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Bedside Index For Severity in Acute Pancreatitis and Assessing Morbidity and Mortality : A Prospective Study

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ABSTRACT

Background: Acute pancreatitis though a self limiting in 80-90% of cases, but in 10-20% cases there is pancreatic necrosis, multi-organ failure & recurring pancreatic injury . A simple accurate, clinical scoring system BISAP (Bed side index for severity in acute pancreatitis) collected data within 24hrs of admission to hospital in predicting patients at risk for developing organ failure, persistent organ failure and pancreatic necrosis. **Methods:** A prospective study done at SCB MCH, from Aug.2016 to Sept.2018. All patients admitted to the hospital as acute pancreatitis are included in this study which is characterized by acute abdominal pain, increased level of serum amylase and/or lipase, USG/CT/MRI of abdomen and pelvis done within 7days of admission which shows findings consistent with features of acute pancreatitis. Each component of the BISAP scoring system was studied for each patient in first 24hrs & each component was awarded one point .Organ failure is defined as a score of ≥ 2 in one or >3 organ as originally described in Marshall score. Oragn – failure was described as transient (<48hrs) or persistent (>48hrs) from the time of admission. All the datas were collected & analysed for patients developing organ failure, persistent organ failure, pancreatic necrosis and death. **Results:** In our study, out of 108nos. of patients, 67(62.1%) were males & 41(37.9%) were females. Alcohol being the leading cause in 57(52.8%) followed by gall stone in 32(29.6%) cases & others in19(17.6%) cases. Patients with BISAP score ≥3 had developed organ failure in 10 (34.4%)cases and with BISAP score ≤ 3 in 6(7.6%) cases. Out of 16nos. organ failure cases 12 cases were transient organ failure & 4cases were persistent organ failure all with BISAP score ≥3. Pancreatic necrosis developed in 18nos of cases of which 11nos with BISAP score ≥3 & 7nos with score ≤ 3. **Conclusion:** The BISAP score is simple & accurate method for early identification of patients at increased risk of developing organ failure, persistent organ failure, pancreatic necrosis within 24hrs of admission to hospital.

Keywords: Bedside Index, Pancreas, Acute Pancreatitis.

INTRODUCTION

Acute pancreatitis is defined as an inflammatory process of the pancreas with possible peri-pancreatic tissue and multi organ involvement including multi-organ dysfunction syndrome with an increased mortality rate.[1] It is believed that the abnormal pancreatic enzyme activation inside the pancreatic acinar cells induces auto-digestion of normal pancreatic parenchyma. Once the cellular injury has been initiated, the inflammatory process can lead to pancreatic edema, hemorrhage, and eventually necrosis. Acute pancreatitis is self limiting in 80-90% of cases. In rest 10-20% of cases there is recurring pancreatic injury and the systemic inflammatory response persists resulting in severe acute pancreatitis characterized by pancreatic necrosis, severe systemic inflammatory response and multi-organ failure. In contrast the mild form of the disease has interstitial edema of pancreas and minimal organ dysfunction, with a mortality of around 1% where as the severe form of the disease carries a mortality rate of 10-30%.[2,3] Many scoring systems have been devised till date to assess the severity of acute pancreatitis like Ransno & colleagues,[4,5] APACHE-II,[6] CT Severity Index but the clinical utility of these tools have been limited.[7] For this purpose a simple, accurate clinical scoring system ,that is bed –side index for severity in acute pancreatitis (BISAP) scoring system was developed. BISAP score is a simple scoring system collected data within 24 hours of admission to hospital,[8] based on simple clinical signs and laboratory parameters. This scoring system has the ability to stratify patients early in their course of

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disease, identifying patients at increased risk of mortality prior to the onset of organ failure.

AIM:

To assess the ability of BISAP score in predicting : mortality in patients admitted for acute pancreatitis, : patients at risk for intermediate markers of severity like development of organ failure, persistent organ failure and pancreatic necrosis. To establish BISAP score as an effective risk stratification tool for management of acute pancreatitis.

