

## Original Research Article

# Study on severity assessment of acute pancreatitis using BISAP score in rural area of south India

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### ABSTRACT

**Background:** Acute Pancreatitis is one of the most common disease in all parts of INDIA. The morbidity and mortality of the disease can be reduced by early detection of complications. In rural health centres, authors need a simple and easily accessible and reproducible scoring system to access the severity. The main aim of the study is, using BISAP score authors can easily identify the severity and complications of acute pancreatitis as early as possible even in rural health centres.

**Methods:** This is a prospective study conducted at Koppal District Hospital, Karnataka. Authors included 80 acute pancreatitis patients admitted in present hospital from July 2015 to July 2017. BISAP score is used within 24 hours of admission to access the severity and complications of the pancreatitis. Complications are accessed with respect to duration of hospital stay, organ failure and necrotising pancreatitis against BISAP score less than 3 and more than 3.

**Results:** In present study male (83.75%) patients are more affected than females (16.25%). Alcohol (52.5%) being the main culprit then biliary (32.5%) and idiopathic (15%) as causes of acute pancreatitis. Middle age group between 30 to 50 years (66.25%) are more affected. Severe pancreatitis features like organ failure (66.67%) and necrotising pancreatitis (71.4%) are seen in patients with score more than 3. And also, the duration of inpatient hospital stay is longer (more than 5 day) in same patients.

**Conclusions:** Acute pancreatitis is one of the most common causes for acute abdomen and alcohol consumption being the main culprit in rural areas of south India. Of the many scoring systems, BISAP score can be easily done at rural health centres to early detection of severity and complication of acute pancreatitis.

**Keywords:** Acute pancreatitis, BISAP score, Severity

### INTRODUCTION

Acute pancreatitis is one of the most common causes of acute abdomen affecting both rural and urban areas of India. Among the many different definitions of Acute pancreatitis (AP) most commonly accepted is, inflammatory process of the pancreas with possible peripancreatic tissue and multiorgan involvement inducing multiorgan dysfunction syndrome (MODS) with an increased mortality rate.<sup>1</sup> Most of the cases will resolve spontaneously, but mortality can be raise up to

about 30% in severe acute pancreatitis.<sup>2</sup> Early assessment and detection of complications will reduce both mortality and morbidity of the patients. According to revised 2013 Atlanta classification acute pancreatitis can be divided into two phases, early (less than 2 weeks) and later (after 2 weeks).<sup>3</sup> Acute pancreatitis is divided into, oedematous interstitial pancreatitis and necrotizing pancreatitis, the latter involving necrosis of the pancreatic parenchyma and peripancreatic tissues. Severity of the disease is categorized into: mild, moderately severe and severe. Mild acute pancreatitis lacks both organ failure (as

defined by Marshal scoring system) and local or systemic complications.<sup>4</sup> Moderately severe acute pancreatitis has transient organ failure (organ failure of <48 hours), local complications and/or exacerbation of coexistent disease. Severe acute pancreatitis is defined by the presence of persistent organ failure (organ failure features  $\geq$ 48 hours). Local complications are defined by contrast-enhanced computed tomography; as acute peripancreatic fluid collections, pseudocyst (which are very rare in acute pancreatitis), acute (pancreatic/ peripancreatic) necrotic collection and walled-off necrosis.

Several prognostic markers have been developed for assessment of severity in acute pancreatitis. Many multifactorial scoring systems incorporating clinical and biochemical criteria for severity assessment have been in use for some decades.<sup>5</sup> These scoring systems are based on clinical, laboratorial and radiologic evaluations have been created or adapted to predict outcome, some are based on local complications and other reflecting systemic manifestations of acute pancreatitis. Ranson's score is possibly the most commonly used scoring system created specifically for acute pancreatitis. The main limitation of the Ranson's criteria is that the evaluation cannot be completed until 48 hours following admission, which may lead to missing some early therapeutic critical hours and may cause increased mortality. Ranson's score is relatively accurate at classifying the severity of acute pancreatitis, but it is difficult to calculate the score as it requires a 48-hour, missing the potential for early treatment.<sup>6</sup> The Acute Physiology and Chronic Health Evaluation II (APACHE II) scoring system was originally created to evaluate any severely ill patients admitted in intensive care unit and this is also being used to predict acute pancreatitis severity. But it required the collection of many parameters, some of which might not be relevant to acute pancreatitis prognosis.<sup>7</sup> CTSI is calculated based on CT findings of local complications and this cannot reflect the systemic inflammatory response of acute pancreatitis. Unspecific biomarkers, such as C-reactive protein (CRP) have also been studied as outcome predictors, but it has only been useful for predicting complications, namely necrotizing acute pancreatitis.<sup>8</sup>

