Original Research Article

BISAP Score as a predictor of outcome in Acute Pancreatitis – A prospective study

Maqsood Ahmed Awasi[1], Shyam Kumar Gupta[2], Sandeep Bhat[3], Sushant Trakroo[4*]

[1]Resident, Department of General Surgery, Government Medical College Jammu, Jammu and Kashmir, India
[2]Assistant Professor, Department of Surgery, Government Medical College Jammu, Jammu and Kashmir India
[3]Lecturer, Department of Surgery, Government Medical College Jammu, Jammu and Kashmir, India
[4]Resident, Department of Surgery, Government Medical College Jammu, Jammu and Kashmir, India

Received: 12-11-2021 / Revised: 23-12-2021 / Accepted: 05-01-2022

Abstract

Objectives: To predict the outcome of Acute Pancreatitis using BISAP score. To find the association of mortality and morbidity with BISAP score in Acute Pancreatitis. **Methods:** The prospective study was conducted over a period of 1 year and included 100 patients, who presented within 24 hours of the onset of symptoms, and the BISAP score was obtained. The study population was divided into two groups – Mild Acute Pancreatitis (BISAP <3) and Severe Acute Pancreatitis (BISAP ≥ 3). The outcome, mortality and morbidity in the study group was analyzed. **Results:** The study group with BISAP ≥ 3 was associated with a significantly higher risk of Pancreatic necrosis, transient organ failure and persistent organ failure; and was associated with a statistically significant mortality, morbidity and hospital stay. **Conclusion:** BISAP score is a simple scoring system which can clearly prognosticate severity, morbidity and mortality of acute pancreatitis patients. It enables us to risk stratify the patients early in the disease process and thus helps in improving the clinical care and facilitates necessary intervention.

Key words: BISAP score

Introduction

Acute pancreatitis can range from a mild, self limiting process that responds to supportive care, to severe disease with multiple organ failure and high mortality[1].

Severe episodes may involve a progression to extensive pancreatic necrosis, development of the systemic inflammatory response syndrome (SIRS), multiorgan failure, rapid clinical deterioration, and even death[2,3].

The mechanism of injury in pancreatitis is the premature activation of enzymes within the pancreas, leading to autodigestion. Any injury to the acinar cell impairs the secretion of zymogen granules or damages the duct epithelium, and thus delays enzymatic secretion, can trigger acute pancreatitis. Once cellular injury has been initiated the inflammatory process can lead to pancreatic edema, hemorrhage and eventually necrosis. As inflammatory mediators are released into circulation Systemic complication can arise, such as hemodynamic instability, bacteremia, Acute Respiratory Distress Syndrome, pleural effusions, gastrointestinal hemorrhage, renal failure and DIC[4].

Acute pancreatitis may be categorized as mild or severe. Mild acute pancreatitis is characterized by the interstitial edema of the gland and minimal organ dysfunction.

80% of the patients will have mild attack of pancreatitis (Mortality- around 1%). Severe acute pancreatitis is characterized by pancreatic necrosis, a severe systemic inflammatory response and often multiorgan failure (Mortality- varies from 20-50%). About one third of deaths occur in the early phase of the attack, from multiorganfailure, while deaths occurring after 1st week of onset are due to septic complications. Most patients of acute pancreatitis recover without complications, the overall mortality rate of this illness is between 2-5%[5,6].

The most common cause of acute pancreatitis is gallstone impacting the distal common bile-pancreatic duct.

*Correspondence
Dr. Sushant Trakroo
Resident, Department of Surgery, Government Medical College Jammu, Jammu and Kashmir, India
E-mail: trakroo.sushant@gmail.com

The majority of investigators accept that the main factors for acute biliary pancreatitis are pancreatic hyperstimulation and bile-pancreatic duct obstruction which increase pancreatic duct pressure and activate trypsinogen. Acute pancreatitis occurs when intracellular protective mechanisms that prevent trypsinogen activation or reduce trypsin activity are overwhelmed[7].As there is an increased risk of deterioration in severe acute pancreatitis, the assessment of severity becomes vital.Various scoring systems for the risk stratification of Acute pancreatitis have been developed but with various limitations. Majority of the scoring systems like Modified Glasgow Score and Ransons Criteria require diverse biochemical parameters, which are limited in the hospital settings in developing countries like India[8].

