Original Research Paper

Volume-7 | Issue-10 | October-2017 | ISSN - 2249-555X | IF : 4.894 | IC Value : 79.96

General Medicine

COMPARATIVE STUDY BETWEEN BISAP SCORING SYSTEM AND C-REACTIVE PROTEIN LEVEL IN PREDICTING SEVERITY AND MORTALITY OF ACUTE PANCREATITIS

Dr.K.B.Singh Post Graduate Trainee, Department of Medicine, Assam Medical College & Hospital, Dibrugarh, Assam

Dr.B.C.Kalita Associate Professor of Medicine, Department of Medicine, Assam Medical College & Hospital, Dibrugarh, Assam *Corresponding author

Dr.R.K.Kotokey Professor of Medicine, Department of Medicine, Assam Medical College & Hospital, Dibrugarh, Assam

ABSTRACT

Background:
Various scoring systems and biochemical markers may help in early prediction of severity and mortality in patients with acute pancreatitis (AP).

Methods:
Bedside index for severity of acute pancreatitis (BISAP) were calculated using data within 24 hours of admission and C-reactive protein (CRP) level were also measured on admission. Predictive accuracy of BISAP and CRP in prediction of severe acute pancreatitis (SAP) and mortality were calculated.

Results:
Out of 91 patients, 18 patients had organ failure and 17 patients had local complication. 23 patients were classified as having SAP and 8 died. Area under receiver operating curves for BISAP and CRP in predicting SAP were 0.918 and 0.823 respectively, and for mortality were 0.983 and 0.881 respectively.

Conclusion:
BISAP is a better predictor of severity and mortality than CRP in acute pancreatitis. Hence, it should be evaluated in all patients with acute pancreatitis.

KEYWORDS : BISAP; CRP; SAP; Organ failure; Local complication; Mortality.

1. Introduction:

Acute pancreatitis is an acute inflammatory process of the pancreas with varying involvement of other regional tissues or remote organ systems.[1] Most episodes of acute pancreatitis (80%) are mild and self-limiting, without sequelae. In 10%-20% of cases, however, severe disease develops and parts of the pancreas and surrounding tissue become necrotic. In such cases, the acute inflammatory response may progress to systemic inflammatory response syndrome and/or multiorgan failure resulting in death.[2] The incidence of acute pancreatitis is about 5–35/100,000 new cases per year worldwide, with a mortality rate of about 3%.[3]

Individual responses to pancreatic injury are highly variable and often unpredictable. Early evaluation and risk stratification for patients with acute pancreatitis are important to differentiate patients with mild versus severe disease.

At present many scoring systems are available to assess the severity of acute pancreatitis. This includes the Ranson's criteria[4], acute physiology and chronic health evaluation (APACHE) II[5], computed tomography severity index (CTSI)[6] and bedside index for severity in acute pancreatitis (BISAP).[7] In addition, a variety of single serum parameters, such as C-reactive protein (CRP), polymorphonuclear (PMN) elastase, phospholipaseA2, alpha 1-antitrypsin, alpha 2-macroglobulin, trypsinogen activation peptide, and procalcitonin, have been reported to be useful indicators of the severity of acute pancreatitis.[8]

Bedside Index of Severity in Acute Pancreatitis [BISAP] a new scoring system was developed for bedside assessment of severity of acute pancreatitis. Among single biochemical markers, CRP remains the most useful in predicting severe acute pancreatitis, especially due to its accuracy and can be done routinely in the laboratory.

MATERIALS AND METHOD:

Patients of acute pancreatitis, 13 years or above diagnosed on the basis of revised Atlanta classification and definitions by international consensuses who were admitted in Assam Medical College and Hospital, Dibrugarh during a period of one year 2015-2016 has been enrolled. A hospital based cross sectional study was done among 91 patients. Patients with following pre-existing co-morbid conditions were excluded from the study: Congestive Heart failure, Chronic Kidney Disease, Chronic Obstructive Pulmonary Disease, Diabetes Mellitus, Chronic Liver Disease and Chronic Pancreatitis. The predictive accuracy of BISAP score and C-reactive protein for severity and mortality was measured by the area under the receiver-operating curve (AUC) using MedCalc Version 16.8.4.

RESULTS AND OBSERVATION:

The present study is a hospital based cross sectional observational study, carried out on patients of acute pancreatitis, admitted in the Department of Medicine Assam Medical College & Hospital, Dibrugarh. After considering the inclusion and exclusion criteria, a total of 91 patients were included. The results and observations of the present study are illustrated in the following tables and figures.

TABLE–1: SHOWING THE AGE WISE DISTRIBUTION OF THE CASES

AGE GROUP(in years)	NUMBER(n)	PERCENTAGE(%)
13—20	5	5.49
21—30	21	23.08
31—40	38	41.76
41—50	15	16.48
51—60	11	12.09
61—70	1	1.10
TOTAL	91	100.00

From the above table it is seen that majority of the patients (38 patients) of acute pancreatitis were in the age group of 31-40 years (41.76%). In the present study, all the patients were in the age range of 13 to 68 years with mean age of 37.11 ± 10.54 year.