An ideal scoring system should promise an early, quick, simple, accurate and reproducible description of disease severity. In 2008, a new simplified prognostic scoring

system for the early determination of the severity of acute pancreatitis, namely bedside index of severity in acute pancreatitis (BISAP) was proposed by Wu et al.<sup>9</sup> This scoring system gives special interest as because the scoring criteria are evaluated at the time of admission and are readily available even in rural health centres.

## METHODS

This study is a single centre, non-interventional, prospective observational study conducted at Koppal District Hospital, Karnataka, India, for a period of two years from July 2015 to July 2017. Acute pancreatitis was diagnosed based on the presence of characteristic abdominal pain, raised serum amylase level three times the upper limit of normal, the presence or absence of characteristic imaging findings of acute pancreatitis and exclusion of other diseases.<sup>10</sup> A total of 80 patients, both males and females presenting within 24 hours of onset of symptoms were included in study. Patients aged less than 14 years and elder patients more than 70 years are excluded. Patients who are willing for referral to higher centres are also excluded.

BISAP scoring is done within 24 hours of admission and data are tabulated for analysis. The scoring criteria is given in Table 1. One point is assigned for each of the variables above within 24 hours of presentation. The BISAP score  $\geq$ 3 in first 24 hours is considered as predictive of severe pancreatitis.

**Table 1: BISAP scoring system.**

Parameters	Score 0	Score 1
Blood urea nitrogen	<25 mg/dl	>25 mg/dl
Impaired mental status	Absent	Present
SIRS	Absent	Present
Age	<60 years	>60 years
Pleural effusion	Absent	Present

SIRS (Systemic Inflammatory Response Syndrome) is diagnosed by presence of any two of criteria:

- 1) Temperature (<36c or >38c),
- 2) Pulse > 90/min,
- 3) Respiratory Rate >20 or PaCO<sub>2</sub> <32mmHg, and
- 4) WBC >12,000/mm<sup>3</sup> or <4,000/mm<sup>3</sup> or >10% bands.

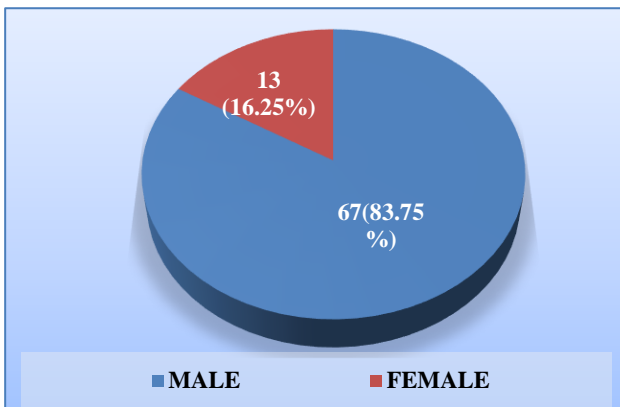
**Table 2: Marshal modified scoring system for organ dysfunction.**

System	Score 0	Score 1	Score 2	Score 3	Score 4
Respiratory (PaO <sub>2</sub> /FiO <sub>2</sub> )	>400	301-400	201-300	101-200	$\leq$ 100
Renal (Sr. Creatinine, mg/dl)	< 1.4	1.4-1.8	1.9-3.6	3.6-4.9	>4.9
Cardiovascular (SBP, mmHg)	>90	<90, responsive to fluids	<90, not responsive to fluids	<90, pH<7.3	<90, pH<7.2

To access organ failure in acute pancreatitis we used criteria proposed by Marshal et al as given in Table 2. The variables are accessed at admission and again after 72 hours. A score of 2 or more in any system defines the presence of organ failure. Duration of organ failure was considered as transient for <48 hours or persistent when score is more than 2 and is lasting >48 hours.