Moreover early therapeutic window is missed in these scoring systems, as they are assessed after 48 hours. The APACHE II scoring system also requires collection of large number of parameters[9,10].

To overcome the above limitations, a simple and accurate clinical scoring system, the BISAP – Bedside Index for Severity in Acute Pancreatitis was introduced. The scoring system conveniently stratifies the patients according to the risk of mortality, and identifies the patients at increased risk of mortality early in the therapeutic window, thus enabling effective future management.

BISAP Score

It includes the following parameters

1. Blood urea nitrogen >25 mg/dl.
2. Impaired mental status (Glasgow coma score <15).
3. Systemic inflammatory response syndrome (SIRS).

SIRS is defined as presence of two or more of the following criteria:

a. Pulse >90bpm
b. Respiratory rate >20/min or PaCO2<32mmhg
c. Temperature >38 or <36^{0}C
d. WBC count >12000 or <4000 cells/mm^3 or >10% immature bands

4.Age > 60 years.

5.Pleural effusion, detected on imaging (chest X-ray or USG or CT scan)

Each point on **BISAP** score is worth one point within 24 hours of presentation. There is steady increase in the risk for mortality with the increasing number of points. **BISAP** score is an uncomplicated, quick and reasonably reliable method for assessment of disease severity on admission. A score of ≥3 indicates a severe acute pancreatitis.

Objectives

1. To predict the outcome of Acute Pancreatitis using BISAP score.
2. To find the association of mortality and morbidity with BISAP score in Acute Pancreatitis.

Method

All patients of Acute pancreatitis presenting to the Department of General Surgery, Government Medical College Jammu from 1st November 2018 to 31st October 2019 were included after following the inclusion and exclusion criteria.

Inclusion criteria

- All patients of acute pancreatitis presenting within 24 hours.

Exclusion criteria

- Patients of acute pancreatitis with pre-existing renal or hepatic dysfunction.
- Patients not giving informed consent for the study

Patients of acute pancreatitis presenting with organ failure at the time of admission. Written well informed consent was taken from all the patients after providing them the study information.All the patients were subjected to detailed history, clinical examination, laboratory investigations and imaging study as per the requirement. Patients were managed on the standardized protocols of pancreatitis keeping in view the severity of pancreatitis, associated organ failure and complications. Surgical intervention as per indication for management was performed.

Criteria for organ failure were based on Marshall scoring

Table 1: Marshall scoring.

Organ system	SCORE				
	0	**1**	**2**	**3**	**4**
Respiratory (PaO2/FiO2)	>400	301-400	201-300	101-200	<101
Renal (sr. creatinine, mg/dl)	≤1.5	>1.5 to ≤1.9	>1.9 to≤3.5	>3.5 to ≤5.0	>5.0
CVS(Systolic blood pressure (SBP) in mmHg)	>90	<90, fluid responsive	<90, fluid unresponsive	<90, pH<7.3	<90, pH<7.2

A score of ≥ 2 in one or more of the three organ system (respiratory, renal and cardiovascular) was defined as organ failure (transient ≤ 48 hours, persistent > 48 hours from the time of presentation).Organ failure scores were calculated for all patients during first 72h of hospitalization based on the most extreme laboratory value or clinical measurement during each 24h period.

For non-ventilated patients, the FiO2 was calculated from the table:

Table 2:FiO2 Levels

Supplemental oxygen (litre/min)	FiO2
Room air	21%
2	25%
4	30%
6-8	40%
9-10	50%

Statistical analysis

Categorical variables were presented in number and percentage (%) and continuous variables were presented as mean ± SD and median. Normality of data was tested by Kolmogorov-Smirnov test. If the normality was rejected then non parametric test was used. Statistical tests were applied as follows-

1. Quantitative variables were compared using Independent t test/Mann-Whitney Test (when the data sets were not normally distributed) between the two groups and ANOVA was used for association of hospital days with BISAP score.
2. Qualitative variables were correlated using Chi-Square test/Fisher's Exact test.
3. A p value of <0.05 was considered statistically significant. The data was entered in MS EXCEL spreadsheet and analysis was done using Statistical Package for Social Sciences (SPSS) version 21.0.

Results

Total 100 patients were included in study. 66% were females and 34% males. Mean age of the patients in study was 44.78 ± 15.12 years. Mean age of the males was comparable to that of females (46.68 ± 13.66 vs 43.8 ± 15.83, P=0.342).

