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ORIGINAL RESEARCH

Comparative Evaluation of Harmless Acute Pancreatitis Score (HAPS) and Bedside Index of Severity in Acute Pancreatitis (BISAP) Scoring System in the Stratification of Prognosis in Acute Pancreatitis

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Abstract

Introduction- Acute pancreatitis exhibits a significant mortality rate, making early identification crucial for effective care and risk stratification. Harmless acute pancreatitis score (HAPS) is one such score that is easy to calculate and is done at the time of admission, bedside index of severity in acute pancreatitis (BISAP) is another one requiring more parameters. The present study was done to do a comparative evaluation of Harmless Acute Pancreatitis Score (HAPS) and Bedside Index of Severity in Acute Pancreatitis (BISAP) Scoring System in the Stratification of Prognosis in Acute Pancreatitis.

Material and methods- The present prospective observational study was conducted among 150 patients of acute pancreatitis at department of medicine, GMC, Jammu for a study period of one year. The patient was evaluated using the BISAP and HAP scores. Analysis was conducted using Statistical Package for Social Sciences (SPSS) version 25.0.

Results– The mean age of patients was 36.45 years. Out of 150 patients 42.6% were male and 57.4% were female. HAPS was positive in 50 % (75) patients. BISAP score was positive in 86% (129) of patients while negative in 14% (21) of patients. BISAP has a sensitivity of 63% and high specificity of 100%. The diagnostic accuracy of BISAP is also high, at around 94%. However, the diagnostic accuracy of HAPS stands at around 66%.

Conclusion- HAPS is a highly sensitive metric for predicting the severity of acute pancreatitis. HAPS appears to be an effective tool for assisting physicians in evaluating the severity of AP. HAPS may be regarded as the benchmark for predicting AP for prompt and economical treatment.

Keywords- Acute pancreatitis, BISAP, Clinical investigation, HAPS, Prognosis

Introduction

Acute pancreatitis (AP) is a prevalent clinical illness characterized by inflammation of the pancreas, potentially affecting surrounding tissues and many organ systems [1,2]. Approximately 80% of acute pancreatitis instances are mild and self-limiting, resulting in no sequelae. However, serious illness manifests in approximately 10–20% of instances where necrosis affects portions of the pancreas and adjacent tissues. These patients experience an initial inflammatory response that advances to systemic inflammatory response syndrome, culminating in multiorgan failure and ultimately death [3–5].

Serum amylase and lipase have served as biochemical indicators for diagnosing acute pancreatitis for numerous decades.[6] Imaging modalities, including ultrasonography (USG)

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and computed tomography (CT), serve as confirmatory tools. While several patients are well controlled with medical intervention, 15%-20% experience problems that significantly elevate their chance of mortality. Dependable scoring methods, radiographic assessments, and laboratory indicators are essential for the early identification of high-risk patients to implement preventative interventions.[7] Various prognostic scoring systems, such as the CT index, APACHE II, and Ranson, have been employed to assess severity in acute pancreatitis; however, they are overly complex, costly, not readily accessible early in the illness progression, and not easily obtainable at basic healthcare facilities.[8]

The Harmless AP Score (HAPS) is a straightforward scoring system for acute pancreatitis that accurately predicts which patients will experience a benign course of the condition.[7] HAPS comprises three parameters: indicators of peritonitis, serum creatinine levels, and haematocrit.[9] The patient is designated as HAPS negative (-) if there are no indications of peritonitis, serum creatinine levels are below 2 mg/dL, and haematocrit levels are below 43% for males and 39.6% for females upon admission [8]. The patient is classified as HAPS positive (+) if any of the aforementioned parameters is positive. This score aids in identifying individuals who will experience a non-severe progression of acute pancreatitis and do not necessitate intense therapy or costly imaging investigations.

The Bedside Index for Severity in Acute Pancreatitis (BISAP) score was introduced in 2008 as a streamlined paradigm for assessment.[10] This assessment considers five accessible clinical and laboratory parameters: blood urea nitrogen levels exceeding 25 mg/dL, impaired mental status indicated by a Glasgow Coma Scale score below 15, evidence of systemic inflammatory response syndrome characterized by more than two SIRS criteria, patient age over 60 years, and imaging findings of pleural effusion, whether unilateral or bilateral. For each parameter, one point is allotted, and the maximum total score is 5. A score of less than 3 is considered mild and more than or equal to 3 is considered severe pancreatitis.[11]

The present study was done to do a comparative evaluation of Harmless Acute Pancreatitis Score (HAPS) and Bedside Index of Severity in Acute Pancreatitis (BISAP) Scoring System in the Stratification of Prognosis in Acute Pancreatitis.

Material and methods

The present prospective observational study was conducted among patients of acute pancreatitis at department of medicine, GMC, Jammu for a study period of one year. Ethical clearance was taken from institutional ethics committee before commencement of study. Patients were asked to sign an informed consent form after explaining them the complete procedure.

Through convenient sampling a total of 150 patients diagnosed with acute pancreatitis were selected for the study on the basis of inclusion and exclusion criteria.

Inclusion criteria

All patients of more than 18 years of age, clinically diagnosed as having AP presented to the medicine department were included in the study.

