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Comparison Of Harmless Acute Pancreatitis Score With Bedside Of Index Of Severity In Acute Pancreatitis Scoring System To Evaluate Prognostication In Acute Pancreatitis.

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ABSTRACT

Acute pancreatitis (AP) is a prevalent condition that frequently results in emergency department visits due to severe abdominal pain. This study aims to evaluate the diagnostic accuracy of two simplified scoring systems, the Harmless Acute Pancreatitis Score (HAPS) and the Bedside Index of Severity in Acute Pancreatitis (BISAP), for predicting the severity of AP in a prospective observational cohort of patients. Conducted at a tertiary care hospital in Maharashtra from April 2024 to February 2025, the study involved 35 patients diagnosed with AP. The results demonstrated that while HAPS exhibited a sensitivity of 100% and a high negative predictive value (NPV) for identifying mild cases, it had limitations in specificity (24%) and overall diagnostic accuracy (45.7%). Conversely, the BISAP score showed improved sensitivity (90%) and specificity (68%) with a higher overall diagnostic accuracy (74%).These findings suggest that HAPS is a valuable tool for early risk stratification in low-resource settings, effectively identifying patients at low risk for severe disease. However, the BISAP score may serve as a more reliable alternative in cases of severe AP due to its greater diagnostic accuracy and specificity. The study underscores the importance of implementing these scoring systems to facilitate timely intervention and optimize resource allocation in managing acute pancreatitis.
Keywords: Acute pancreatitis, Harmless Acute Pancreatitis Score.

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INTRODUCTION

Acute pancreatitis (AP) is a common cause of acute abdominal pain that often leads patients to seek treatment in emergency departments. This condition involves the inflammation of the pancreas, which can range from mild and self-limiting to severe and life-threatening. The most common risk factors for AP include biliary tract disease, especially gallstones, and alcohol abuse. Patients typically present with severe epigastric pain that radiates to the back, along with symptoms like vomiting and abdominal distension [1]. While elevated levels of serum amylase and lipase were commonly used to confirm the diagnosis of AP, they do not provide information about the severity or prognosis of the condition. Imaging studies, such as ultrasonography (USG) and computed tomography (CT), help to assess the extent of the disease and complications such as pancreatic necrosis or pseudocyst formation [2].

Though most patients recover with medical management, 15-20% of individuals with AP develop severe complications that increase the risk of mortality. These complications can include pancreatic necrosis, organ failure, and systemic inflammatory response syndrome (SIRS). Therefore, identifying high-risk patients early is crucial for timely intervention and to avoid the progression to severe forms of the disease. Several prognostic scoring systems have been developed to predict the severity of AP and guide clinical decision-making. These scoring systems use clinical, laboratory, and radiological parameters to categorize patients into different risk levels [3].

Traditional scoring systems, such as the Ranson criteria and APACHE II (Acute Physiology and Chronic Health Evaluation) score, were commonly used in hospital settings. The Ranson criteria involves assessing multiple parameters at admission and 48 hours after the onset of symptoms, such as age, white blood cell count, blood glucose, and serum lactate dehydrogenase (LDH). However, the Ranson criteria require extensive testing and were complex, making them less ideal for early-stage assessment or in settings with limited resources. Similarly, the APACHE II score, which evaluates the patient's overall physiological status based on factors like heart rate, blood pressure, and kidney function, is comprehensive but also complicated and requires significant clinical data [5].

To address these challenges, simpler scoring systems have been developed, such as the Harmless Acute Pancreatitis Score (HAPS) and the Bedside Index of Severity in Acute Pancreatitis (BISAP) [4]. HAPS is designed to identify patients who were likely to have a mild course of AP. It uses three parameters: signs of peritonitis, serum creatinine levels, and hematocrit levels. A patient is considered HAPS negative if none of these parameters were abnormal, suggesting that they were at low risk for severe disease. In contrast, a positive HAPS score indicates that the patient is at higher risk for complications [6].

