



Original Article



Frequency of Raised Bedside Index for Severity in Acute Pancreatitis (BISAP) and Ranson Score in Patients of Acute Pancreatitis

Usman Riaz¹, Salman Javed¹, Umbreen Aslam¹, Hassaan Yousaf², Muhammad Haseeb Nawaz³, Mohibullah¹ and Humaira Waseem⁴

¹Department of Gastroenterology, Services Hospital, Lahore, Pakistan

²Sheikh Zayed Hospital, Lahore, Pakistan

³Services Hospital, Lahore, Pakistan

⁴Department of Data Sciences, Inti International University, Malaysia

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***Corresponding Author:**

Usman Riaz
 Department of Gastroenterology, Services Hospital,
 Lahore, Pakistan
docravian@yahoo.com

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ABSTRACT

Acute pancreatitis is a growing abdominal disorder that presents a major surgical problem to general surgeons across the globe. **Objectives:** To identify the raised Bedside Index for Severity in Acute Pancreatitis (BISAP) and Ranson scores frequencies in patients with acute pancreatitis. **Methods:** The cross-sectional descriptive study was carried out on 120 patients in the Emergency Department of the Sheikh Zayed Hospital in Lahore. Patients who fit into the inclusion criteria were enrolled. Clinical histories, physical examinations, and laboratory investigations were conducted in detail. Each patient had their BISAP and Ranson scores calculated- BISAP on initial presentation and Ranson scores at admission and 48 hours. There were high levels of BISAP and Ranson scores that were stipulated based on the operational standards. The data analysis was done in SPSS version 23.0. **Results:** The average age of the participants was 44.92 ± 8.92 years; 46 (38.3%) were male and 74 (61.7%) female. It was seen that a high BISAP and Ranson scores occurred in 28 (23.3%) and 42 (35%) patients, respectively. The percentage of patients who had an increased BISAP was 23.3, and the percentage of patients who had an increased Ranson score was 35, which means that a higher percentage were classified as severe by the Ranson classification criteria. **Conclusions:** The BISAP score is a convenient, valid, and time-saving instrument to evaluate the severity of acute pancreatitis at an early stage and risk classification in clinical practice, although the Ranson might be more effective in this regard.

INTRODUCTION

Acute pancreatitis (AP) is an illness that has been experiencing a steady increase throughout the entire world, and has become one of the most significant gastrointestinal diseases subject to hospitalization. Epidemiological data further show the acute pancreatitis (AP) disease incidence in the United States to vary between 13 to 45 cases per one lakh individuals annually and the incidence of the disease in the United Kingdom to range from 4.8 to 24.2 cases per one lakh individuals annually [1-

3]. AP is a pancreatic inflammatory disease that is brought about by the destruction of the digestive enzymes that it produces. It is a sterile inflammation, i.e., it is not bacterially infected. The most common causes of AP are gallstones, which cause 54 percent of the cases, next comes consumer of alcohol and cases of unknown origin (idiopathic) [4]. Acute pancreatitis pathogenesis starts with the process of trypsinogen conversion to trypsin in acinar cells, in quantities that cannot be counteracted by

the active trypsin. This results in the activation of other proenzymes, such as trypsinogen in itself and other inactive precursors of elastase, phospholipase A2 (PLA2), and carboxypeptidase. Etiologically, the most common causes are gallstone disease (cholelithiasis) and alcohol use, which represent a large percentage of the cases [5]. Megafauna epidemiological studies provide the mortality rate related to pancreatitis, 1.5-4.2 percent, based on the severity of the disease. Nonetheless, the rate of mortality in the infected state of pancreatic necrosis increases significantly to 30% in this situation [6]. An incident of acute pancreatitis can result in several complications (both local and systemic), and, therefore, it should be diagnosed early so as to provide triage and effective treatment promptly to avoid the negative effects. Various scoring systems, such as the Ranson Scoring System, Acute Physiology and Chronic Health Evaluation (APACHE)-II, BISAP, Computed Tomography Severity Index (CTSI), and Sequential Organ Failure Assessment (SOFA) score systems, are based on different variables to measure the severity of acute pancreatitis [7]. Each scoring system has its own limitations, and the sensitivity and specificity range between 55 and 90% depending upon the cutoff values and timing of the score [8]. In one of the studies, the frequency of raised BISAP was 18.75% and that of Ranson score was 31.25% [9]. Ranson's criteria need to be calculated at admission and after 48 hours, while BISAP is easy to calculate, i.e., only at admission, these tools are equally effective in detecting patients at an elevated risk of mortality before organ failure develops [10, 11]. Similarly, the modified CT severity index demonstrated high diagnostic accuracy in evaluating severe acute pancreatitis [12]. AP is a serious condition with significant global health implications, leading to complications that contribute to both morbidity and mortality. The deaths are not uniform, and they are about 1 to 20 percent in mild and severe cases. Moreover, AP imposes quite a significant burden on healthcare resources because of the costs incurred with it [13]. Treatment of acute pancreatitis is difficult and aims at determining the etiology of the disease, assessing the severity of the disease, and identifying complications.

