Original Research Article

Comparative study between BISAP score and Ranson score in predicting severity of acute pancreatitis

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ABSTRACT

Background: Acute pancreatitis has widely variable clinical and systemic manifestations spanning the spectrum from a mild, self-limiting episode of epigastric pain to severe, life-threatening, multi-organ failure. Since the morbidity and mortality of acute pancreatitis differ markedly between mild and severe disease (mild <5% versus severe 20–25%), it is very important to assess severity as early as possible. To assess the accuracy of the BISAP scoring system versus Ranson scoring system in predicting severity in an attack of acute pancreatitis.

Methods: It is a prospective and retro prospective study that was conducted, from August 2018 to November 2019. All surgical units in the headquarters hospital, Ooty. BISAP score and Ranson's score is calculated in all such patients based on data obtained within 48 hours of hospitalization.

Results: Ranson's score of more than 3 and the BISAP score of less than or equal to 3 had the best accuracy of predicting the severity of acute pancreatitis. Both Ranson's score and BISAP score showed higher sensitivity in the prediction of systemic complications than that of local complications.

Conclusions: From this study, we can conclude that the BISAP scoring system is not inferior to Ranson's scoring system in predicting the severity of acute pancreatitis. BISAP scoring system is very simple, cheap, easy to remember and calculate. BISAP scoring system accurately predicts the outcome in patients with acute pancreatitis.

Keywords: Acute pancreatitis, BISAP score, Ranson score

INTRODUCTION

Acute pancreatitis is a common entity encountered during routine surgical practice and it poses a great challenge to the treating surgeon. Acute pancreatitis is defined as a pancreatic inflammatory process, with peripancreatic and multi-organ involvement causing multi-organ dysfunction syndrome (MODS), with increased mortality rate.[1] Acute pancreatitis has an incidence of around 2.29%. Based on severity, acute pancreatitis can be acute edematous; acute persistent; or acute hemorrhagic necrotizing.[2] Early identification of patients at risk of developing a severe attack has great importance for instituting therapeutic interventions and improved outcome. About 10 to 20% of patients experience a severe attack of acute pancreatitis

(SAP); the rate of mortality in SAP is about 20% of all cases of acute pancreatitis.[3] Accurate prediction of severity is important to improve survival. There are several assessment criteria to predict prognosis and severity of acute pancreatitis, which help in guiding patient triage and management.[4] However, nothing is proven to perform significantly better in clinical settings than good clinical judgment. Ideal predicting criteria should, therefore, be simple, noninvasive, accurate and quantitative and assessment tests are easily available.[5] According to the Atlanta classification, severe acute pancreatitis (SAP) is defined as an AP associated with local and/or systemic complications. Atlanta classification is a clinically based classification defining AP, severity, and complications.[6] AP occurs when pancreatic enzymes are prematurely

activated inside the pancreas leading to auto digestion of the gland and local inflammation. These enzymes can also reach the bloodstream, stimulating the production of inflammatory cytokines and tumor necrosis factor-α (TNF-α) from leukocytes. The release of those substances triggers an inflammatory cascade, which leads to the SIRS.[7]

METHODS

It is a prospective and retro prospective study that was conducted, from August 2018 to November 2019. All surgical units in the headquarters hospital, Ooty. BISAP score and Ranson's score is calculated in all such patients based on data obtained within 48 hours of hospitalization. Acute pancreatitis was defined as 2 or more of the following: characteristic abdominal pain, increased levels of serum amylase and/or lipase 3 times the normal value, ultrasonography of the abdomen within the first 7 days of hospitalization demonstrating changes consistent with acute pancreatitis, BISAP score and Ranson's score is calculated in all such patients based on data obtained within 48 hours of hospitalization. A computed tomography (CT) or magnetic resonance imaging (MRI) or ultrasonography (USG) of the abdomen, obtained at any time in the first 7 days of hospitalization, was required to differentiate necrotizing from interstitial pancreatitis. Organ failure was defined as a score of ≥2 in one or more of the three (respiratory, renal and cardiovascular) out of the five organ systems initially described in the Marshall score. Organ failure scores were calculated for all patients during the first 72 hours of hospitalization based on the most extreme laboratory value or clinical measurement during each 24 hour period. The duration of organ failure is defined as transient (≤48 hour) or persistent (≥48 hour) from the time of presentation.

Method of collection of data

Prospective and retro prospective study was conducted on patients admitted with acute pancreatitis during the study period from November 2013 to September 2014. All the patients were subjected to detailed clinical examination, laboratory investigations and radiological imaging with their consent.

Inclusion criteria

Patients with history and clinical findings suggestive of acute pancreatitis with evidence of bulky edematous pancreas on USG/CT abdomen.

Exclusion criteria

Patients with chronic pancreatitis, acute on chronic pancreatitis were excluded.

