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A Prospective study of BISAP score in Acute Pancreatitis

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Abstract:

Background: Acute pancreatitis is defined as an inflammatory process of the pancreas with possible peri pancreatic tissue and multi-organ involvement inducing Multi-Organ Dysfunction Syndrome (MODS) with an increased mortality rate[1].The underlying mechanism of injury in pancreatitis is thought to be premature activation of pancreatic enzymes within the pancreas, leading to a process of auto digestion. Due to the risk of rapid deterioration in severe acute pancreatitis, the assessment of severity becomes crucial to a clinician. Multiple risk stratification tools for acute pancreatitis have been developed, but their clinical usefulness is limited. In Ranson's criteria[4] and modified Glasgow score there are multiple parameters, of which some of them are not available in majority of hospitals in India. In addition, both are assessed after 48hrs, thereby missing potentially valuable early therapeutic window. The APACHE II[5, 6] score (Acute Physiology and Chronic Health Evaluation) is the most widely used prediction system currently, but it requires the collection of large number of parameters some of which may not be relevant to prognosis. APACHE II was originally developed as an intensive care instrument. 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. More over the data for BISAP score is collected within the first 24hrs of hospitalization. The ability to stratify patients early in their course is a major step in improving future management strategies in acute pancreatitis.

Methods:

A prospective study was done in cases of acute pancreatitis with the effectiveness of Bedside Index for Severity in Acute Pancreatitis (BISAP) 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

Results:

A total of 50 cases were taken and the Bedside Index for Severity in Acute Pancreatitis (BISAP) scoring system was calculated in assessing mortality and intermediate markers of severity in acute pancreatitis in 24 hours of presentation. It is observed that individuals with BISAP score ≥3 were 4.5 times more likely to develop organ failure and 6 times more likely to develop pancreatic necrosis, than those with BISAP score <3.Thus confirming the efficacy of the BISAP score in predicting the mortality and morbidity associated with acute pancreatitis.

Conclusion:

The BISAP score is a simple and accurate method for the early identification of acute pancreatitis at increased risk for in hospital mortality. BISAP score is efficient in identification of patients of acute pancreatitis who are at the risk of developing intermediate markers of severe pancreatitis in the first 24hours of presentation

I. INTRODUCTION:

Acute pancreatitis is defined as an inflammatory process of the pancreas with possible peri pancreatic tissue and multi-organ involvement inducing Multi-Organ Dysfunction Syndrome (MODS) with an increased mortality rate[1].The underlying mechanism of injury in pancreatitis is thought to be premature activation of pancreatic enzymes within the pancreas, leading to a process of auto digestion. Once the 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 complications can arise, such as Hemodynamic instability, Bacteraemia (due to translocation of gut flora), Acute Respiratory Distress Syndrome and pleural effusions, gastrointestinal hemorrhage, renal failure and Disseminated Intravascular Coagulation (DIC)

• Acute pancreatitis may beclassified as mild, moderate or severe.
• Mild acute pancreatitis, the most common form, has
• No organ failure,
• local or systemic complications and
• usually resolves in the first week.

Moderately severe acute pancreatitis is defined by

• the presence of transient organ failure(<48hrs)
• local complications or
• exacerbation of co-morbid disease.

Severe acute pancreatitis is defined by

• Organ failure that persists for >48hrs.
• Local complications are
• peri pancreatic fluid collections
• pancreatic and peri pancreatic necrosis (sterile or infected),
• Pseudo cyst and walled-off necrosis (sterile or infected)

80% of patients have mild attack of pancreatitis, the mortality rate is around 1%. In those who have a severe attack of pancreatitis, the mortality rate varies from 20% to 50%. About one-third of deaths occur in the early phase of attack, from multi organ failure, while deaths occurring after first 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%[2,3]. Due to the risk

of rapid deterioration in severe acute pancreatitis, the assessment of severity becomes crucial to a clinician. Multiple risk stratification tools for acute pancreatitis have been developed, but their clinical usefulness is limited. In Ranson's criteria[4] and modified Glasgow score there are multiple parameters, of which some of them are not available in majority of hospitals in India. In addition, both are assessed after 48hrs, thereby missing potentially valuable early therapeutic window. The APACHE II[5,6] score (Acute Physiology and Chronic Health Evaluation) is the most widely used prediction system currently, but it requires the collection of large number of parameters some of which may not be relevant to prognosis. APACHE II was originally developed as an intensive care instrument.

