

Bisap: A New Method For Assessing Severity And Mortality Of Acute Pancreatitis

Dr Laxman Saka¹, Dr Ramesh Kumar Korumilli², Dr S Rama Chandra Reddy³,
Dr Muvva Sri Harsha⁴, Dr Pavan Kumar⁵, Kanmathareddy Amulya⁶

¹ Assistant Professor, Department of general Surgery, SVS medical college, KNR university of health sciences, Telangana

² Professor & HOD, Department of general surgery, SVS medical college, KNR university of health sciences, Telangana

³ Professor, Department of General Surgery, SVS Medical college, KNR university of health sciences, Telangana.

^{4,5} Second year post-graduate, Department of General Surgery, SVS medical college, KNR university of health sciences, Telangana

⁶ First year post-graduate, Department of General Surgery, SVS medical college, KNR university of health sciences

Corresponding Author: Dr Laxman Saka

Abstract: OBJECTIVES: This study was conducted with aim of to determine the ability of BISAP (Bedside index for severity in acute pancreatitis score) score to predict mortality and severity in acute pancreatitis.

MATERIAL AND METHODS: In this prospective observational study, 100 patients of acute pancreatitis were studied from July 201 to Nov 2018. . BISAP score is calculated based on data obtained within 24 hours of hospitalisation. Marshall scoring system was used to characterize organ failure. The optimal cut off score for mortality from the receiver operating characteristics (ROC) curve was used to evaluate the development of persistent organ failure and pancreatic necrosis.

RESULTS: Among 100 patients, 19% patients had organ failure, 12% patients had pancreatic necrosis, 21% patients had severe acute pancreatitis. overall mortality was 4%. The receiver operating curve (ROC) demonstrated a BISAP score of 3 as the optimal sensitivity and specificity threshold for mortality. With increase of BISAP score there was good correlation with the development of organ failure, pancreatic necrosis and mortality.

CONCLUSION: So, BISAP score is simple and accurate clinical method used to identify patients who are at increased risk of mortality within 24 hours of admission.

Keywords: severe acute pancreatitis, organ failure, pancreatic necrosis, mortality

Date of Submission: 20-03-2019

Date of acceptance: 06-04-2019

I. Introduction

Incidence of acute pancreatitis has increased during the past 20 years. Acute pancreatitis responsible for more than 300,000 hospital admissions annually in the United States. 10-20% of patients have a rapidly progressive inflammatory response associated with prolonged length of hospital stay. Patients with mild pancreatitis have a mortality rate of less than 1% but, in severe pancreatitis this increases up to 10-30%. The most common cause of death in this group of patients is multiorgan dysfunction syndrome¹.

Currently, a variety of scoring systems are available to evaluate the severity of Acute pancreatitis, including Ranson criteria, acute physiology and chronic health evaluation (APACHE) II, and computed tomography severity index (CTSI). However, all scoring systems have their own distinct pros and cons. For this purpose a simple and accurate clinical scoring system that is Bedside index for severity in acute pancreatitis (BISAP) scoring system was developed. This scoring system used for stratifying patients according to their risk of hospital mortality prior to the onset of organ failure.

Individual variables of BISAP SCORE

1. Blood urea nitrogen > 25mg/dl
2. Impaired mental status (Glasgow coma scale score <15)
3. Systemic inflammatory response syndrome
Presence of more than 2 of following criteria
-pulse > 90 bpm

- Respiration >20/min or PaCO₂ < 32mmHg
- Temperature >38 or <36 degree Celsius
- WBC count >12000 or <4000 cells/cubic mm or >10% immature neutrophils.

4. Age >60yrs
 5. Pleural effusion (on CT scan or chest X ray or USG)
- Each point on BISAP score is worth 1 point.

II. Material And Methods

This prospective observational study conducted in S.V.S Medical College and Hospital, Mahabubnagar, Telangana from June 2017 to Nov 2018 with sample size of 100. All cases of acute pancreatitis in in-patients of Department of General surgery included in this study.

Acute Pancreatitis is 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 first 7 days of hospitalisation demonstrating changes consistent with acute pancreatitis.

BISAP score is calculated in all such patients based on data obtained within 24 hours of hospitalisation.

Duration of organ failure was defined as transient (\leq 48hrs) or persistent (>48hrs) from the time of presentation.

Criteria for organ failure based on Marshall scoring system²

ORGAN SYSTEM	SCORE				
	0	1	2	3	4
Respiratory (PaO ₂ / FiO ₂)	>400	301-400	201-300	101-200	<101
Renal(serum creatinine,mg/dl)	<1.5	>1.5to<1.9	>1.9to<3.5	>3.5to<5.0	>5.0
Cardiovascular(SBP, mm hg)	>90	<90,fluid responsive	<90, fluid unresponsive	<90, ph<7.3	<90,ph<7.2

STATISTICAL ANALYSIS: Data was entered in Microsoft excel and analysis was done using SPSS version 20. Significance is assessed at 5 % level of significance. The Receiver Operating Characteristic curve was used to find out an optimal BISAP score for mortality prediction.