After considering both the inclusion and exclusion criteria, the total number of patients included in the study were 60. All the 60 patients were subjected to both BISAP and Ranson's scoring systems. Scoring was done on admission/time of diagnosis and at 48 hours. The scores were compared with the clinical severity which was graded according to revised Atlanta criteria and persistent organ failure graded by modified Marshall scoring system is used to assess both scores' reliability in predicting organ failure.

Statistical analysis

Independent t-test was used to examine differences in age; Fischer's exact test for sex; and chi-square test for etiology were used. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and accuracy were calculated. A "p" value of less than 0.05 was considered to be statistically significant. Data analysis was performed using statistical package for the social sciences (SPSS) software.

RESULTS

Among 60 patients in our study, 55 (91%) were males and 5 (9%) were females. However it was found that there was male predominance when stratifying mortality based on sex in severe acute pancreatitis BISAP score more than 3 was above 40 years of age. Concerning etiological factors of acute pancreatitis, we found alcohol being the most common cause of acute pancreatitis. Out of 60 patients, 38 patients had mild pancreatitis (63.33%). The majority of patients, the disease was self-limiting. 22 patients had severe pancreatitis (27.7 %) (Figure 1).
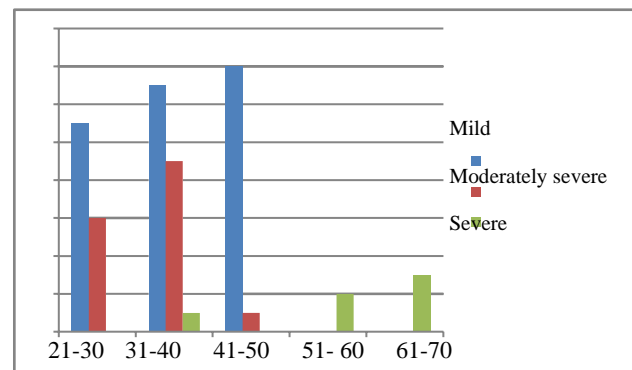

Figure 1: Age distribution of the study population.

Out of 60 patients, 10% of patients developed organ failure. Organ failure may be transient or persistent. 3 patients had transient organ failure. 3 patients developed persistent organ failure (Figure 2).

Among 60 cases ARDS–5%, MODS–3%, renal failure–2%, transient organ failure developed in 3 patients. Persistent organ failure developed in 3 patients who died (Figure 3). Ranson's score of greater than or equal to 4 predicted 93% of severe attacks and 96% of mild attacks with a PPV of 93.33 and a NPV of 96 and accuracy of 95. Ranson's score of greater than or equal to 3 predicted more severe attacks (100%) but less number of mild attacks (56%) with a PPV of 57.69 and NPV of 100 and accuracy

of 72.5. Ranson's score of greater than or equal to 5 predicted less number of severe attacks (53%) and branded more severe attacks as mild attacks. Ranson's score of greater than or equal to 4 had the best sensitivity, specificity, and accuracy (Table 1).
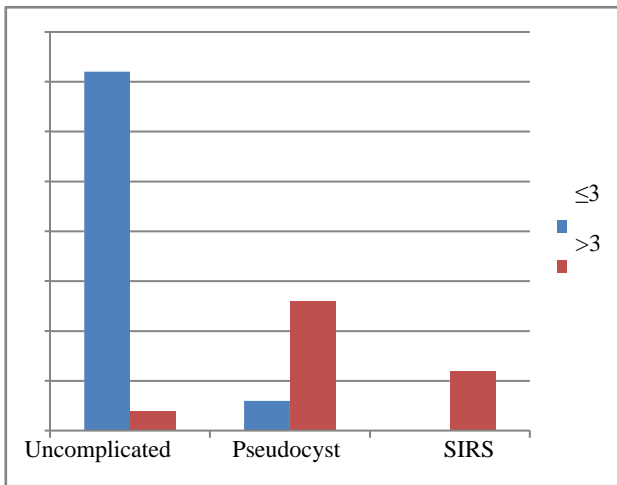

Figure 2: Outcome of patients based on different cut off BISAP score.

BISAP score of less than or equal to 3 predicted 93.33% of severe attacks and 96% of mild attacks with a PPV of 93.33 and NPV of 96 and accuracy of 95.BISAP score of

less than or equal to 3 had the best sensitivity, specificity, and accuracy (Table 2).