The BISAP score, developed in 2008, is another simple tool that evaluates five parameters: blood urea nitrogen (BUN) >25 mg/dL, impaired mental status, presence of SIRS, age >60 years, and pleural effusion detected by imaging. Each parameter receives one point, and a score of 3 or more suggests a higher risk of severe pancreatitis. Both HAPS and BISAP were valuable for early risk stratification, enabling clinicians to determine which patients require intensive management and which can be safely managed with conservative treatment [7].

In conclusion, acute pancreatitis is a serious condition that demands early identification and accurate risk stratification to ensure appropriate treatment. While traditional scoring systems like Ranson and APACHE II were useful, they were complex and require extensive resources. Simplified scoring systems like HAPS and BISAP provide an efficient and effective way to predict the severity of AP, helping clinicians prioritize treatment and reduce unnecessary interventions. These tools were particularly valuable in resource-limited settings and emergency departments where rapid decision-making is crucial.

MATERIALS AND METHODS

This was a prospective observational study conducted in the department of general surgery at a tertiary care hospital in Maharashtra from April 2024 to February 2025. The study population included all patients getting admitted to the department of general surgery with the diagnosis of acute pancreatitis. Sample size estimation:

To estimate the sample size of this study we have considered the diagnostic accuracy of HAPS and BISAP as primary outcome variables. In a study conducted by Gupta et al, the Diagnostic accuracy of HAPS and BISAP was 65.00% and 93.33% respectively [8]. Therefore, the sample size of this study was determined using the following formula.

Sample size formula:

$$n = \frac{\left(Z_{(1-\frac{\alpha}{2})} + Z_{(1-\beta)}\right)^2 \; p\,(1-p)}{\delta^2}$$

The minimal sample size of 35 patients was estimated using OpenEpi. Therefore, we included at least 35 patients in this study.

Sampling Method

Consecutive sampling method.

Statistical analysis

The data was stored in Microsoft Excel Spreadsheet and data analysis was performed using IBM SPSS statistics version 28.0. The data was represented in the form of tables and graphs. Frequency, percentage, and descriptive statistics was used to summarize data.

The diagnostic accuracy of HAPS and BISAP was evaluated using sensitivity, specificity and predictive values.

METHODOLOGY

All patients diagnosed with acute pancreatitis based on ultrasonography, clinical diagnosis and serum markers admitted to surgery department were included in the study. Written and informed valid consent was taken from each patient willing to be a part of this study. After stabilizing the patient, data was collected prospectively from the onset of symptoms until discharge from hospital. Included were patients who were admitted in the emergency room or OPD and subsequently received intermediate treatment.

Following data was recorded in each patient-

- Registration number
- Age
- Sex
- Vitals (Pulse rate, blood pressure, respiration rate, temperature)
- Findings of per abdominal examination
- Complete blood count including hematocrit
- Kidney function tests
- Chest x-ray to look for signs of pleural effusion

After relevant history, clinical examination, and getting the above mentioned parameters, the patients' HAPS and BISAP score was calculated on admission. Patients were followed up until their course of hospital stay till the time of discharge or till ICU admission and the ultimate outcome of the patients was noted. This ultimate outcome was then compared with the "predicted outcome" noted at the time of admission of the patient to give the final results about the accuracy of the prognostication given by HAPS and BISAP scoring system.

Inclusion criteria

- Patients clinically diagnosed with acute pancreatitis
- Patients above 18 years of age
- Patients giving consent for participation in the study

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Exclusion criteria

- Patients with traumatic pancreatitis, post-operative pancreatitis, malignancy.
- Pregnant and immune-compromised patients
- Patient not giving consent to be a part of this study.

RESULTS

A group of 35 patients was selected for the study, and both HAPS and BISAP scores were recorded on the first day of admission and during the initial attack of acute pancreatitis (AP). Pancreatitis can affect individuals of any age, and in this study, the majority of the patients were between the ages of 31 and 50 years.