MATERIALS AND METHODS

This is a prospective study done at SCB Medical College Hospital, Cuttack from August 2016 to September 2018. All the patients admitted to the hospital diagnosed as acute pancreatitis were included in this study. Acute pancreatitis was defined as, characteristic abdominal pain, increased level of serum amylase and/or lipase, and USG of abdomen and pelvis, CT or MRI of abdomen within first 7 days of hospitalization demonstrating changes consistent with acute pancreatitis. The individual components of BISAP scoring system as such: BUN> 25mg%, Impaired mental status (GCS< 15); SIRS (two or more of the following: temp <36/>38 c ; Respiratory rate >20 /min; Pulse rate >90/min ; WBC <4000 or>12000/mm3 or >10% immature bands;) Age >60years; and Pleural effusion detected on imaging (chest radiograph or USG or CT Thorax). One point is assigned to each variable within 24 hours of presentation. Organ failure was defined as a score of ≥ 2 in one or more of the three (respiratory, renal and cardiovascular) out of five organ system initially described in the Marshall score. All the routine investigations and relevant tests were done. Organ failure scores were calculated for all patients during the first 72hrs of hospitalization based on the laboratory value/ clinical measurements during each 24hrs interval. Duration of organ failure was defined as transient(<48 hrs) or persistent(>48 hrs) from the time of presentation. Patients were monitored for development of organ-failure, persistent organ-failure, pancreatic necrosis & death and data were collected for analysis. All the patients with organ-failure at or within 24hrs of presentation were excluded from the study.

RESULTS

A total 108 patients with acute pancreatitis were admitted to the hospital during this period were taken into the study. Among these patients 67(62.1%) were males and 41(37.9%) were females. The male: female: 1.6:1. The age of the patients varies from 18-79 years with mean age 42±13 with maximum no. of cases between 40- 50 years(n=29).[Table 1]. The leading cause of acute pancreatitis was alcohol in 57(52.8%) patients, gall-stone in 32(29.6%) and others in 19(17.6%) [Table 2]

Table 1: AGE –Wise Distribution

AGE (in yrs)	Frequency	Percentage(%)	Cummulative Percentage
10-20	2	1.8	1.8
20-30	21	19.5	21.3
30-40	27	25	46.3
40-50	29	26.9	73.2
50-60	16	14.8	88
60-70	11	10.2	98.2
70-80	2	1.8	100

Table 2: Distribution of Etiology Among Study Population

Etology	Frequency	Percentage
Alcohol	57	52.8
Gall-stone	32	29.6
Others	19	17.6
Total	108	100

There were 23(21.3%), 36(33.3%), 20(18.5%), 18(16.7%), 8(7.5%), and 3(2.7%) cases with BISAP score of 0-5 respectively(Table-3). 5no.(4.6%) of patients died in our study, all having BISAP score of ≥3. Out of 5no. of patients 2patients developed MODS, 2 patients had ARDS and 1 patient had persistent renal failure. Mortality rates in groups with BISAP score 3,4&5 were 11.1%,25%, &33.3% respectively , suggesting a increasing mortality with increasing BISAP score(p=0.002) Area under curve for mortality by BISAP score was 0.917(95% confidence interval =0.844,0.989) and the receiver operating curve demonstrate a BISAP score of 3 as the optimal sensitivity and specificity threshold for mortality. 17.4% cases died with BISAP score of ≥ 3 while no death was recorded in group score less than 3.

Table 3: Distribution Of Cases According To Bisap Score

BISAP Score	Frequency	Percentage	Cummulative percentage
0	23	21.3	21.3
1	36	33.3	54.6
2	20	18.5	73.1
3	18	16.7	89.8
4	8	7.5	97.3
5	3	2.7	100

Table 4: Development Of Organ-Failure According To BISAP Score

Patients	No organ-failure	Organ-failure	Total
BISAP< 3	73	6	79
BISAP≥3	19	10	29
Total	92	16	108

Out of 108 patients 92(85.2%) patients had no organ failure, 16(14.8%) patients developed organ failure [Table 4]. Among the different forms of organ –

failures renal failure 7(6.5%) was most common followed by ARDS 6(5.5%), MODS in 2(1.9%) and cardiac failure 1(0.9%). [Table 5]