Table 3:-Association of age with gender.

Age distribution(years)	Gender distribution		Total	P value
	Female(n=66)	**Male(n=34)**		
<=20	3 (75 %)	1 (25 %)	4 (100 %)	0.902*
21-30	12 (75 %)	4 (25 %)	16 (100 %)	
31-40	17 (68 %)	8 (32 %)	25 (100 %)	
41-50	12 (57.14%)	9 (42.86%)	21(100 %)	
51-60	10 (62.50%)	6 (37.50%)	16(100 %)	
>60	12 (66.67%)	6 (33.33%)	18(100 %)	
Mean ± Stdev	43.8 ± 15.83	46.68 ± 13.66	44.78 ± 15.12	0.342#
Median(IQR)	42.5(32 - 55)	46.5(35 - 59)	45(33 - 58)	

Organ failure

There was a significant association of acute respiratory distress syndrome with BISAP score (P= 0.0002). All patients with BISAP score 0 and 1 were without Acute respiratory distress syndrome, while those with score 2-4 showed increasing percentage of patients with ARDS (P=0.0002).

There was a significant association of renal failure with BISAP score (P= 0.0006). All patients with BISAP score 0 and 1 do not developed

renal failure, while those with score 2-4 showed increasing percentage of patients with renal failure (P=0.0006).
There was a significant association of cardiac failure with BISAP score (P= 0.006). All patients with BISAP score 0, 1, and 2 were without cardiac failure, while those with score 3 and 4 showed increasing percentage of patients with Cardiac failure (P=0.006).
There was a significant association of MODS with BISAP score (P=0.001). All patients with BISAP score 0, 1, 2 and 3 were without MODS, while all patients with MODS had score 4 (P=0.001).

Table 4:-Association of organ failure with BISAP score.

Organ failure		BISAP score					Total	P value*
		0(n=16)	1(n=29)	2(n=21)	3(n=22)	4(n=12)		
Acute respiratory distress syndrome	Negative	16 (100%)	29 (100%)	18 (85.71%)	16 (72.73%)	6 (50%)	85 (85%)	0.0002
	Positive	0 (0%)	0 (0%)	3 (14.29%)	6 (27.27%)	6 (50%)	15 (15%)	
Renal	Negative	16 (100%)	29 (100%)	19 (90.48%)	16 (72.73%)	7 (58.33%)	87 (87%)	0.0006
	Positive	0 (0%)	0 (0%)	2 (9.52%)	6 (27.27%)	5 (41.67%)	13 (13%)	
Cardiac	Negative	16 (100%)	29 (100%)	21 (100%)	20 (90.91%)	9 (75%)	95 (95%)	0.006
	Positive	0 (0.00%)	0 (0.00%)	0 (0.00%)	2 (9.09%)	3 (25%)	5 (5%)	
MODS	Negative	16 (100%)	29 (100%)	21 (100%)	22 (100%)	9 (75%)	97 (97%)	0.0001
	Positive	0 (0%)	0 (0%)	0 (0%)	0 (0%)	3 (25%)	3 (3%)	

*-Chi square test
16% patients had transient organ failure whereas the organ failure was persistent in 7% of the patients. The BISAP score among the patients with transient organ failure was ≥3 in 12 patients and <3 in 4 patients; whereas all the patients with persistent organ failure had BISAP score of ≥3.

Pancreatic Necrosis

Table 5:-Association of pancreatic necrosis with BISAP score.

Pancreatic necrosis	BISAP score		Total	P value*
	<3(n=66)	>=3(n=34)		
Negative	64 (96.97%)	15 (44.12%)	79 (79 %)	<.0001
Positive	2 (3.03%)	19 (55.88%)	21 (21 %)	
Total	66 (100 %)	34 (100 %)	100 (100 %)	

*-Fisher's Exact test
21 patients developed pancreatic necrosis, out of which, 19 patients were having BISAP score ≥3. Only 2 patients were having BISAP score <3.

Hospital Stay

Table 6:-Association of hospital stay with BISAP score.

Hospital Stay (days)	0(n=16)	1(n=29)	2(n=21)	3(n=22)	4(n=12)	P value*
Mean ± Stdev	2 ± 0.73	6.9 ± 1.78	10.71 ± 2.35	14.73 ± 2.05	19.58 ± 3.99	<.001
Median(IQR)	2 (1.500 - 2.500)	7(5.750 - 8)	11(9 - 13)	14.5(13 - 16)	18.5(17 - 21)	

*-ANOVA
Median hospital stay of the patients with BISAP score 0, 1, 2, 3,4 was 2, 7, 11, 14.5, and 18.5 days respectively.

