Utility of Bedside Index For Severity In Acute Pancreatitis Score

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ABSTRACT

Objective — *To establish the utility of Bedside Index for severity in acute pancreatitis (BISAP) score of more than 3 in patients with acute pancreatitis.*

Study design — *Descriptive case series.*

Place & Duration of study — *Department of Surgery Ward 3 Jinnah Postgraduate Medical Centre (JPMC) Karachi, from April 2014 to April 2017.*

Methodology — *Patients having acute pancreatitis between 30 - 70 year of age, both gender, BISAP score > 3, and duration of disease < 7 days, were included. In first 24 hours BISAP score were calculated. Organ failure was assessed as P_aO_2 / F_iO_2 of <101 to 200 as respiratory failure, serum creatinine > 3.5mg/ dl as renal failure, systolic blood pressure (SBP) <90mm Hg and pH<7.3 as cardiovascular failure. Lack of delineation of pancreas on CT scan done with oral and IV contrast was taken as pancreatic necrosis. Mortality within 7 days of admission was noted.*

Results — *Total number of patients was 116. There were 56 male and 60 female patients. Mean age of the patients was 54 year, and mean duration of disease 9 days. Frequency of outcome showed that respiratory failure was found in 21(18.10%), renal failure in 25 (21.60%), cardiovascular failure in 12 (10.30%), pancreatic necrosis in 81(69.80%) and mortality in 20 (17.20%) patients.*

Conclusion — *The most common complication of BISAP score > 3 was necrosis of pancreas in 70% patients with 17% mortality in patients of acute pancreatitis.*

Key words — *Acute pancreatitis, Bedside Index for severity in acute pancreatitis (BISAP) score, Systemic inflammatory response syndrome (SIRS).*

INTRODUCTION:

Acute pancreatitis (AP) is a challenging illness with significant mortality.[1,2] Patients with acute pancreatitis usually present with mild attack which frequently settles down without any sequelae. However, in 10 to 20% patients it may advance into severe form. In this form, it may lead to severe systemic inflammatory response, and longer hospitalization because of local/systemic complications with higher mortality.[3-6] Many cases of severe acute pancreatitis who progress to systemic inflammatory response syndrome may develop organs failure and necrosis of pancreas. Despite ongoing medical research, it is still not possible to diagnose the severity of AP early in disease by single or multiple sets of investigations. The scoring systems popular for assessing morbidity and mortality are used mainly for comparing outcome.

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The Ranson's criteria which is the most frequently used scoring system in acute pancreatitis, quite accurately calculates mortality. However it has two disadvantages: Firstly, 48 hours are required for its completion so the valuable early therapeutic window is not utilized.[7] Secondly, the data used is usually not routinely done at admission or during hospitalization (PaO_2, LDH and fluid sequestration). Another scoring system which is commonly used in ICU but also used in AP known as APACHE-II (Acute Physiology and Chronic Health Examination) requires collection of parameters some of which are not important in acute pancreatitis, whereas important factors like pancreatic injury and necrosis are missed.[8,9] Lately, Bedside Index for Severity in AP (BISAP) is a new score which is gaining popularity as a precise method for timely stratification of high risk patients for local, systemic complications and mortality.

In BISAP five variables are used at the time of admission. These five variables are age 60 years, altered mental status, SIRS positive, BUN more than 25 mg/dl and pleural effusion on plain chest x-ray. Each variable is given a score of 1. The score above 3 indicates the severe acute pancreatitis.[10,-12] This study was done to find the utility of BISAP score which is easily available and less time consuming test in severe acute pancreatitis so that patients with increased risk can be directly admitted to ICU.

METHODOLOGY:

This was a descriptive case series conducted at JPMC Karachi from April 2014 to April 2017. Non probability consecutive sampling was used to induct patients. Inclusion criteria was patients 30 -60 year of age, of either gender, diagnosed as acute pancreatitis cases on the basis of serum amylase level = 300 units/liter at admission and with BISAP score more than 3.