TABLE–2: DISTRIBUTION OF PATIENTS WITH BISAP SCORE

BISAP SCORE	NUMBER(n=91)	SEVERE AP(n)	MORTALITY(n)
0	26	1 (3.83%)	0
1	39	2 (5.12%)	0
2	7	3 (42.85%)	0
3	13	11 (84.61%)	2 (15.38%)

4	6	6 (100%)	6 (100%)
5	0	0 (0%)	0 (0%)

From above data it is seen that as BISAP score increases, the proportion of patients with severe acute pancreatitis and mortality increases. Of a total 72 patients with BISAP score ≤ 2, no mortality was observed and only 6 patients developed severe acute pancreatitis. However, of a total 19 patients with BISAP score >2, 17 patients developed SAP and death occurred in 8 patients.

TABLE-3: DISTRIBUTION OF PATIENTS WITH CRP LEVEL

CRP LEVEL(mg/dl)	NUMBER(n= 91)	SAP(n)	MORTALITY(n)
0-10	57	5 (8.77%)	1 (1.75%)
>10-20	14	3 (21.42%)	0 (0%)
>20-30	9	5 (55.55%)	2 (22.22%)
>30-40	9	8 (88.88%)	4 (44.44%)
>40-50	2	2 (100%)	1 (50%)

From above data it is seen that patients with higher CRP level had higher proportion of severe acute pancreatitis and mortality. It was observed that of a total of 71 patients with CRP level in the range of 0-20 mg/dl, SAP and mortality were seen in 8 and 1 patients, respectively. However, of a total of 20 cases with CRP level in the range of 20-50 mg/ dl, SAP and mortality were seen in 15 and 7 patients, respectively.

TABLE-4: AUC COMPARISON OF BISAP AND CRP IN PREDICTING SEVERE PANCREATITIS AND MORTALITY

AUC (95%CI)	SAP	MORTALITY
BISAP	0.918 (0.842-0.966)	0.983 (0.931-0.999)
CRP	0.823 (0.729-0.895)	0.881 (0.796-0.939)

FIG-1: AUC COMPARISON OF BISAP AND CRP IN PREDICTING SEVERE PANCREATITIS

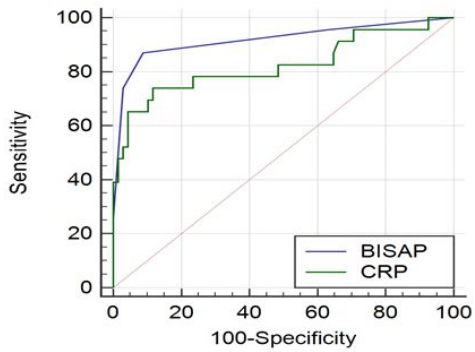
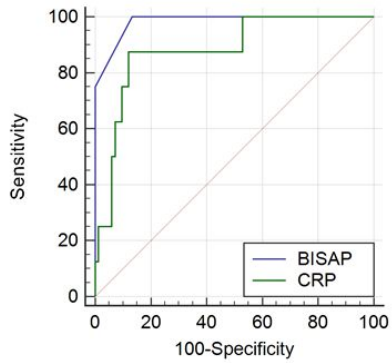


FIG-2 :AUC COMPARISON OF BISAP AND CRP IN PREDICTING MORTALITY



ROC curves for BISAP score predicting severe pancreatitis and death yielded AUC of 0.918 (95% CI, 0.842-0.966) and 0.983 (95% CI, 0.931-0.999) respectively. ROC curves for CRP predicting severe pancreatitis and death yielded AUC of 0.823 (95%CI, 0.729-0.895) and 0.881 (95%CI, 0.796-0.939) respectively.

DISCUSSION:

The present study included patients ranging from 13 years to 68 years and majority of the cases (38 cases) were in the age group of 31-40 years (41.76%), which is comparable to the study by Bezwada SR *et al*[9] where maximum number of cases was in their fourth decade.

In our study majority of the cases (73 cases) were males (80.22%) and 18 cases were females (19.78%). The male: female ratio were 4.05:1, which is comparable to the study by Venkateswara Rao Katta *et al*[10] in which out of a total of 102 cases, 80 cases were males (78.43%) and 22 were female (21.57%).

In our study it was observed that alcohol was the most common cause of acute pancreatitis and was seen in 54 patients (59.34%). Gallstone pancreatitis was seen in 15 cases (16.48%) and idiopathic pancreatitis accounted for 24.17% of the total cases. Venkateswara Rao Katta *et al*[10] in their study observed that alcoholic pancreatitis was the most predominant diagnosis seen in 62 patients (60.78%). Gallstone pancreatitis was the second most common diagnosis seen in 22 patients (21.56%) and 18 patients had idiopathic pancreatitis (17.65%).

In our study the mean amylase of all the patients was 529.02 ± 452.35 U/L with a median of 432. Mean lipase was 2933.04 ± 2421.49 U/L with a median of 1902. Lipase was found to be elevated in 78.02% cases and amylase in 54.95% cases above the maximum upper limit. Rakesh Sanol *et al*[11] in their study observed that serum amylase in 26 patients (50%) and serum lipase in 45 patients (76%) were elevated to greater than 3 times of upper limit of normal.