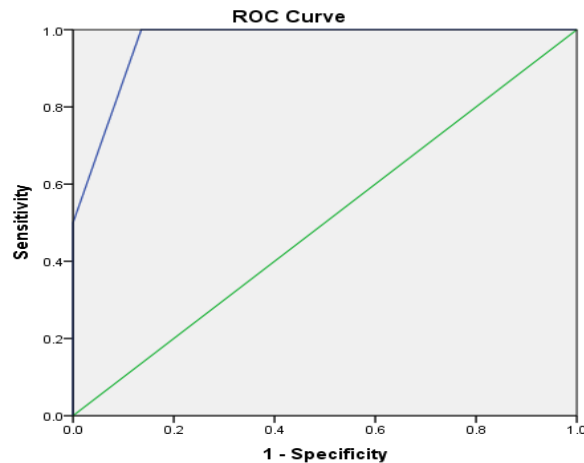
III. Results

Demographic, etiological, imaging results and outcome of the study in acute pancreatiti(n=100)	
Sex distribution	
Male	69%
Female	31%
Age distribution	
21-30	10
31-40	67
41-50	16
51-60	3
>60	4
Aetiology	
Alcohol	43
Gallstones	30
Others	27
Organ Failure	
No organ failure	81
transient organ failure	15
persistent organ failure.	4
Deaths	4
Imaging	
Necrotising pancreatitis	12
Non Necrotising pancreatitis	88
Severity	
Mild acute pancreatitis	79
Severe acute pancreatitis	21
BISAP Score	
<3	81
\geq 3	19

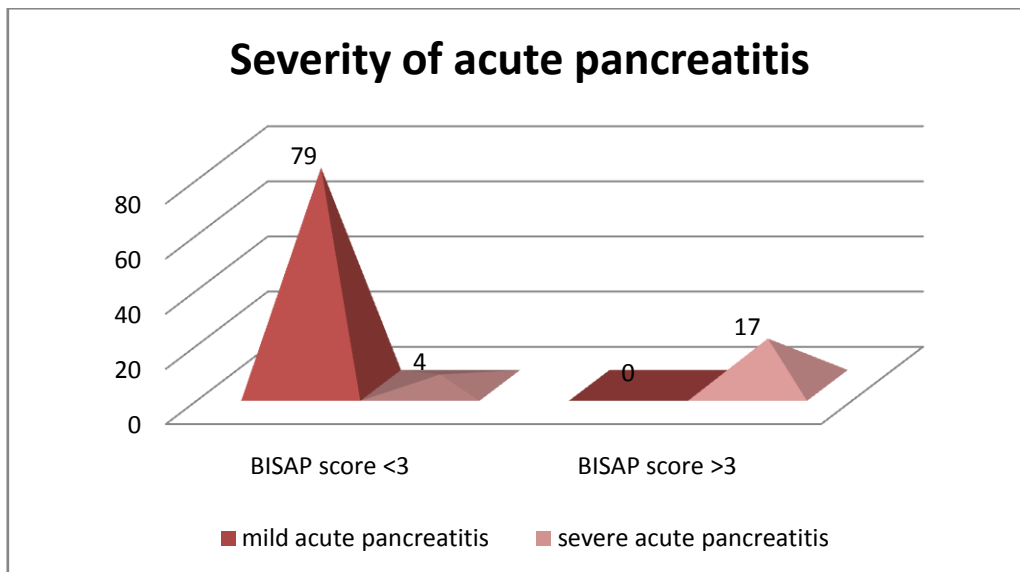
Among 100 patients, 69 were males(69%) and 31 were females(31%). Most common age group affected is between 31-40Yrs (67%). The leading cause of acute pancreatitis was alcohol in 43 patients(43%).Gallstones was cause in 30 patients(30%).