Exclusion criteria

Patients with traumatic pancreatitis, post-operative pancreatitis, malignancy, post-ERCP pancreatitis, as well as pregnant or immunocompromised individuals were excluded from this study.

Upon admission, a comprehensive medical history was recorded according to the established proforma, and the patient underwent a complete examination and investigation. Subsequent to this evaluation, participants diagnosed with AP were recruited for the study. The HAP score and BISAP score were computed within one hour of admission.

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The HAP score encompasses indicators of peritonitis, haematocrit levels (abnormal if above 43% for males and 39.6% for women), and serum creatinine levels (abnormal if beyond 2 mg/dL). Each variable is allocated one point, resulting in a total score that spans from 0 to 3. The BISAP Score comprises blood urea nitrogen (abnormal if exceeding 25 mg/dL), altered mental status, SIRS, age (abnormal if over 60 years), and the presence of pleural effusion as identified through imaging.

Each variable is allocated one point, resulting in a total score that spans from 0 to 5. All patients commenced standard treatment for acute pancreatitis and were monitored for the emergence of local and/or systemic sequelae. Suitable intervention was administered for the complications. The patient was evaluated using the BISAP and HAP scores.

Categorical variables were expressed as counts and percentages, whereas continuous variables were reported as mean ± standard deviation and median. A diagnostic test was employed to determine sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). Inter-rater kappa agreement was employed to assess the strength of concordance between HAPS and BISAP concerning outcomes. The McNemar test was employed to examine sensitivity and specificity. A comparative analysis of receiver operating characteristic curves was employed to assess the area under the curve of HAPS and BISAP for outcome prediction. A p-value of less than 0.05 was deemed statistically significant. The data were inputted into an MS Excel spreadsheet, and analysis was conducted using Statistical Package for Social Sciences (SPSS) version 25.0.

Results

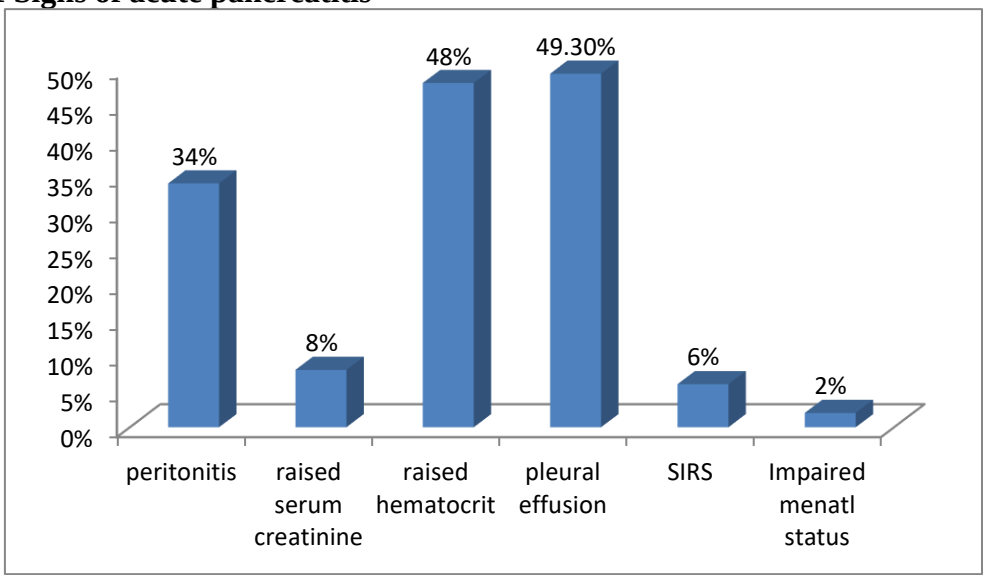
The mean age of patients was 36.45 years. Out of 150 patients 42.6% were male and 57.4% were female as shown in table 1.

Table 1 Demographic data of patients

Demographic		Frequency (%)
Mean age (years)		36.45±3.6
Gender	Male	64 (42.6)
	Female	86 (57.4)

Clinical signs of acute pancreatitis like peritonitis were seen in 34% patients, raised serum creatinine was seen in 8% patients, raised haematocrit value was seen in 48% patients and pleural effusion was seen in 49.3% patients, SIRS was seen in 6% patients and 2% patiens had impaired mental status as shown in figure 1.

Figure 1 Signs of acute pancreatitis



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HAPS was positive in 50 % (75) patients. 45 patients with positive HAPS developed mild acute pancreatitis whereas 35 patients developed severe acute pancreatitis. Those with negative HAPS 65 patients developed mild acute pancreatitis while 10 developed severe acute pancreatitis as shown in table 2.

Table 2 Outcome of HAPS assessment of patients

Severity of Acute Pancreatitis	HAPS positive N= 75	HAPS negative N=75
Mild	45 (60%)	65 (86.6%)
Severe	30 (40%)	10 (13.4%)

BISAP score was positive in 86% (129) of patients while negative in 14% (21) of patients. Out of all the patients 40% had grade I AP, 30% had grade II AP , 15% had grade III AP , 10% had grade IV AP and 5% had grade V AP as shown in table 3.