Mortality

Table 7:-Association of outcome(mortality) with BISAP score.

Outcome	BISAP score		Total	P value*
	<3(n=66)	≥3 3(n=34)		
Expired	0 (0 %)	9 (26.47%)	9 (9 %)	<.0001
Recovered	66 (100 %)	25 (73.53%)	91 (91 %)	
Total	66 (100 %)	34 (100 %)	100 (100 %)	

*-Fisher's Exact test
As compared to patients with BISAP score <3, those with score ≥3 had more mortality (26.47% vs 0.00%, P<.0001). All the patients who expired (09) had BISAP score ≥3.

Discussion

Incidence of acute pancreatitis has increased during the past 20 years. The most common cause of death in this group of patients is multiorgan dysfunction syndrome[11].Predicting severity of pancreatitis early in the course of disease is critical to maximize therapy and to prevent and minimize organ dysfunction and complications. There is a need for a simple and clinically oriented severity scoring system that can predict severity of acute pancreatitis within 24h of presentation. Early recognition of severe disease would enable the clinician to consider more aggressive interventions within a time frame that could potentially prevent adverse outcomes[12].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 is used for stratifying patients according to their risk of mortality and is able to identify patients at increased risk of mortality prior to the onset of organ failure[13].We found that patients with higher BISAP score had significantly prolonged hospitalization, had more pancreatic necrosis, multiorgan failure and deaths. There was a significant association of BISAP score with morbidity and mortality among patients with acute pancreatitis in our study (P<0.05). Our findings were in line with other studies. **Saka L *et al.*, (2019)**, **Kaushik *et al.*, (2017)**, **Venkatapuram*et al.*, (2018).**

Demography

Mean age of the patients in the study was 44.78 ± 15.12 years with 66% females and 34% males. Mean age of the males was comparable to that of females (P=0.342).In the study by **Saka L *et al.*, (2019)**, 69% were males and 31% were females. Most common age group affected is between 31-40 years (67%). In study by **Venkatapuram *et al.*, (2018)**, 90% were males and 10% were females; most common affected age group was 31-40 years. Thus it was seen that gender distribution in our study was more inclined towards females whereas other studies reported a male predominance, possible reason for this is that most of the patients included in our study were of calculous pancreatitis (most patients of pancreatitis admitted under Surgery department of our institute are of calculous pancreatitis) and cholelithiasis being more common among females.

Mean age of the patients in study by **Kaushik *et al.*, (2017)** was 43.74±16.85 years; 82% were males and 18% were women. **(Mukherjee *et al.*, 2017)** reported that the mean age of patients at the time of enrolment was 44.4 ± 10.8 years; 69.2% were males and 31.6% females.

Clinical history and examination findings

Most common presentation of patients in our study was pain in abdomen that was noted in all patients; followed by Nausea and Vomiting. Epigastric tenderness was found in all patients; 69% had guarding. USG abdomen showed diffuse edematous pancreas in majority, followed by pleural effusion. Serum amylase was elevated in 80% patients.

This co-relates with the studies by **Chauhan *et al.*, (2018), Negi *et al.*, (2018), Ramu R *et al.*, (2019)** where most common presenting complaint in all patients was abdominal pain followed by vomiting and fever[14-16].

The mean value of BISAP score of study subjects was 1.85 ± 1.27. 34% of patients had BISAP score >=3 and only 66% of patients had BISAP score <3.

A. Association with Organ failure

We found that there was a significant association of ARDS, and renal failure, cardiac failure, and MODS with BISAP score as higher BISAP score (>=3) was significantly associated with organ dysfunction. Very few Patients with BISAP score <3 were associated with organ dysfunction. Transient organ failure was present in 16 % patients. Persistent organ failure was present in 7 % patients. Transient organ Failure and Persistent organ failure was more common in patients with BISAP score ≥3.Our findings agree with the findings reported by **Singh VK *et al.*,(2009)**. The BISAP scores of ≥3 predicted the severity with the development of transient organ failure and persistent organ failure in their study[17].