In BISAP each variable is given score 1, at the time of admission and later on adding them for a cumulative score ranging from 0-5. This includes altered mental status i.e. Glasgow Coma Scale <15, presence of SIRS if patients have any of the following two signs, temperature < 36° C / > 38 ° C, respiratory rate > 20 breaths/minutes, TLC < 4 x 10^3 or >12 x 10^3/mm ^{3} , tachycardia > 90 beats/min, age more than 60 years, Blood Urea Nitrogen (BUN) more than 25 mg/ dl , chest x ray showing pleural effusion. Subsequent outcome was observed during hospitalization i.e. 7 days. This included mortality, death during above mentioned period of hospitalization, organ failure if following parameters were present, respiratory failure, labeled when P_aO_2/F_iO_2 value was <101 to 200, renal failure when serum creatinine was > 3.5 mg/dl, cardiovascular failure when systolic blood pressure < 90 mm Hg. Pancreatic necrosis was defined as no or less uptake of contrast by pancreas on contrast enhanced computed tomography.

Informed written consent was taken from the patients who fulfilled inclusion criteria. Data was entered into SPSS17 and analyzed. Percentages and frequencies were used to calculate mortality and morbidity i.e. organ failure and pancreatic necrosis.

RESULTS:

Total number of patients were 116. There were 56 male and 60 female patients. The age of male patients was from 32 to 60 years and in females 30 to 58 years. The patients in our study had mean age of 54 year. Mean hospital stay was 9 days. Outcome showed that 21(18%) patients had respiratory failure, 25 (21%) renal failure, 12 (10%) cardiovascular failure, 81 (69%) necrosis of pancreas and 20 (17%) had mortality when BISAP score was >3**.**

DISCUSSION:

There is no gold standard investigation till date and any scoring system to assess the severe acute pancreatitis in patients who present early. However, BISAP is evaluated in this study to predict early morbidity/ mortality in severe acute pancreatitis. High BISAP score (> 3) was related with increased morbidity like organ failure and necrosis of pancreas as well as mortality in our study which matches with many international studies.[9]

It is very important to know high risk patients on admission in acute pancreatitis because they can be directly admitted to HDU/ICU and monitored to prevent as well as treat any ongoing organ failure. Secondly by identifying and treating patients with SIRS prevent patients from progressing to multiple organ dysfunction syndrome (MODS) and multiple organ system failure (MOSF) thus decreasing mortality.[10] Another ICU scoring system is also used to assess severity in AP known as APACHE-II. It is quite complex and has parameters not directly linked to acute pancreatitis like chronic conditions.[14] The disadvantage of APACHE-II is its poor predictive value early in admission and cumbersome application.[6]

The Ranson criteria for depicting mortality in acute pancreatitis consist of 11 variables in which 5 are calculated on admission and 6 are calculated in next 48 hours. Scores <3, between 3-5 and score >6 shows 0-3%, 11-15% and 40% mortality

respectively.[14] The sensitivity of Ranson's criteria ranges between 40% to 90%. It has a poor predictive value as shown in different studies.[15] This score was not aimed to identify high risk patients but purpose was to consider role of early surgical or radiological intervention in acute pancreatitis.[11] In reality, currently used scoring systems have yet not been best in predicting severity. Their poor negative predictive value and moderate sensitivity being the reasons.[14,16]

BISAP is a relatively new scoring system but its role in depicting early morbidity and mortality has been comparable to other scoring systems. This scoring system has variables which are routinely done on admission and this score has been used in other cohort studies as well.[11] Being an underdeveloped and resource limited country, it is important that investigations/score used to depict severity in acute pancreatitis should be cost effective, consist of easily available tests and easy to calculate. BISAP score is cost effective, and score can be calculated completely on admission unlike Ranson's criteria and consist of variables which are routinely tested on admission unlike APACHE.[14]