Regarding clinical signs, 22 (63%) of the patients showed evidence of peritonitis, while the rest did not. Among the 22 patients with peritonitis, 10 (45.45%) developed severe AP. The presence of abdominal guarding/rigidity, as indicated by the HAPS score, is linked to a more severe progression of AP.

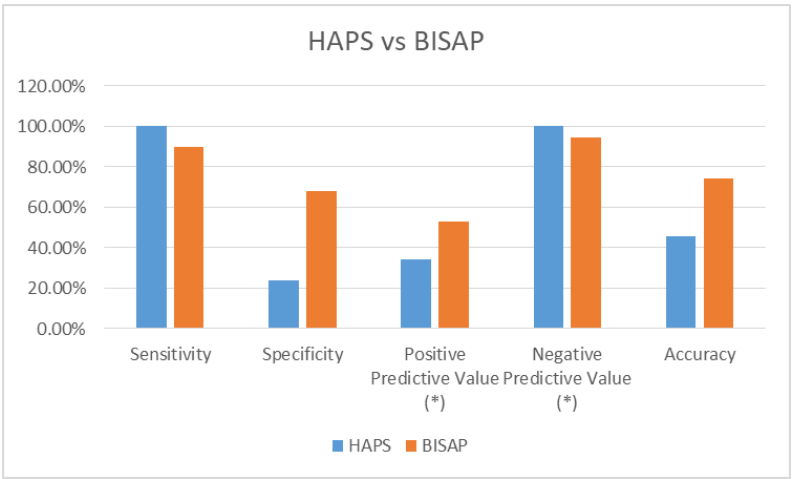
Concerning renal function, elevated serum creatinine levels (≥ 1.5 mg/dL) were observed in only 4 out of 35 patients (11%). Nevertheless, 10 patients developed severe AP. The study found that higher serum creatinine levels at admission are associated with more severe pancreatitis and complications, such as persistent organ failure.

Regarding hematocrit values, 4 patients had elevated levels. 2 developed severe AP. A hematocrit value of ≥43% at admission or failure to decrease within 24 hours is an early indicator of severe AP.

Pleural effusion was observed in 2 (11.11%) patients, with both of them developing severe AP. However 9 patients without pleural effusion progressed to severe AP. According to the BISAP score, the presence of pleural effusion serves as an indicator of severe AP.

25 (72.22%) patients in our study exhibited signs of systemic inflammatory response syndrome (SIRS), and 10 of these patients developed severe AP. The BISAP score suggests that SIRS presentation is associated with a more severe course of AP. Additionally, only 3 (8.57%) patients had altered mental status at admission, but 10 patients went on to develop severe AP. The BISAP score indicates that impaired mental status is a predictor of a severe course of pancreatitis.

	HAPS	BISAP
Sensitivity	100.00%	90.00%
Specificity	24.00%	68.00%
Positive Predictive Value (*)	34.48%	52.94%
Negative Predictive Value (*)	100.00%	94.44%
Accuracy	45.71%	74.29%



DISCUSSION

In Acute Pancreatitis (AP), a hematocrit level greater than 43% at admission or a failure of hematocrit to decrease within 24 hours has been associated with a higher risk of developing necrotizing AP. Conversely, the absence of hemoconcentration tends to have a stronger negative predictive value (NPV) for severe AP, as found in studies by Berger et al., Lankisch et al., and Gardner et al. Studies by Lankisch et al. have also highlighted that the presence of pleural effusion on chest X-rays can be an indicator of severe AP, a finding similar to our study [15, 16, 17]. The BISAP score, which includes parameters like systemic inflammatory response syndrome (SIRS) and impaired mental status, has been shown to predict a higher likelihood of developing severe AP, as reported by Singh et al. and Mofidi et al. [19] Furthermore, research on Balthazar classification by Gulen et al. concluded that markers such as the neutrophil/lymphocyte ratio and RDW are not effective in predicting mortality in AP patients [20]. AP can affect individuals of any age, though it is most commonly seen in middle-aged patients, which does not align with findings from a study by Machicado et al [10]. Other studies by Ong et al. and Corfield et al. also support the observation that older age is linked to an increased risk of mortality in AP cases [11, 12]. There is a notable predominance of male cases of AP compared to females, a trend similarly reported in other studies. Research by Wan et al., Muddana et al., and Lankisch et al. has indicated that a serum creatinine level exceeding 1.8 mg/dL within 24 hours of hospital admission can serve as a strong predictor for persistent organ failure in AP, while levels below 1.8 mg/dL can predict a lower risk of organ failure, which is consistent with our study's observations [13, 14].

