdominal ultrasound

obtained within 24 h of presentation). One point was assigned for each variable within 24 hours of presentation and added for a composite score of 0-5. The disease was classified as mild or severe on the basis of development of organ system failure and local complications such as peripancreatic fluid collections, pancreatic pseudocyst, pancreatic necrosis and pancreatic abscess. Transabdominal ultrasonogram and CECT abdomen were used to diagnose the development of local complications.

Diagnosis of organ system failure is based on the presence of following features

persisting for more than 48 hours:
Cardiovascular insufficiency:
Systolic blood pressure <90mmhg,
Pulmonary insufficiency: Arterial PO₂ <60mmhg in room air or need for mechanical support, Renal failure: Serum creatinine level >2mg/dl.[9] The accuracy of BISAP score in predicting the severity and prognosis of acute pancreatitis was evaluated.

Results

Out of 50 patients 45 (90%) were males and 5 (10%) were females. Thus, a male preponderance was observed in this disease (Table 1).

Table 1: Sex distribution

Sex	Frequency	Percentage
Male	45	90%
Female	5	10%

Table 2: Age distribution

Age group in years	Number of patients	%
Below 30	8	16
30-40	20	40
40-50	20	40
50-60	0	0
Above 60	2	4

Out of 50 patients, 20 belonged to the age group 30-40 years, 20 belonged to the age group 40-50 years, 8 belonged to the age below 30 years, 2 belonged to the age group above 60 years and none belonged to the age group 50-60 years. The peak incidence was in the 3rd and 4th decade (Table 2).

Table 3: Etiology

Etiology	No. of patients	Percentage
Alcohol	43	86%
Gall stone	7	14%
Total	50	100

The history of alcohol consumption and likelihood of it being the etiological factor was in 43 patients (86%), while gallstone disease was implicated in 7 patients (14%) (Table 3).

Table 4: Relationship between BISAP score and hospital stay

BISAP Score	Hospital stay in days		Total
	≤ 7 days	>7 days	
<2	37 (92.5%)	3 (7.5%)	40
≥2	1 (10%)	9 (90%)	10

Out of 50 patients, 40 had BISAP score <2 . Among them, 37 patients (92.5%) had a hospital stay for ≤ 7 days and only 3 patients (7.5%) had a hospital stay for >7 days (Table 4).

10 patients had BISAP score ≥ 2 . Among them, 9 patients (90%) had a hospital stay for >7 days and only 1 patient (10%) had a hospital stay for ≤ 7 days. Hence, BISAP Score ≥ 2 was associated with prolonged hospital stay.

Table 5: Relationship between BISAP score and development of complications (systemic+local)

BISAP Score	Development of complications (systemic + local)		Total
	Yes	no	
≥ 2	7	3	10
< 2	3	37	40
	10	40	50

Out of 50 patients, 10 developed complications and 40 patients did not develop any complications. Of the 10 patients with BISAP score ≥ 2 , 7 patients developed complications while 3 of them did not develop any complications. Among the 40 patients with BISAP score < 2 , only 3 patients developed complications while 37 of them did not develop any complications. BISAP score ≥ 2 was found to be more associated with the development of complications (Table 5).

Out of 50 patients, 10 developed severe pancreatitis and 40 patients developed mild pancreatitis. Of the 10 patients with BISAP score ≥ 2 , 7 patients developed severe pancreatitis while only 3 of them developed mild pancreatitis.

Among the 40 patients with BISAP score < 2 , only 3 patients developed severe pancreatitis while 37 of them developed mild pancreatitis. BISAP score ≥ 2 was found to be more associated with the severe form of the disease (Table 6).

Table 6: Relation between BISAP score and the severity of acute pancreatitis

BISAP Score	Severity		Total
	Severe	Mild	
≥ 2	7	3	10
< 2	3	37	40
	10	40	50

Following statistical values evaluated the accuracy of BISAP score in predicting the severity of acute pancreatitis. In this study, BISAP score had a sensitivity of 70%, specificity of 92.5%, positive predictive value of 70, negative predictive value of 92.5%, false positive rate of 7.5% and false negative rate of 30% in predicting severe acute pancreatitis and poor prognosis

Discussion

In this study, author evaluated the usefulness of the BISAP score in predicting severity and prognosis of acute

pancreatitis. This study demonstrated that the BISAP score was accurate in predicting severity and prognosis of acute pancreatitis.

Of the 52 patients studied 45 (90%) were males and 5 (10%) were females. Thus, a male preponderance was observed in this disease. Alcoholism was the most common etiology in this study, and this explains the reason for male preponderance. Male predominance in this disease and alcoholism as the common etiology has been reported by most studies which was in conformity with this study. [9,11] 40

(80%) patients were between 30- 50 years of age. Similar results were obtained in the study conducted by Kaya E et al. [12]

Of the 50 patients studied 10 patients developed severe acute pancreatitis, 40 of them had mild pancreatitis that showed 20% of the patients studied developed severe form of the disease. In most cases, acute pancreatitis is self-limiting, however, 20-30% of patients develop a severe disease that can progress to severe form. [13] Similar incidence (27.5%) was also reported in study conducted in Thailand and Heredia. [14,15] In this study, BISAP score had a sensitivity of 70%, specificity of 92.5%, positive predictive value of 70, negative predictive value of 92.5%, false positive rate of 7.5% and false negative rate of 30% in predicting severe acute pancreatitis and poor prognosis. This result was comparable to the results obtained by Papachristou GI et al. [16] Nine of the eleven patients who had BISAP score ≥ 2 developed severe pancreatitis. 37 of the 40 patients who had BISAP score < 2 developed mild pancreatitis. 7 of the 10 patients with BISAP score ≥ 2 had longer hospital stay (> 7 days). 7 of the 10 patients with BISAP score ≥ 2 had poor prognosis and developed either local or systemic complications.

Thus, BISAP score ≥ 2 was found to be associated with the severe form of the disease and poor prognosis. This was in conformity with various previous studies in India, Korea and China. [9,11,13] Kim BG et al, concluded that BISAP is accurate in predicting the severity of acute pancreatitis in a Korean population. [17, 9] Zhang J et al, also reported that the BISAP score may be a valuable means of risk stratification and prognostic prediction in Chinese patients with acute pancreatitis. [18]

Conclusion

It can be concluded that BISAP score is accurate in predicting severity and prognosis of acute pancreatitis. Patients

diagnosed with acute pancreatitis having BISAP score ≥ 2 are prone to develop severe pancreatitis and carried poor prognosis while patients with BISAP score < 2 develop only mild pancreatitis and have better prognosis.

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