Early and accurate assessment of severity in acute pancreatitis is essential to reduce morbidity, mortality, and healthcare burden. Limited local data are available regarding the comparative frequency of elevated BISAP and Ranson scores in patients presenting with acute pancreatitis. This study aimed to establish the prevalence of an increase in BISAP and Ranson scores in patients with acute pancreatitis.

METHODS

This cross-sectional descriptive study was conducted on 120 patients at the Emergency Department of the Sheikh Zayed Hospital in Lahore, from 29 June 2019 to 28 December 2019, after ethical approval from the CPSP (CPSP/REU//GAS-2017-072-743). A total of 120 cases were included by a consecutive sampling technique. This was done by dividing 95% confidence level and 7 percent margin of error by an expected frequency of raised BISAP of 18.75 to come up with a sample size. The survey covered both male and female patients aged between 20 and 70 years with acute pancreatitis who gave written informed consent. Non-pregnant women, patients on hemodialysis, on anticoagulant therapy (aspirin, clopidogrel, warfarin, or heparin), and having COPD (FEV1 less than 70 percent of normal) were not excluded, however. A comprehensive history was taken on each patient. The same resident gathered all clinical tests, vital signs, and blood samples, and the laboratory results were obtained in the hospital laboratory to reduce bias. Two scoring systems were employed to measure the severity of AP, and were known as BISAP and Ranson. The BISAP score consists of five parameters, with blood urea nitrogen greater than 25mg/dl, impaired mental status, systemic inflammatory response syndrome (SIRS), age above 60 years, and pleural effusion being one point each (0-5). Ranson score was assessed at admission and 48 hours of admission on standard parameters and cutoff values defining severe acute pancreatitis. A BISAP score of 3 or more and a Ranson score of 3 or more were believed to be severe acute pancreatitis, which is in line with earlier published research. The data analysis was done using SPSS version 23.0. Numerical variables (age and serum amylase levels at admission) were also presented in the form of mean \pm SD, and frequencies and percentages were filled on categorical variables (gender and raised BISAP and Ranson scores). The data were normally distributed by using the Shapiro-Wilk test, and the means plus SD were reported. Age, gender, BMI, symptom duration, and serum amylase levels at admission were used to stratify the data. Chi-square tests were post-stratified, where a p-value of <0.05 was taken as statistically significant.

RESULTS

The age distribution showed that 66 (55%) of patients were between 20 and 50 years, while 54 (45%) were aged 51 to 70 years, with a mean \pm SD of 44.92 ± 8.92 years. Regarding gender, 46 (38.33%) were male, and 74 (61.67%) were female. The average serum amylase level at admission was 1341.14 ± 478.52 U/L (Table 1).

Table 1: Demographic Features of Patients

Variables	n (%)
Age (Years)	
20-50	66 (55%)
51-70	54 (45%)
Total	120
Mean \pm SD	44.9 \pm 28.92
Serum Amylase (U/L)	1341.14 \pm 478.52
Gender	
Female	74 (61.6%)
Male	46 (38.3%)

Frequency of raised BISAP and Ranson score in patients of AP was calculated as 28 (23.33%) for BISAP and 42 (35%) for Ranson score (Table 2).

Table 2: Patients with Raised BISAP and RANSON Score (n=120)

Raised Scores	No. of Patients
BISAP	28 (23.33%)
Ranson	42 (35.0%)

Data stratification shows that out of 28 increased BISAP, 10 were male and 18 were female, p-value was 0.918, and of 42 increased Ranson score, 13 were male and 29 were female, p-value=0.819 (Table 3).