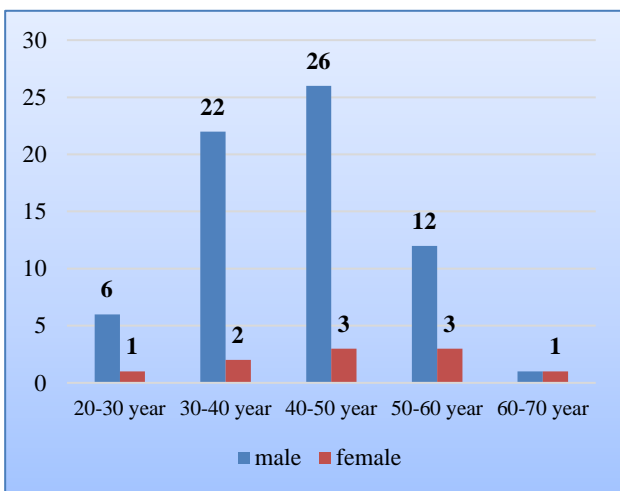
**RESULTS**

Total 80 acute pancreatitis patients are included in present study. There are 63 males (83.75%) and 17 female (16.25%) patients in this study with preponderance to male sex as shown in Figure 1.



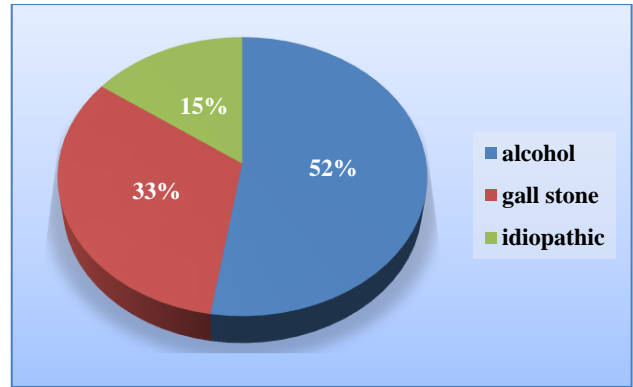
**Figure 1: Sex distribution.**

Age distribution of acute pancreatitis (Figure 2) in present study shows more number of patients in the age groups between 30-40 years (24 patients,30%) and 40-50 years (29 patients, 36.25%).



**Figure 2: Age distribution.**

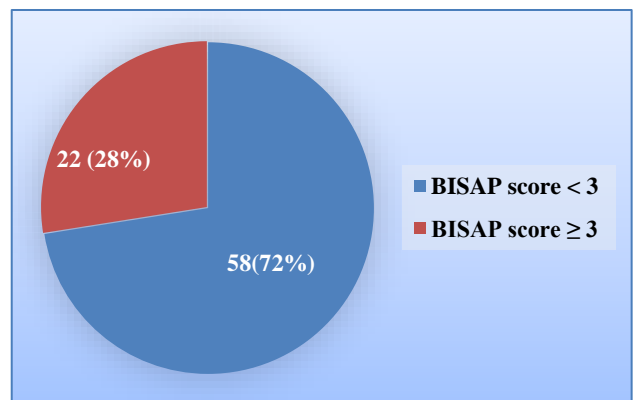
Alcohol (52.5%) was the most common aetiology followed by biliary pancreatitis (32.5%), remaining being idiopathic (Figure 3).



**Figure 3: Aetiology of acute pancreatitis.**

BISAP score less than 3 is seen in 58 (72.5%) patients and more than 3 seen in 22 (27.5%) patients (Figure 4).