The results of our study are in line with another study in which organ failure 23% , necrosis of pancreas 34% and mortality 18% was reported when their BISAP score was >3 in acute pancreatitis patients. Another study showed that in a group of 26 patients with BISAP score >3 necrosis of pancreas was seen in 12 (46.2%) and mortality in 4 (15.4%) patients.[10, 11]

CONCLUSIONS:

The BISAP score of >3 is associated with high morbidity most common being pancreatic necrosis noted in 81 (69.80%) while mortality was 20 (17.20%) in patients with acute pancreatitis. In country like ours where disease burden is huge and resources are limited, BISAP score can be easily used to identify high risk patients on admission thus minimizing disease related complications and death by early treatment.

REFERENCES:

1. Papachristou GI, Clermont G, Sharma A, Yadav D, Whitcomb DC. Risk and markers of severe acute pancreatitis. Gastroenterol Clin North Am. 2007;36:277-96.

2. Swaroop VS, Chari ST, Clain JE. Severe acute pancreatitis. JAMA. 2004;291:2865-8.

3. Isenmann R, Beger HG. Natural history of acute pancreatitis and the role of infection Baillieres Best Pract Res Clin Gastroenterol. 1999;13:291-301.

4. Whitcomb DC. Clinical practice. Acute pancreatitis. N Engl J Med. 2006; 354:2142-50.

5. Fagenholz PJ, Castillo CF, Harris NS, Pelletier AJ, Camargo CA Jr. Increasing United States hospital admissions for acute pancreatitis, 1988- 2003. Ann Epidemiol. 2007;17:491-7.

6. Banks PA, Freeman ML. Practice guidelines in acute pancreatitis. Am J Gastroenterol. 2006; 101:2379-400.

7. Ranson JH, Pasternak BS. Statistical methods for quantifying the severity of clinical acute pancreatitis. J Surg Res. 1977;22:79-91.

8. Yeung YP, Lam BY, Yip AW. APACHE system is better than Ranson system in the prediction of severity of acute pancreatitis. Hepatobil Pancreat Dis Int. 2006;5:294- 9.

9. Larvin M, McMahon MJ. APACHE-II score for assessment and monitoring of acute pancreatitis. Lancet. 1989; 2:201-5
.

10. Mofidi R, Duff MD, Madhavan KK, Garden OJ, Parks RW. Association between early systemic inflammatory response, severity of multiorgan dysfunction and death in acute pancreatitis. Br J Surg. 2006;93:738-44.

11. Singh VK, Wu BU, Bollen TL, Repas K, Maurer R, Johannes RS, et al. A prospective evaluation ofthe bedside index for severity in acute pancreatitis score in assessing mortality andintermediate markers of severity in acute pancreatitis. Am J Gastroenterol. 2009;104:966-71.

12. Ji B, Gaiser S, Chen X, Ernst SA, Logsdon CD. Intracellular trypsin induces pancreatic acinar cell death but not NF-kappa B activation. J Biol Chem. 2009; 284:17488-98.

13. Gorelick FS, Thrower E. The acinar cell and early pancreatitis responses. Clin Gastroenterol Hepatol. 2009;7: S10-4.

14. Park JY, Jeon TJ, Ha TH, Hwang JT, Sinn DH, Oh TH, Shin WC, et al. Bedside index for severity in acute pancreatitis: comparison with other scoring systems in predicting severity and organ failure Hepatobil Pancreat Int 2013;12:645-50

15. De Bernardinis M, Violi V, Roncoroni L, Boselli AS, Giunta A, Peracchia A. Discriminant power and information content of Ranson's prognostic signs in acute pancreatitis: A meta-analytic study. Crit Care Med 1999;27: 2272-83.

16. Papachristou GI, Muddana V, Yadav D, O'Connell M, Sanders MK, Slivka A, et al. Comparison of BISAP, Ranson's, PACHE II and CTSI scores in predicting organ failure, complications, and mortality in acute pancreatitis. Am J Gastroenterol. 2010;105:435-41.

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