Table 3: Comparison of Gender with Raised BISAP and RANSON Score among Patients

Score	Gender	Raised (n)	Not Raised (n)	p-value
BISAP	Male	10	36	0.918
	Female	18	56	
Ranson	Male	13	23	0.819
	Female	29	45	

Out of the 28 individuals with higher BISAP scores, 19 were between the ages of 20 and 50, and 9 were between the ages of 51 and 70. The data stratification indicates that, of the 42 individuals with higher Ranson scores, 25 were between the ages of 20 and 50, and 17 were between the ages of 51 and 70 (Table 4).

Table 4: Comparison of Age with Raised BISAP and RANSON Score among Patients

Score	Age Group (Years)	Raised (n)	Not Raised (n)	p-value
BISAP	20-50	19	47	0.179
	51-70	9	45	
Ranson	20-50	25	41	0.590
	51-70	17	37	

DISCUSSIONS

Acute pancreatitis is an increasingly prevalent condition marked by pancreatic inflammation, presenting a significant challenge for general surgeons globally. It can range from a mild, self-resolving illness to a severe, rapidly worsening state that poses a serious risk to life. The

estimated incidence of acute pancreatitis is approximately 2.29% [14]. The severity of AP can be divided into three categories: acute hemorrhagic necrotizing, acute edematous, and acute persistent. For prompt therapeutic action and better results, patients at risk of severe disease must be identified early [15]. Each scoring system has its own sensitivity and specificity depend upon the cutoff values and timing of the score [16]. So there was a need to perform a local study to see the effectiveness of these scoring systems in our local population and prompt us in recognizing the patients who are at risk of developing severe morbidities or mortality, thus an early intensive treatment plan can be initiated. In this study, most patients were between 20 and 50 years old, while a slightly smaller proportion were aged 51 to 70 years. The average age was in the mid-40s. Females outnumbered males, making up a larger share of the study population. The frequency of elevated BISAP scores was observed in nearly a quarter of the cases, while an increased Ranson score was noted in over one-third of the patients with acute pancreatitis. While comparing the results with an earlier study where the frequency of raised BISAP was 18.75% and that of Ranson score was 31.25%, the findings agree with this study [9]. A study conducted at Dow University Hospital, Karachi, evaluated 206 patients with AP and found that the BISAP score predicted severe cases with 76.2% accuracy, whereas the Ranson score indicated that the accuracy of the Ranson score was higher at 82.2% [17]. The majority of the studies have shown that it is predominantly female, which correlates with the findings of this study [3, 18]. It is more prevalent among middle-aged people. Most of the patients in this study were in their 40s and 50s, which agrees with a previous study [19]. The BISAP and the Ranson scoring systems have been tested by Parimala and colleagues to determine their predictive value on the severity of AP, and came to the conclusion that BISAP is not less than the score of Ranson in this aspect. The BISAP scoring system is simple and affordable, and user-friendly, and it does not require long before results are generated. Ranson, however, takes at least 24 hours to score. BISAP is also an effective determinant of patient outcome in acute pancreatitis [20]. Local data on the prevalence of high BISAP and Ranson scores in acute pancreatitis are limited, so there is a need to conduct cross-centre research to corroborate the results. The work contributes to the useful evidence regarding the local prevalence and demographics, with the focus on the practicality of BISAP as a tool of simple bedside risk stratification in under-resourced settings.

Nevertheless, the study is cross-sectional, single-center, and small-sample, which cannot be generalizable. The imaging-based indices, such as the CT Severity Index and

long-term outcome, were not evaluated. It is suggested that future multicenter, longitudinal studies, including radiological and biochemical parameters, be used to improve prediction and best treatment of acute pancreatitis.

CONCLUSIONS

The scores of both BISAP and Ranson are important in determining the level of severity of AP. Timely clinical decision support because BISAP can be used to stratify risks early, and the score provided by Ranson, which incorporates both admission and 48-hour post-admission assessment, is a more holistic assessment of the disease course. The two scores are effective predictors of severe pancreatitis and useful in the early detection of high-risk patients. Nevertheless, these scores provide a more comprehensive prediction of the severity of the disease and the possible complications.

Authors' Contribution

Conceptualization: SJ

Methodology: UR

Formal analysis: UA, HW

Writing and Drafting: UR, SJ, HY, MHN, M

Review and Editing: UR, SJ, UA, HY, MHN, M, HW

All authors approved the final manuscript and take responsibility for the integrity of the work

Conflicts of Interest

All the authors declare no conflict of interest.

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