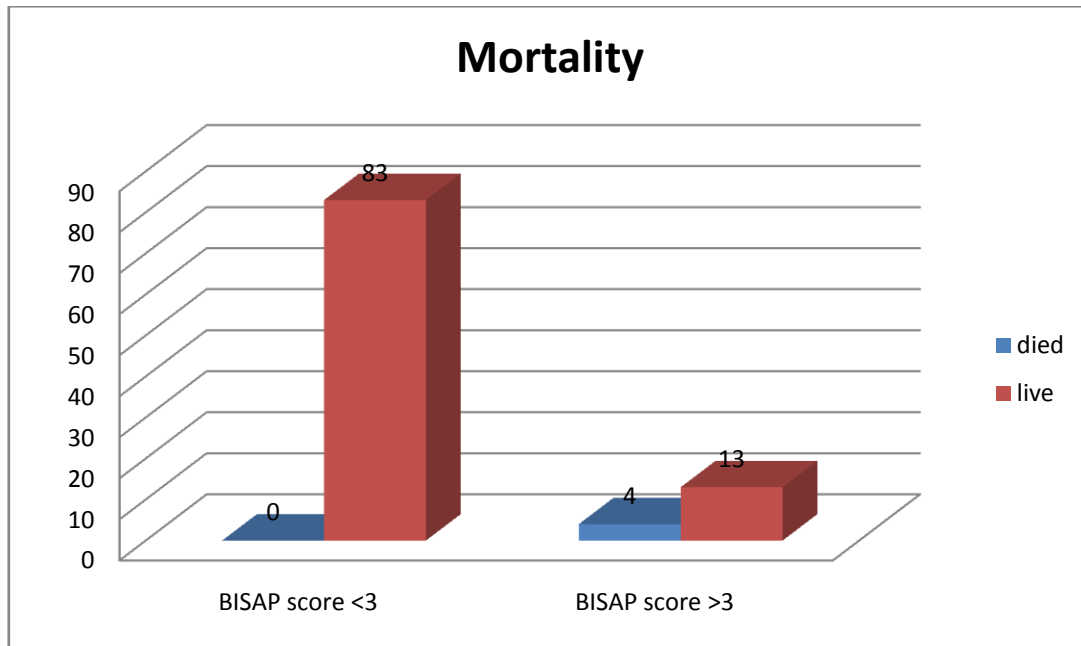
Among 100, 19 patients(19%) had organ failure,in which 16 patients have BISAP score ≥ 3 (p value <0.05). Among 19, 15 patients (78.9%) were transient organ failure. All were having BISAP score ≥ 3 except three (p value <0.05). 4 patients(21.1%) had persistent organ failure.All had BISAP score ≥ 3 . 12 patients(12%) had pancreatic necrosis. In these 10 patients had BISAP score ≥ 3 (p value <0.05).

According to Atlanta classification³, 21 patients had severe acute pancreatitis (21%) and 79 patients (79%) had mild acute pancreatitis. Among 21, 17 patients (80.9%) had BISAP score ≥ 3 (p value <0.05). The overall mortality was 4%.All patients had BISAP score ≥ 3 .Trend for increasing mortality with increasing BISAP score was statistically significant (p <0.05).The receiver operating curve(ROC) demonstrated a BISAP score of 3 as the optimal sensitivity and specificity threshold for mortality.(cut off value is ≥ 2.5).Area under curve for mortality by BISAP score was 0.966



Diagonal segments are produced by ties.





IV. Discussion

The main limitation of the Ranson criteria is that the evaluation cannot be completed until 48 hours following admission, which may lead to missing an early therapeutic window and increased mortality. About APACHE II, complexity is its major drawback. CTSI is calculated based on CT findings of some local complications and cannot reflect the systemic inflammatory response⁵. For this purpose a simple and accurate clinical scoring system that is Bedside index for severity in acute pancreatitis (BISAP) scoring system was developed.

Among 100 patients, in present study 69 were males (69%), 31 were females (31%). Similar results observed in other studies also^{6,7,8}. However in our study, when stratifying mortality on the basis of sex in severe acute pancreatitis as all four were males in mortality group. In our study most common age group affected was between 31-40 years (67%), as commonest aetiologists are alcoholism and gallstones both of which are common in this age group.

Out of 100, 19 (19%) developed organ failure. Out of 19, 15 (78.9%) had transient organ failure and 4 (21.1%) had persistent organ failure. Patients with transient organ failure were recovered without any mortality, but patients with persistent organ failure had 100% mortality in this study, so organ failure is the most important determinant for mortality in acute pancreatitis. More recently, organ failure has been shown to be a much stronger predictor of mortality than local complications such as peripancreatic fluid collections and necrosis^{9,10}. Among 19 patients, 16 have BISAP score ≥ 3 .

Early evaluation of the severity of acute pancreatitis is essential, to allow the clinician to predict the patient's clinical course, estimate prognosis, and determine the need for admission to the intensive care unit. The overall mortality in our study was 4%. All patients had BISAP score ≥ 3 . These results are similar as compared to studies done by Vikesh K. Singh et al¹¹, Yadav et al¹² and Senapati D et al¹³. So BISAP score ≥ 3 shows good correlation with the development of transient organ failure, persistent organ failure, pancreatic necrosis and mortality.

So we determined the ability of BISAP score to predict mortality and severity. It is simple to calculate, requiring only those vital signs, laboratories, and imaging that are commonly used.