Ranson's scores were very sensitive for prediction of systemic complications (100%) but less sensitive for prediction of local complications (93.33) (Table 3).
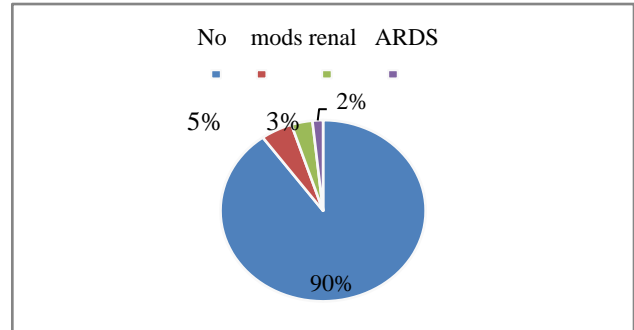
Figure 3: Systemic complications.

BISAP score was a more accurate prediction of systemic complications (100%) but less sensitive for prediction of local complications (93.33) (Table 4).

As sensitivity, specificity, positive predictive value, negative predictive value, and accuracy are found to be the same for Ranson's and BISAP scores, the BISAP scoring system is equally efficacious as Ranson scoring system in predicting the severity of acute pancreatitis (Table 5).

Table 1: Prediction of severity by Ranson's score.

Ranson's score	Sensitivity	Specificity	PPV	NPV	Accuracy
≥3	100	56	57.69	100	72.5
≥4	93.33	96	93.33	96	95
≥5	53..33	100	100	78.1	82.5

Table 2: Prediction of severity by BISAP score.

BISAP score	Sensitivity	Specificity	PPV	NPV	Accuracy
≤3	93.33	96	93.33	96	95
>3	86.66	100	100	92.6	95

Table 3: Prediction of major organ failure and pancreatic collection by Ranson's score.

Ranson's score	Sensitivity	Specificity	PPV	NPV	Accuracy
Pancreatic collection	93.33	96	93.33	96	95
Major organ failure	100	64.1	6.66	100	65

Table 4: Prediction of major organ failure and pancreatic collection by BISAP score.

BISAP score	Sensitivity	Specificity	PPV	NPV	Accuracy
Pancreatic collection	93.33	64.1	93.33	96	95
Major organ failure	100	64.1	6.66	100	65

Table 5: Prediction of severity by Ranson and BISAP scoring systems.

Score	Sensitivity	Specificity	PPV	NPV	Accuracy
Ranson's score	93.33	96	93.33	96	95
BISAP score	93.33	96	93.33	96	95

DISCUSSION

The majority of patients of acute pancreatitis present with mild disease, however approximately 20% run a severe course and require appropriate management in an intensive care unit.[8] Multi-organ dysfunction syndrome, the extent of pancreatic necrosis, infection and sepsis are the major determinants of mortality in acute pancreatitis. Pancreatic necrosis is considered as a potential risk for infection, which represents the primary cause of late mortality.[9] Occurrence of acute respiratory (ARF), cardiovascular (CV) and renal failures (RF) can predict the fatal outcome in sap. A wide range of mortality (20-60%) has been reported in SAP.[10] Early diagnosis and prognostic evaluation are extremely important and may reduce the morbidity and mortality associated with sap. On account of differences in outcome between patients with mild and severe disease, it is important to define that group of patients who will develop severe pancreatitis, predicting which still represents a challenge for the clinician.[11] Interestingly, when seeking medical attention (usually 12 to 24 hours after the onset of pain) most patients do not exhibit multiple organ dysfunction, which is likely to emerge by the second or third day.[12] Also, both require 48 hours, thereby missing potentially valuable early therapeutic window. The APACHE II score is the most widely used prediction system currently but it requires the collection of a large number of parameters. APACHE II was originally developed as an intensive care instrument and requires the collection of a large number of parameters, some of which may not be relevant to prognosis".[13] Out of 60 patients, 38 patients had mild pancreatitis (63.33%). The majority of patients, the disease was self-limiting. 22 patients had severe pancreatitis (27.7%). Alcohol is the main cause in the United States of America and Finland, gallstones in southern Europe, whereas central and northern Europe sees a similar frequency of the two factors or a predominance of alcohol.[14] In our study, out of 60 patients, 55 (90%) had no organ failure, 6 (10%) patients developed organ failure.[15] Out of 6 patients, 3 (50%) patients had transient organ failure and 3 (50%) had persistent organ failure.[16] Mortality was seen in 3 patients, who presented with persistent organ failure. The study was done by Freeman et al.[17] Both Ranson and BISAP were equal in predicting the severity of acute pancreatitis. Both were equally efficacious in assessing the predictability of organ failure.[18]

CONCLUSION

From this study, we can conclude that the BISAP scoring system is not inferior to Ranson's scoring system in predicting the severity of acute pancreatitis. BISAP scoring system is very simple, cheap, easy to remember and calculate. BISAP scoring system accurately predicts the outcome in patients with acute pancreatitis. Moreover, the values in the BISAP score are instantaneous and there is no time delay. Ranson's score takes a minimum of 24 hours. Thus, the BISAP score has proved to be a powerful tool in predicting the severity of acute pancreatitis in par with Ranson's score.

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