Venkatapuram *et al.*, (2018) reported similar findings as ours. 22% patients developed organ failure. Among these 11 individuals, 9 had BISAP score >3 and 2 had BISAP score <3. 6 cases had renal failure, 3 had ARDS, 1 had cardiac failure and 1 case suffered MODS. Most of the patients with organ failure had BISAP score >3 (p= 0.006). Individuals who developed transient and persistent organ failure, had BISAP score>3, which is significant.

These results are similar as compared to studies done by **Yadav *et al.*, (2016)** and **Senapati D *et al.* (2014)**[18-19].

B. Association with pancreatic necrosis

Pancreatic necrosis was present in 21% patients. As compared to patients with BISAP score <3, those with score ≥3 had significantly more number of patients with pancreatic necrosis (55.88% vs 3.03%, P<.0001).The observations were similar to study done by **Singh VK *et al.*,(2009)**, where the BISAP scores of ≥3 predicted the severity with the development of pancreatic necrosis in their study. **Venkatapuram *et al.*, (2018)** reported that14% individuals developed pancreatic necrosis. Most of these patients had BISAP score of more than 3.**Saka *et al.*, (2018)** in their study observed that 12% patients had pancreatic necrosis. In these patients, 10 patients had BISAP score BISAP score >3 (p value <0.05)[20].

In our study, there were 9 (9%) deaths and 91 (91%) survived. In a similar study like ours, **Kaushik *et al.*, (2017)** mentioned that outcome assessed at 28 days revealed recovery of 54% patients, complication among 36% and mortality of 10% of study subjects. In study by **Venkatapuram *et al.*, (2018), there were** 6% deaths.

C. Association of BISAP score with mortality

We observed that patients who expired had BISAP score ≥3. All the patients with BISAP score <3 survived. BISAP score of 0 and 1 significantly predicted the recovery with P value <0.001. BISAP score of 2 and above significantly predicted the complication with P value <0.001. BISAP score of 3 and above significantly predicted the mortality with P value <0.001. The trend for increasing severity and mortality with increasing BISAP was statistically significant.

Similar trend was observed by **Kaushik *et al.*, (2017)** who mentioned that outcome assessed at 28 days revealed mortality of 10% of study subjects. BISAP score computed at 24h was correlated with the severity and outcome observed at 28 days. trend of increasing complication with BISAP score of ≥2 and increasing mortality with BISAP score of ≥3 was statistically significant (P <0.001).

The findings were similar to study done by **Singh VK *et al.*,(2009)**, where statistically significant trend of increasing mortality with increasing BISAP score was noted.

Perez *et al.*, (2002) reported an overall mortality rate of 14% among 99 patients with pancreatic necrosis but found that the concomitant presence of organ failure at admission or during hospitalization was associated with a nearly 50% mortality rate[21].

Venkatapuram *et al.*, (2018), found that in all the patients who died in their study had BISAP score >3.

Wu BU *et al.*, (2008) also reported similar findings[22].

D. Association of BISAP score with hospital stay

In this study, median hospital stay associated with BISAP score 0, 1, 2, 3, 4, was 2, 7 11, 14.5, and 18.5, respectively. Median hospital stay was significantly higher in patients with BISAP score ≥3.

These observations are at par with earlier publications. **Venkatapuram *et al.*, (2018) found** mean duration of hospital stay in mild pancreatitis (BISAP Score<3) was 4.8 days and severe acute pancreatitis was 8.3 days. It was observed that duration of hospital stay increases, with increasing BISAP score.

Similar findings were observed by **Haridas TV *et al.*, (2019)** where 11 patients had BISAP score ≥2. Among them, 10 patients (90.09%) had a hospital stay for >7 days and only 1 patient (9.09%) had a hospital stay for ≤7 days. Hence, BISAP Score ≥2 was associated with prolonged hospital stay.BISAP score was initially derived and tested using 36,248 cases of acute pancreatitis across 389 hospitals, reflecting the full spectrum of health-care delivery[23].

Conclusion

We found that there was significant association of BISAP score with prolonged hospitalization, more pancreatic necrosis, multiorgan failure and death. Higher the BISAP score more the morbiditry and mortality and vice versa

It can be concluded that the BISAP score, which is a simple and accurate scoring system can clearly prognosticate severity, morbidity and mortality of Acute Pancreatitis patients. Increasing BISAP score enable us to risk stratify the patients within 24 hours of admission and thus help in improving clinical care and facilitate necessary interventions as soon as possible.

