ORIGINAL ARTICLE

The Effectiveness of BISAP Score for the Diagnosis of Severe Acute Pancreatitis

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ABSTRACT

Background: The clinical profile of severity of acute pancreatitis ranges from modest pancreatic inflammation to an unusually fatal acute necrotizing pancreatitis rightly known as severe acute pancreatitis (SAP). For the evaluation of clinical spectrum of pancreatitis, a more accurate models that is also cost-effective is required. Here, we sought to evaluate the contribution BISAP scoring systems to the diagnosis of severe of acute pancreatitis by comparing it with CT severity index.

Settings and duration: This observational study was carried out at medicine department, Jinnah hospital, Lahore from 16th July 2022 to 15th January 2023.

Sampling: Patients diagnosed with acute pancreatitis were registered. Acute pancreatitis was labelled based triad of classic epigastric pain, blood markers and imaging tool. BISAP score ≥3 was meant SAP and CT severity index for SAP included findings like necrosis and collection. Diagnostic accuracy was determined.

Results: The patient's age ranged from 20 to 60 years with mean age of 36.41 + 9.362 years. The ratio of male to female participants was 2.3 to 1. For the diagnosis of SAP, the BISAP score's sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were each 95.8%, 55.2%, 85.2%, 83.3%, and 84.8%, respectively.

Conclusion: Simple clinical tools like BISAP score could be helpful in diagnosing severe acute pancreatitis, precluding the need for expensive and technically complex imaging modalities.

Keywords: Severe acute pancreatitis (SAP), BISAP Score, Diagnostic accuracy

INTRODUCTION

One of the most prevalent gastrointestinal conditions is acute pancreatitis (AP). The primary causes of AP, an inflammatory disorder of the pancreas, are gallstones or heavy drinking.[1] According to the 2012 revision of the Atlanta classification definition, AP is categorised as mild, moderate, or severe. Self-limiting in nature, mild AP (MAP) often recovers within the first week. Symptomatic relief, including intravenous fluids and pain management, is the main therapy for MAP.[2] The fatality rate of AP is around 5%; severe AP has a greater rate (SAP). A systemic inflammatory response, pancreatic infection, peripancreatic apoptosis, one or more organ failure, and even death are frequently linked to SAP.[3]

There are often two stages to severe acute pancreatitis (SAP); the earlier stage (during the third week and beyond) is marked by infected pancreatic necrosis (IPN), and the later stage (during the third week and beyond) by systemic inflammatory response syndrome (SIRS).[4] Typical IPN is a significant factor in acute pancreatitis mortality even though it primarily manifests in the disease's late stages of pathogenesis.[5] Antibiotic prophylaxis has long been researched as a treatment option to avoid pancreatic infection. The outcomes, however, continue to be debatable and discouraging.[6]

A variety of clinical and laboratory markers are widely used multiparameter scoring systems like BISAP, Ranson, and APACHE II, can be used to assess the severity of early-stage pancreatitis. Because of the intricate design of these algorithms and the time-consuming structure of the data collection procedure, early risk assessment is difficult.[7]

The BISAP score was created in 2008 to help identify patients who are at risk of dying early. When compared to traditional scoring systems, BISAP score is more useful to use with fewer constituents.[8] Many studies have supported the BISAP score. Due to variations in demographics, cutoffs, and clinical outcomes, they showed a broad range in prediction accuracy.

Objective: The purpose of this study is to determine BISAP's diagnostic performance in predicting SAP while using CT as the gold standard.

MATERIALS AND METHODS

Settings: This observational study was carried out at department of general medicine, Jinnah hospital, Lahore from 16th July 2022 to 15th January 2023.

Sampling: 190 male and female patients recorded, ranging in age from 20 to 60. The diagnosis of acute pancreatitis was confirmed by 1) evidence of acute pancreatitis on imaging tool, 2) the presence of the triad of acute pancreatitis-specific pain in the epigastrium, and 3) rise (3 X ULN) of enzymes (amylase or lipase).

BISAP score consisting of five clinical entities (blood nitrogen, deranged GCS, SIRS, old age and pleural effusion). Each carrying one point. Score ≥3 was considered confirmatory for severe acute pancreatitis. CT findings confirming severe acute pancreatitis included pancreatic necrosis and peri-pancreatic collection which was considered gold standard. Findings of both tools were compared to draw diagnostic accuracy of BISAP score for severe acute pancreatitis. Sensitivity, specificity, positive predictive value, and negative predictive value measurements of diagnostic accuracy were made. Pregnant women, patients with pancreatic malignancy and those with chronic pancreatitis were not allowed to participate.

Data Collection: Participants were recruited from the indoor department of medicine after taking approval from research review committee. Informed consent was taken from all study participants. Baseline characteristics including age, gender, BMI and pain duration were recorded.