Systemic complication like organ failure (n=24) seen in 6 (25%) patients having BISAP score less than 3 and same complication seen in 18 (75%) patients having score more than 3.



**Figure 4: Incidence of severe pancreatitis according to BISAP scoring system. (score ≥3 indicates severe pancreatitis).**

The local complication like necrotising pancreatitis (n=21) is seen in 4 (19%) patients with score less than 3 and same complication seen in 17 (81%) patients with score more than 3.

The longer duration of hospital stays (>10 day) is also seen in same patients (Table 3).

**Table 3: Complications of acute pancreatitis.**

Complications	BISAP score <3	BISAP score >3
Necrotising pancreatitis (n=21)	04	17
Organ failure (n=24)	06	18
Duration of hospital stay	<5 days	52
	5-10 days	06
	>10 days	00

## DISCUSSION

Acute pancreatitis is defined as an inflammatory process of the pancreas with possible peripancreatic tissue and multiorgan involvement inducing multiorgan dysfunction syndrome with an increased mortality rate. Gall stones are the most frequent cause of pancreatitis, in approximately 50% of patients, followed by alcohol (20%), idiopathic in 20% and other known causes in 10% cases (hypercalcemia, hypertriglyceridemia, medications, hereditary causes, sphincter of Oddi dysfunction, pancreas divisum, pancreatic neoplasms, and others). Most of the acute pancreatitis cases will resolve spontaneously and about 20% may turn into severe pancreatitis. Mortality is about 1% in mild/ moderate pancreatitis, while it raises to 15% for severe acute pancreatitis.<sup>11</sup>

Several scoring systems analysing multiple factors including clinical, blood investigations and imaging findings are available to predict severity, complications and risk stratification for acute pancreatitis. Most commonly being used in most of the institutes are Ranson's Scoring and APACHE 2 scoring system. These systems are complicated and require multiple data that are not routinely collected on early stage especially in rural health centre of India. The main limitation of the Ranson's criteria is that the evaluation cannot be completed until 48 hours following admission, which may lead to missing some early therapeutic critical hours and may cause increased mortality. Ranson's score is relatively accurate at classifying the severity of acute pancreatitis, but it is difficult to calculate the score as it requires a 48-hour, missing the potential for early treatment.<sup>6</sup>

BISAP is a new system used to predict the severity and prognosis of acute pancreatitis.<sup>9</sup> The parameters in this scoring system are easy to calculate. It includes two clinical parameters: age and impaired mental status, and very easily available and routinely doing investigations: Blood urea nitrogen, SIRS (temperature, pulse rate, respiratory rate and total leucocyte count) and Pleural effusion (chest X-ray). So, this system can be applicable in rural health centres. A study done by Papachristou et al reported a sensitivity of 37.5%, specificity of 92.4%, PPV of 57.7% and NPV of 84.3% towards prediction of severity of acute pancreatitis.<sup>12</sup>

BISAP scoring system comprises of 5 variables which can be obtained and calculated within 24 hours of admission: 1) Blood urea nitrogen >25mg/dl, 2) Impaired mental status, 3) SIRS, 4) Age more than 60 year and 5) Pleural effusion on chest X-ray. Scoring point 1 is given to each variable if they are present. And the score more than 3 is defined as severe pancreatitis in this system. In present study the complications like organ failure and necrotising pancreatitis are often associated with BISAP score more than 3 in study group. Present results are comparable to the study of Singh et al and Chen et al.<sup>13,14</sup>

Even though death is not reported in present study, the longer duration of hospital stays (10 days) is seen in patients with BISAP score more than 3.

## CONCLUSION

The high morbidity and mortality associated with severe acute pancreatitis is reduced by early detection and prediction by accessing all patients of acute pancreatitis. BISAP scoring system is the one, by which helps to improve the clinical care by early intervention, supportive measures and aggressive treatment within 24 hours of admission. BISAP scoring is more clinical and lesser laboratory-based scoring system compared to other scoring systems. BISAP has the advantages of being simple to use and quick over traditional scoring systems especially in rural health centre of India.

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