Table 5: Distribution Of Organ Failure In Study Population

Complications	Frequency	Percent	Cummulative percent
No organ failure	91	85.2	85.2
Renal failure	7	6.5	91.7
ARDS	6	5.5	97.2
MODS	2	1.9	99.1
Cadiac failure	1	0.9	100
Total	108	100	

Further studying the patients who had developed organ-failures with BISAP score≥ 3 &<3, it was found that 6(7.6%) patients developed organ-failure with BISAP score <3 and 10(34.4%) patients in BISAP score≥3. Out of 16nos. of patients who develops organ-failure 12nos (75%) had transient organ –failure and 4nos (25%) of patients had persistent organ –failure. All the 4 patients, who have developed persistent organ-failure are having BISAP score ≥3. A total of 18nos.(16.7%) patients had developed pancreatic necrosis of which 7nos.(8.8%) with BISAP score <3 and11nos(37.9%) with BISAP score≥3

DISCUSSION

Acute pancreatitis (AP) still remains a serious disease of which approximately 20% run a severe pancreatic necrosis, infection and sepsis are the major determinants of mortality in AP.[9-11] Pancreatic necrosis is considered as a potential risk for infection which represents the primary cause of late mortality. Occurrence of ARDS, cardiac failure and renal failure can predict the fatal outcome in SAP.[12] A wide range of mortality(20-30%) has been reported in SAP.[13,14] Early diagnosis and prognostic evaluations are extremely important and may reduce the morbidity & mortality associated with SAP. In this study of 108 patients 67(62.1%) were male and 41(37.9%) were females & male to female ratio was 1.6:1 and 50% of patients were from 30-50 years of age. Regarding the etiological factors of AP, in this study, alcohol being the most common cause in 52.8% of cases, followed by gall-stone in 29.6% of cases, alcohol is the main cause of AP in USA & Finland.[15,16] The mortality rate in AP varies from 2-9% while in severe cases It is up to 30%. In this study the mortality rate in AP is 7.6% & in SAP is 34.4%.There were 5nos (17.2%) of deaths in this study, all had a BISAP score ≥ 3 and no death in patients with BISAP score <3. BISAP score of ≥ 3 had a sensitivity of 100%, specificity of 77%, a positive predictive value of 17.2% and a negative predictive value of 100% for mortality which in comparision with the study of Vikesh K Singh et al had sensitivity 71%, specificity 83%, positive predictive value 17.5% and negative predictive value of 99% for mortality.[17] In this study out of 108 patients 92(85.2%) had no organ failure,& 16nos(14.8%) patients developed organ failure. Out of the 16 organ failure cases 12(75%) had transient organ failure & 4(25%) had persistent organ- failure. Most of the organ –failure occurs with BISAP score ≥ 3(p< 0.001). A BISAP score of ≥ 3 is associated with increased pancreatic necrosis 37.9% (n=11). BISAP score has several advantages over other prognostic scoring system in AP. First, the score has simple calculation, as it requires vital signs, laboratories & imaging studies that are commonly obtained at the time of examination or within 24 hrs of presentation. Secondly this score can be utilized in the whole of health care system starting from primary health care to tertiary level of referral centers. Thirdly this score predicts in-hospital mortality and chances of developing organ-failure , transient organ-failure and pancreatic necrosis within 24hrs of hospitalization. But this study have certain limitations. First, the sample size was small which limits us for doing more extensive study of BISAP score in predicting mortality, development of organ-failure, persistent organ-failure and pancreatic necrosis. Second, the GCS score used for assessment of impaired mental status is subject to personal variation. Thirdly our study also include cases referred from other centers without any information of patients status as regard to BISAP scoring system thus limiting the spectrum of the study.

CONCLUSION

This study found that BISAP score represents a simple way to identify patients at risk of increased mortality and development of intermediate markers of severity in AP calculating all the data within 24hrs of presentation. This score can be used as a reliable risk stratification tool for formulating further management of patients in acute pancreatitis

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