Each participant had a thorough history obtained, followed by a physical examination. At the time of hospital admission, BISAP score was established. The BISAP score was 3 points. In our facility, all patients with a clinical diagnosis of acute pancreatitis get a CT scan with a pancreatic protocol for two reasons: 1) to confirm the diagnosis, and 2) to check for potential sequelae. Because of this, the CT with pancreatitis procedure was carried out on each individual. Radiologist consultant reported the CT. Necrosis and peri-pancreatic fluid accumulation were identified as consequences. There was severe acute pancreatitis found. To assess the diagnostic efficacy of BISAP score using CT severity as the gold standard, BISAP score and CT results were compared.

Data Analysis: Data was entered into an IBM SPSS version 25 spreadsheet and then analysed. Frequencies and percentages were used to represent qualitative data. For quantitative data, mean and standard deviation were computed. Shapiro and Kourmogorov tests were used to determine the normality of the data. For data that was regularly distributed, parametric tests were used, while on data that was not normally distributed, non-parametric tests were used. Student t tests and chi square tests were used as statistical tests of significance for continuous and categorical data, respectively. A 2X2 table was created to assess diagnostic accuracy. Calculations were made for sensitivity, specificity, PPV, and NPV.

RESULTS

The patients' ages spanned from 20 to 60 with 36.41 + 9.362 years as the mean age. (Table 1). 121 patients (63.7%) belonged to the age group 20 to 40 years. Rest of the patients (69, 36.3%) had age between 41 to 60 years. Mean height and weight of the patients were 171.44 ± 9.270 cm and 75.54 ± 11.342 kg respectively while mean BMI was 25.78 ± 4.08789 kg/m^2. 133 participants (70.0%) were male. The ratio of male participants to female ratio was 2.3 : 1. Among the causes of acute pancreatitis, gall stone was the most common observed in 85 patients (44.7%), followed by idiopathic cause in 71 patients (37.4%). Minority of the causes included iatrogenic and hypercalcemia.

Table 1: Basic Feature of Participants

Basic Features	Mean ± Standard Deviation
Age (years)	36.41 ± 9.362
Weight (kg)	75.54 ± 11.342
Height (cm)	171.44 ± 9.270
BMI (kg/m^2)	25.78 ± 4.08789
Serum Amylase (U/L)	770.42 ± 305.662

Out of 190 patients with acute pancreatitis, 23 patients (12.10%) were labelled severe acute pancreatitis on CT scan and 27 patients (14.2%) had SAP on BISAP score. 06 cases (3.1%) were labelled negative for severe acute pancreatitis on BISAP score but 05 were labelled negative by CT severity index.

Table. 2: 2×2 table for diagnostic accuracy

	CT Positive	CT Negative
Bisap Positive	23	04
Bisap Negative	1	05

Table 3: Diagnostic accuracy of BISAP score

Sensitivity	95.8%
Specificity	55.5%
Positive predictive value	85.2%
Negative predictive value	83.3%
Accuracy	84.8%

The sensitivity, specificity, positive predictive value, negative predictive value and accuracy of BISAP score for the diagnosis of SAP were 95.8%, 55.2%, 85.2%, 83.3% and 84.8% respectively as shown in table 3.

DISCUSSION

Acute pancreatitis manifests as a clinical illness that requires prompt and intense treatment in order to treat or avoid complications and lower morbidity and mortality. To make care decisions and avoid patients with mild disease from expensive and intrusive protocol, it is crucial to assess severity and prognosis.[9]

The BISAP score is a simple clinical score that may be used at the bedside to evaluate the extent of acute pancreatitis. Including sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy, the BISAP score's diagnostic accuracy in this study were 95.8%, 55.2%, 85.2%, 83.3% and 84.8% respectively respectively. The diagnostic accuracy of this scoring system in predicting severity have been questioned in multi-center research. According to Mayeaux, patients with fewer than three symptoms had a better prognosis and a death rate of less than 1%. If there are more than three symptoms, there is a 25% chance of death.[10] According to Toth, having three or four indications at the time of admission is linked to a mortality rate of 15% to 20%. When seven or more symptoms are present, death is close to 100%.[11]

43 patients were included in the research by Horzic et al. Mild indicators were those with fewer than three symptoms.[12] Those with three or more criteria were thought to have a serious illness. Patients who were in the second group had a survival rate of 60%. More than six prognostic variables were present in the deceased. In eight individuals, multiple organ failure occurred. It was determined that the presence of more components increased the predictive accuracy of Ranson's criterion.[13]

Bezmarevi and colleagues in a study on the diagnostic accuracy of BISAP score came to the conclusion that the score is considerably convenient in its calculation without compromising its strength of diagnosing acute pancreatitis.[14] These findings are in coherence with the findings of our investigation. Pooled sensitivity and specificity of BISAP score of 10 prospective studies reported by Gao and his colleagues in his meta-analysis, were in contrast to our findings.[15] Genetics, diet, and ethnicity may have implied an impact in this regard, but we were unable to deal with this discrepancy, making it one of the study's shortcomings.

CONCLUSION

In resource limited settings like ours, simple clinical tools like BISAP score could be helpful in diagnosing severe acute pancreatitis, precluding the need for expensive and technically complex imaging modalities.

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