Table 3 Grading according to BISAP score

BISAP score	N (%)
Grade I	60 (40)
Grade II	45 (30)
Grade III	22 (14.6)
Grade IV	15 (10)
Grade V	8 (5.4)

BISAP has a sensitivity of 63% and high specificity of 100%. The diagnostic accuracy of BISAP is also high, at around 94%. However, the diagnostic accuracy of HAPS stands at around 66%. The sensitivity, specificity, and diagnostic accuracy of HAPS and BISAP are shown in Table 4.

Table 4 Sensitivity, specificity, positive predictive value and negative predictive value of HAPS and BISAP for predicting severe acute pancreatitis

Severe acute pancreatitis	HAPS	BISAP
Sensitivity	90%	63%
Specificity	60%	100%
AUC	0.78	0.83
Positive predictive value	33.2%	100%
Negative predictive value	95%	92%
Diagnostic accuracy	66%	94%

Discussion

Acute pancreatitis originates in the pancreas but has extensive implications for the entire body and may impact many organ systems. While 80% of cases are classified as mild and typically resolve with minimal morbidity or fatality, the other 20% progress to severe disease, which may result in a mortality rate of up to 30%.[13] Severe disease typically arises in certain instances from the initial onset, but gradual progression from mild to severe is rare.[14] The early assessment and categorization of disease severity are crucial for prognosis and therapy.

Acute pancreatitis can manifest in any age demographic, although it predominantly affects middle-aged individuals, as indicated in a comparable study by Machicado et al [15]. There is a higher incidence of acute pancreatitis in females compared to males, as evidenced by research conducted by Roberts et al and Yadav et al. [16,17]

In our study peritonitis were seen in 34% patients, raised serum creatinine was seen in 8% patients, raised haematocrit value was seen in 48% patients and pleural effusion was seen in

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49.3% patients, SIRS was seen in 6% patients and 2% patients had impaired mental status similar results were seen in study done by Wan et al, Lankisch et al and Singh et al.[18-20]
At present, multiple scoring systems are available for prognostication of the severity of acute pancreatitis. An ideal prognostic score should be simple, use parameters that are readily available even in the basic setup, have good sensitivity and specificity, and be accurate, while not subjecting the patient to any significant discomfort.[21]
In our study HAPS was positive in 50 % (75) patients. 45 patients with positive HAPS developed mild acute pancreatitis whereas 35 patients developed severe acute pancreatitis. Those with negative HAPS 65 patients developed mild acute pancreatitis while 10 developed severe acute pancreatitis. Sensitivity of HAPS was 90%, specificity was 60% and diagnostic accuracy was 66%. Consequently, HAPS determines whether a patient necessitates costly imaging treatments, hence conserving significant hospital expenditures. The elevated NPV indicates that the HAPS scoring method may accurately identify patients who will experience a mild course, do not require extensive therapy, and are not at risk of mortality from the disease during the first hour of admission. Consequently, the HAPS score method effectively eliminates the majority of patients with AP who do not require excessive management, akin to the findings of Ma et al [22].
BISAP score was positive in 86% (129) of patients while negative in 14% (21) of patients. Out of all the patients 15% had grade III AP , 10% had grade IV AP and 5% had grade VAP. All patients identified by BISAP as having a severe course of acute pancreatitis developed severe acute pancreatitis, and the majority succumbed during their hospitalization, similar to the findings of Arif et al [23]. A BISAP score of 3 or above indicates a bad prognosis and a significant likelihood of experiencing a severe course of pancreatitis, according to a study by Kaushik et al [24]. BISAP has a sensitivity of 63% and high specificity of 100%. The diagnostic accuracy of BISAP is also high, at around 94%.
Due to the nature of our study being a single-arm design, the results cannot be compared with a direct contemporaneous group. The sample size of our study was limited to 150 participants. Single-centre studies possess the drawback of typically being conducted by a highly motivated researcher. Consequently, the results may appear more favorable than they actually are. Given that our study focused on patients hospitalized for gallstone-induced pancreatitis, the results may differ in individuals treated for alternative etiologies of pancreatitis. Furthermore, as the investigation of HAPS focuses on patients presenting for the first time with acute pancreatitis, we were unable to examine the patients for recurrence of the condition.

Conclusion

Multiple scores have been created to forecast the progression of AP and facilitate informed decision-making, monitoring, and prompt action. Most of them are intricate, necessitate substantial and costly procedures, and are time-intensive. Nevertheless, the overwhelming majority of patients with AP exhibit a lesser progression of the disease. Identifying mild cases of acute pancreatitis (AP) is crucial, as HAPS may offer substantial advantages over other grading systems in patient triage. The HAPS score is straightforward to compute and is regularly assessed upon patient admission. The parameters utilized for its calculation are readily accessible and may be performed at most healthcare facilities in underdeveloped nations. Additionally, it assists in determining which patient may want rigorous monitoring. HAPS appears to be an effective tool for assisting physicians in evaluating the severity of AP. HAPS may be regarded as the benchmark for predicting AP for timely and economical management.

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