V. Conclusion

1. Bedside index for severity in acute pancreatitis (BISAP) scoring system is simple, accurate, uncomplicated, quick and reasonably reliable that was developed for stratifying patients according to the risk of hospital mortality prior to onset of organ failure within 24 hrs of hospitalisation.
2. There is statistically significant trend with increasing organ failure, pancreatic necrosis, mortality with increase of BISAP score.
3. help to improve clinical care and facilitate enrollment of appropriate patients with acute pancreatitis in future prospective trials.

References

- [1]. Satyajit Bhattacharya. The pancreas. In; Norman S Williams, Christopher J.K. Bulstrode and P. Roman O'Connell (Editors). Bailey and Love's Short practice of Surgery. 26th edition. New York. CRC Press Taylor and Francis Group; 2013. Pp. 1127
- [2]. Marshall JC, Cook DJ, Christou NV et al. Multiple organ dysfunction score: a reliable descriptor of a complex clinical outcome. *Crit Care Med* 1995; 23: 1638–52.
- [3]. Garg PK, Madan K, Pande GK, Khanna S, Sathyanarayan G, Bohidar NP, et al. Association of extent and infection of pancreatic necrosis with organ failure and death in acute necrotizing pancreatitis. *Clin Gastroenterol Hepatol* 2005 Feb; 3(2): 159-166.
- [4]. Yeung YP, Lam BY, Yip AW. APACHE system is better than Ranson system in the prediction of severity of acute pancreatitis. *Hepatobiliary Pancreat Dis Int.* 2006;5(2):294–299.
- [5]. Larvin M, McMahon MJ. APACHE-II score for assessment and monitoring of acute pancreatitis. *Lancet.* 1989;2(8656):201–205.
- [6]. Chen L, Lu G, Zhou Q and Zhan Q. Evaluation of the BISAP Score in Predicting Severity and Prognoses of Acute Pancreatitis in Chinese Patients. *Int Surg.* 2013 Jan-Mar; 98(1): 6–12.
- [7]. Ramalingeshwara K, Nataraj NR. Bisap: A Novel Method For Assessing Severity Of Acute Pancreatitis. *Journal Of Evolution Of Medical And Dental Sciences* 2014 Sep; 3(42):10428-34.
- [8]. Yadav J, Yadav SK, Kumar S, Baxla RG, Sinha DK, Bodra P, et al. Predicting morbidity and mortality in acute pancreatitis in an Indian population: a comparative study of the BISAP score, Ranson's score and CT severity index. *Gastroenterol Rep (Oxf).* 2015 Mar 2
- [9]. Gompertz M, Fernández L, Lara I, Miranda JP, Mancilla C, Berger Z. Bedside index for severity in acute pancreatitis (BISAP) score as predictor of clinical outcome in acute pancreatitis: retrospective review of 128 patients. *Rev Med Chil* 2012 Aug; 140(8):977-83.
- [10]. Garg PK, Madan K, Pande GK, Khanna S, Sathyanarayan G, Bohidar NP, et al. Association of extent and infection of pancreatic necrosis with organ failure and death in acute necrotizing pancreatitis. *Clin Gastroenterol Hepatol* 2005 Feb; 3(2): 159-166.
- [11]. Park JY, Jeon TJ, Ha TH, Hwang JT, Sinn DH, Oh TH, et al. Bedside index for severity in acute pancreatitis: comparison with other scoring systems in predicting severity and organ failure. *Hepatobiliary Pancreat Dis Int.* 2013 Dec; 12(6):645-50.
- [12]. Singh VK, Wu BU, Bollen TL, Repas K, Maurer R, Johannes RS, et al. A prospective evaluation of the bedside index for severity in acute pancreatitis score in assessing mortality and intermediate markers of severity in acute pancreatitis. *Am J Gastroenterol.* 2009 Apr; 104(4):966-71
- [13]. Yadav J, Yadav SK, Kumar S, Baxla RG, Sinha DK, Bodra P, et al. Predicting morbidity and mortality in acute pancreatitis in an Indian population: a comparative study of the BISAP score, Ranson's score and CT severity index. *Gastroenterol Rep (Oxf).* 2015 Mar 2
- [14]. Senapati D, Debata PK, Jenasamant SS, Nayak AK, Gowda S M, Swain NN. A prospective study of the Bedside Index for Severity in Acute Pancreatitis (BISAP) score in acute pancreatitis: an Indian perspective. *Pancreatol.* 2014 Sep-Oct; 14(5):335-9.

Dr Laxman Saka " Bisap:A New Method For Assessing Severity And Mortality Of Acute Pancreatitis" *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, vol. 18, no. 4, 2019, 01-05.