References

1. Maingot's Abdominal Operations, 13th edition, Chapter 68, page – 1257.
2. Petrov MS, Shanbhag S, Chakraborty M, Phillips AR, Windsor JA. Organ failure and nfection of pancreatic necrosis as determinants of mortality in patients with acute pancreatitis.*Gastroenterology*.2010;139:813-820.
3. Windsor JA, Johnson CD, Petrov MS, Layer P, Garg PK, Papachristou GI. Classifying the severity of acute pancreatitis: towards a way forward. *Pancreatology*. 2015;15(2):101-104.
4. Bailey and Love's Short Practice of Surgery, 27th edition. Chapter 68, page-1221.
5. Ranson JH,Rifkind KM, Roses DF. Objective early identification of severe acutepancreatitis. Am J Gastroenterol. 1974;61:443-51.
6. Yeung YP, Lam BY, Yip AW. APACHE system is better than Ranson system in the prediction of Severity of acute pancreatitis Hepato Biliarypancreat Dis Int. 2006;5:294-9.
7. Wang, G. J., Gao, C. F., Wei, D., Wang, C., & Ding, S. Q. (2009). Acute pancreatitis: etiology and common pathogenesis. *World journal of gastroenterology*, *15*(12), 1427–1430.
8. Larvin M, McMahon MJ. APACHE-II score for assessment and monitoring of acute pancreatitis. Lancet. 1989;2:201-5.
9. Wu BU, Johannes RS, Sun X. The early prediction of mortality in acute Pancreatitis: a large population based study. Gut. 2008;57:1698-70.

10. 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;104:966-71.
11. Saka L, Korumilli RK, Reddy RC, Harsha MS, Kumar P, Amulya K. Bisap: A new method for assessing severity andmortality of acute pancreatitis. IOSR-JDMS 2019;18(4):1-5.
12. Kaushik MR, Dubey AP, Jain R, Rathore A, Pathak A. Prospective evaluation of the BISAP score and its correlation with Marshall score in predicting severity of organ failure in acutepancreatitis. IJAM 2017;4(2):534-39.
13. Venkatapuram MR, Sateesh S, Batchu D. A prospective study of BISAP score in assessing severity of acute pancreatitis. Int SurgJ 2018;5(5):1785-91.
14. Chauhan Y, Jindal N, Verma RK, Tyagi PK, Rana M, Singh S. A clinical profile and outcome of patients with acute pancreatitis: A prospective study in North India. Arch Int Surg2018;8:132-38.
15. Negi N, Mokta J, Sharma B, Sharma R, Jhobta A, Bodh V. Clinical profile and outcome of acute pancreatitis: a hospital-based prospective observational study in sub-Himalayan state. J AssocPhys India 2018;66:22-24.
16. Ramu R, Paul V, Devipriya S, Philip NC. Etiology, clinical profile and outcome of acute pancreatitis in a tertiary care teaching hospital in rural South India: a ten year retrospective study. IntSurg J 2019;6:3794-99.
17. 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 JGastroenterol 2009;104:966-71.
18. 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)2016;4(3):216-20.
19. Senapati D,Nayak AK, Gowda SM, Swain NN. A prospective study of the Bedside Index for Severity in Acute Pancreatitis (BISAP) score in acute pancreatitis:an Indian perspective. Pancreatology 2014;14(5):335-39.
20. Saka L, Korumilli RK, Reddy RC, Harsha MS, Kumar P, Amulya K. Bisap: A new method for assessing severity andmortality of acute pancreatitis. IOSR-JDMS 2019;18(4):1-5.
21. Perez A, Whang EE, Brooks DC, Moore FD Jr, Hughes MD, Sica GT et al. Is severity of necrotizing pancreatitis increased in extended necrosis and infected necrosis. Pancreas2002;25:229-33.
22. Wu BU, Johannes RS, Sun X, Tabak Y, Conwell DL, Banks PA. The early prediction of mortality in acute pancreatitis: a largepopulation-based study. Gut 2008;57:1698-703.
23. Haridas TV, Iqbal AIK. A prospective study of the bedside index for severity in acute pancreatitis (BISAP) score in predicting severity and prognosis of acute pancreatitis. Int Surg J2019;6:570-73.

Conflict of Interest: Nil Source of support: Nil