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. More over the data for BISAP score is collected within the first 24hrs of hospitalization. The ability to stratify patients early in their course is a major step in improving future management strategies in acute pancreatitis.

BISAP Score

1. Blood urea nitrogen> 25mg/dl,
2. Impaired mental status (Glasgow coma scale score< 15),
3. Systemic inflammatory response syndrome(Presence of ≥ 2 of following criteria)

- Pulse rate >90/minute,
- Respiratory rate >20/min or PaC02 < 32 mm Hg
- Temperature >38 or < 36 degree Celsius,
- WBC count > 12000 or < 4000 cells/cubic mm or > 10% immature neutrophils,

4. Age > 60 years,
5. Pleural effusion (on CT scan or chest x- ray or USG).

Each point on BISAP score is worth 1 point.

AIMS & OBJECTIVES

A prospective and observational study of cases attended to Narayana Medical College and Hospital

- Primary aim of this study was to evaluate the ability of BISAP score to predict mortality in a prospective cohort of patients suffering from acute pancreatitis.
- The secondary aim was to assess the ability of the BISAP score to predict, the intermediate markers of severity including the
  - development of organ failure,
  - persistent organ failure, and
  - pancreatic necrosis

II. MATERIALS AND METHODS

All patients who presented to Narayana medical college and hospital from DECEMBER 2016 to NOVEMBER 2018 with any 2 of the following 3 criteria forms the subjects of study

a)Characteristic abdominal pain suggestive of acute pancreatitis

b)Increased levels of Serum amylase and/or lipase 3 times the normal value.

c)Ultrasonography of the abdomen within first 7 days of hospitalization demonstrating changes consistent with acute pancreatitis.

50 patients were included in the study BISAP score was calculated in all such patients based on data obtained within 24hrs of entering the study

Inclusion criteria

All cases of acute pancreatitis patients diagnosed based on the afore mentioned criteria who presented to Narayana general hospital

Exclusion criteria

Acute Pancreatitis patients, presenting with organ failure at the time of admission (or) within 24 hours of presentation. Included patients were evaluated for local complications like pancreatic necrosis, acute fluid collections, pseudocyst, acute necrotic collections and walled off necrosis.A CT or MRI or USG of the abdomen as per indications obtained at any time in the first 7 days of hospitalization, to differentiate necrotizing pancreatitis from interstitial pancreatitis. Organ failure scores were calculated for all patients during the first 72 hours of hospitalization based on the most extreme laboratory value or clinical measurement during each 24h period. Organ failure was defined based on the Modified Marshall scoring system. A score of >2 for more than 48 hours was considered as persistent organ failure, whereas a score of <2 for less than 48 hours was considered as transient organ failure.

III. RESULTS OF THE STUDY:

Table.1. Distribution of sex among study population(n=50)

Sex	No.of cases	Percentage(%)
Male	45	90%
female	5	10%

50 individuals with acute pancreatitis were admitted during the study period. Among these individuals, 45 (90%) were males and 5 (10%) are females. Male to Female ratio was 9:1.

AGE DISTRIBUTION

Table.2. Age Distribution(n=50)

Age (Years)	No of Cases	Percentage (%)
21-30	13	26%
31-40	19	38%
41-50	4	8%
51-60	4	8%
61-70	10	20%

Table.3. Distribution of study population according to BISAP Score(n=50)

BISAP SCORE	CASES
BISAP 0	0
BISAP 1	6(20%)
BISAP 2	15(50%)
BISAP 3	6(20%)
BISAP 4	3(10%)
BISAP 5	0

ORGAN FAILURE

Out of 50 individuals, 39 (78%) had no organ failure, remaining 11(22%) developed organ failure. Among these11 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 from MODS.

Table.4. Distribution of organ failure among study population

	RENAL	ARDS	CARDIAC	MODS
BISAP≥3	5(10%)	2(4%)	1(2%)	1(2%)
BISAP<3	1(2%)	1(2%)	0	0
TOTAL	6(12%)	3(6%)	1(2%)	1(2%)

Transient organ failure

Out of 50 individuals, 11 had organ failure in which 7(14%)had transient organ failure . All had BISAP score≥3 except 2 individuals who had BISAP score of <3. All these patients recovered without any mortality.