Out of the 91 patients included in the study, 17 patients developed local complications and 18 patients had organ failure. Renal failure was present in 9.89%, respiratory failure in 5.49%, and cardiovascular failure in 4.40%. 68 patients were diagnosed as having mild acute pancreatitis (74.73%) while 23 patients as severe acute pancreatitis (25.27%). It was also observed that among all the cases, 83 patients recovered (91.21%) and were discharged while 8 patients expired (8.79%) during the hospital stay. ROC curves for BISAP score predicting severe pancreatitis and death yielded AUC of 0.918 (95% CI, 0.842-0.966) and 0.983 (95%CI, 0.931-0.999) respectively. ROC curves for CRP predicting severe pancreatitis and death yielded AUC of 0.823 (95%CI, 0.729-0.895) and 0.881 (95%CI, 0.796-0.939) respectively. It was observed that AUCs for BISAP predicting severe pancreatitis and death were greater than those for C-reactive protein level. Ji Young Park *et al*[12] in their study of the 303 patients, 31 (10.2%) were classified as having severe acute pancreatitis. Organ failure occurred in 23 (7.6%) patients, pancreatic necrosis in 40 (13.2%), and death in 6 (2.0%). AUCs for BISAP predicting severe pancreatitis and death were 0.80 and 0.86, respectively. AUCs for BISAP predicting severity, organ failure, and death were greater than those for CRP (0.69, 0.80, 0.72).

CONCLUSION:

In the present study an attempt was made to identify patients at higher risk of developing severe acute pancreatitis with local complication and organ failure. After evaluation of the cases, it was observed that patients with high BISAP score and CRP values were at higher risk for developing severe acute pancreatitis as well as mortality. It was also observed that BISAP score was a better predictor for severe disease and mortality than CRP. Therefore, BISAP score should be assessed in all patients with acute pancreatitis to help in early identification of patients at risk of developing severe disease and death.

REFERENCES:

(1) Bradley 3rd EL: A clinically based classification system for acute pancreatitis. Summary of the International Symposium on Acute Pancreatitis, Atlanta, Ga, September 11 through 13,1992. Arch Surg 1993; 128:586.
(2) Papachristou GI, Muddana V, Yadav D, O'Connell M, Sanders MK, Slivka A, Whitcomb DC. Comparison of BISAP, Ranson's, APACHE-II, and CTSI scores in predicting organ failure, complications, and mortality in acute pancreatitis. Am J Gastroenterol 2010; 105:435-441.
(3) Conwell DL, Greenberger J, Banks PA. Part 14, Section 3: Disorder of Pancreas. In: Dennish Kasper, Stephen L. Hauser, J. Carry Jameson, Anthony S. Fauci, Dan. L. Longo, Joseph Loscaizo (Eds). Harrisons Principle of Internal Medicine, 19th Edition, Volume 2, McGraw-Hill Publication. 2015: 2086.
(4) Ranson JH, Rifkind KM, Roses DF, Fink SD, Eng K, Spencer FC. Prognostic signs and the role of operative management in acute pancreatitis. Surg Gynecol Obstet 1974; 139(1): 69–81.
(5) Knaus WA, Draper EA, Wagner DP, Zimmerman JE. APACHE II: a severity of disease classification system. Crit Care Med 1985; 13(10): 818–829.
(6) Balthazar EJ, Robinson DL, Megibow AJ, Ranson JH. Acute pancreatitis: value of CT in establishing prognosis. Radiology 1990; 174(2): 331–336.
(7) Wu BU, Johannes RS, Sun X, Tabak Y, Conwell DL, Banks PA. The early prediction of mortality in acute pancreatitis: a large population-based study. Gut 2008; 57(12):

1698–1703.
(8) Rettally CA, Skarda S, Garza MA, Schenker S. The usefulness of laboratory tests in the early assessment of severity of acute pancreatitis. Crit Rev Clin Lab Sci 2003; 40: 117-49.
(9) Rao BS, SreeVani M**,** Chandra VS. Etiology, Clinical Profile, Severity And Outcome Of Acute Pancreatitis In Relation To Bed Side Index For Severity Of Acute Pancreatitis Bisap And Ct Severity Index [CTSI] Scores. Int J Med Res Health sci. 2014;3(4):922-928.
(10) Katta VR, Kongara R, Prasad A, Kumar SK, Kumar SV. Evaluation Of BISAP Score In Predicting Severity Of Acute Pancreatitis. International Journal of Current Research Vol. 8, Issue, 03, March, 2016.. 28624-28627.
(11) Sanol R, Bhadreshwara K, Vaisnav A, Qureshi MA,, Mathew JG et al. Severity and Outcome of Acute Pancreatitis in Relation to Bed Side Index for Severity of Acute Pancreatitis [Bisap] and Ct Severity Index [Ctsi] Scores. IJSR - International Journal of Scientific Research. Volume: 4, Issue: 6, June 2015.532- 535.
(12) 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 & pancreatic diseases international: HBPD INT. 2013; 12(6):645–50.