In our study, 29 patients (82%) were found to be HAPS positive, indicating a predicted severe course of AP, while the other 6 patients (18%) were HAPS negative, predicting a milder course. Of those predicted to have a severe course (HAPS positive), 10 patients (34.34% of HAPS positive cases) indeed had a severe course, with one of them died during their hospital stay. Among the 6 HAPS-negative patients, no one eventually developed severe AP. The sensitivity of the HAPS score in predicting severe AP in our study was 100%, while its specificity was 24%. These results suggest that HAPS has a high sensitivity for predicting mortality and disease severity. The diagnostic accuracy of the HAPS score was approximately 45%, but its NPV was as high as 100%. This suggests that a negative HAPS score reliably indicates a mild course, while a positive score leaves the possibility of a severe or mild course open. As a result, the HAPS score can be a useful tool in identifying patients who may not need costly imaging procedures, thus saving significant healthcare costs. The high NPV further emphasizes that the HAPS scoring system can effectively distinguish patients likely to have a mild course, who do not require intensive treatment, within the first hour of admission. This supports the use of the HAPS score to help prioritize care for patients with AP.

Regarding the BISAP score, 18 patients (51.4%) had a score of less than three, while 17 (48.6%) had a score of three or more. The majority of patients presented with a BISAP score of zero. For those patients with a BISAP score indicating a severe course, 9 developed severe AP. A BISAP score of 3 or higher is associated with a poor prognosis and a higher likelihood of developing severe pancreatitis, as noted in a study by Kaushik et al [21]. In our study, the BISAP score had a sensitivity of 90% and a specificity of 68%, comparable to the findings of Venkatapuram et al [22]. The diagnostic accuracy of BISAP was higher than HAPS, around 74%, while the HAPS score demonstrated an accuracy of about 45.7%.

CONCLUSION

Several scores have been developed to predict the course of acute pancreatitis (AP), helping with monitoring and timely intervention. However, most of these scores are complex, costly, and time-consuming, while many AP cases are mild. The HAPS score, a simpler and easier tool, is useful in identifying mild AP cases and is widely applicable, even in developing countries. According to a study, HAPS demonstrated high sensitivity (100%) in predicting AP severity, with a very high negative predictive value (100%) for mild cases. This means that if HAPS is negative, the patient is more likely to have a mild course of AP. The score also aids in deciding which patients need intensive monitoring. Due to its simplicity, cost-effectiveness, and accuracy, HAPS is a valuable tool for prognosticating AP and can potentially serve as a gold standard for early management of the condition.

However, BISAPS has a higher specificity and diagnostic accuracy than HAPS thus making it a valuable tool in diagnosing patients with severe AP. This is especially true in cases of severe pancreatitis which might get over diagnosed by HAPS score which has a low positive predictive value (24%).

This study was conducted to establish the use of the better score in low resource settings. Over diagnosis might lead to wasteful use of resources in scenarios where equitable distribution of drugs and hospital equipment is necessary. BISAP score can be a better alternative in such cases but HAPS is the gold standard to ensure that adequate treatment can be given to the patients in need of intensive hospital management of AP.

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