Table.5. Distribution of Transient organ failure among study population according to BISAP Score

BISAP SCORE	TRANSIENT ORGAN FAILURE
BISAP≥3	**5(10%)**
BISAP<3	**2(4%)**

Fischer's exact test was done and p value was found to be significant (p= 0.0063). **Persistent organ Failure:**Out of 50 individuals, 4 individuals developed Persistent Organ Failure. All these 4 had BISAP score>3. Fischer's exact test was done and p value found to be significant (p=0.0133).

MORTALITY

3 individuals in the present study died (6%) and they all had BISAP score>3. Out of 3, 2 patients had ARDS and 1 patient developed MODS.

Table.6. Mortality among study population

Mortality	**NO**	**YES**
No. OF CASES	47	3
PERCENTAGE(%)	94%	6%

SEVERITY

The severity of Acute Pancreatitis was defined on the basis of BISAP score. Out of 50 individuals 18 (36%) had severe pancreatitis and 32 (64%) were classified as having mild pancreatitis.

Table.7. Distribution of severity among Study Population according to BISAP score(n=50)

Score	**BISAP≥3**	**BISAP<3**
NO. OF CASES	18	32
PERCENTAGE	36%	64%

Pancreatic Necrosis according to BISAP score

Out of 50 individuals, 7 (14%) developed pancreatic necrosis. Among these 7, 6 had BISAP score ≥3 and 1 had BISAP score <3.

Table.8: Distribution of Pancreatic Necrosis among study group according to BISAP score(n=50)

BISAP SCORE	**Pancreatic necrosis**
BISAP ≥3	6(12%)
BISAP <3	1(2%)
Total	7(14%)

IV. DISCUSSION

Acute pancreatitis is a common cause of acute abdomen. The severity of acute pancreatitis varies; most (80%) have a mild course and minimal hospitalization and no significant morbidity and mortality. About 20% of these cases progress to severe pancreatitis associated with pancreatic necrosis ,infected necrosis, organ dysfunction and substantial morbidity and

mortality .Hence it is important to predict which patient is likely to develop severe pancreatitis so that they need for intensive care and transfer to higher centers can be predicted and patients and attendants can be suitably counseled .The present study chose the BISAP Score to predict the severity of acute pancreatitis and examined its efficacy in correctly predicting the severity of the pancreatitis at the time of admission/ presentation. According to the Atlanta classification, Severe Acute Pancreatitis (SAP) is defined as an AP associated with local and/or systemic complications. In the present study severity of acute pancreatitis is defined on the basis of BISAP Score.

Mild AP BISAP Score <3, Severe AP BISAP Score ≥3.

Multi-organ dysfunction syndrome, the extent of pancreatic necrosis, local infection and sepsis are the major determinants of mortality in AP[4-6]. Identification of patients at risk for mortality early in the course of acute pancreatitis is an important step in improving outcome" write Dr. Wu B U[7] and his colleagues, from Brigham and women's hospital and Harvard medical school in Boston, Massachusetts (USA) The BISAP score was evaluated in 50 cases of acute pancreatitis admitted to our institution. BISAP scores were calculated in all cases using data within twenty four hours of presentation.

1. In the present study, 36% (18/50)patients had BISAP score ≥ 3 and 64% (32/50) had BISAP score of < 3.
2. The present study group mortality was 6% and organ failure seen in 22% and pancreatic necrosis in 14% of patients.
3. It is observed that individuals with BISAP score ≥3 were 4.5 times more likely to develop organ failure and 6 times more likely to develop pancreatic necrosis, than those with BISAP score <3.Thus confirming the efficacy of the BISAP score in predicting the mortality and morbidity associated with acute pancreatitis.
4. A BISAP score of less than 3 was efficient in predicting the reduced hospital stay when compared to the BISAP score of more than 3.the mean duration of hospital stay in those with BISAP score of >3 was almost twice that of those with BISAP score of <3.

V. CONCLUSION

The BISAP score is a simple and accurate method for the early identification of acute pancreatitis at increased risk for in hospital mortality. BISAP score is efficient in identification of patients of acute pancreatitis who are at the risk of developing intermediate markers of severe pancreatitis in the first 24 hours of presentation

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