Section: Research Paper
ISSN 2063-5346

BISAP Score for Predicting Severity of Acute Pancreatitis

First and Corresponding Author: Dr. P. Sivabalan, Associate Professor, Department of Surgery, GMCH Nagapattinam, Tamil Nadu, INDIA.
Email: drsivabalan1995@gmail.com

Second Author: Dr. S. Rajesh, Assistant Professor, Department of General Surgery, GMCH, Tamil Nadu, Nagapattinam, INDIA.
Email: drsrajesh93@gmail.com

Abstract

Background: Acute pancreatitis is the most frequent gastrointestinal cause of hospitalization. The prognosis of AP depends on its severity, which was classified as mild, moderate, or severe by the latest revised Atlanta classification. Most patients present with mild or moderate AP, and only 15–20% of patients have severe AP. Severe episodes may involve a progression to extensive pancreatic necrosis, development of the systemic inflammatory response syndrome (SIRS), multi organ failure, rapid clinical deterioration, and even death. The mechanism of injury in pancreatitis is the premature activation of enzymes, leading to auto digestion. Any injury to the acinar cell impairs the secretion of zymogen granules or damages the duct epithelium and thus delays enzymatic secretion, can trigger acute pancreatitis. Once 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 complication can arise, such as hemodynamic instability, bacteremia, Acute Respiratory Distress Syndrome, pleural effusions, gastrointestinal hemorrhage, renal failure and DIC. Acute pancreatitis may be categorized as mild or severe. Mild acute pancreatitis is characterized by the interstitial edema of the gland and minimal organ dysfunction. 80% of the patients will have mild attack of pancreatitis (Mortality-around 1%). Severe acute pancreatitis is characterized by pancreatic necrosis, a severe systemic inflammatory response and often multiorgan failure (Mortality-varies from 20-50%). About one third of deaths occur in the early phase of the attack, from multiorganfailure, while deaths occurring after 1st week are due to septic complications. Most patients of acute pancreatitis recover without complications, the overall mortality rate of this illness is between 2-5%. The most common cause of acute pancreatitis is gallstones worldwide. The Bedside Index for Severity in Acute Pancreatitis (BISAP) score has been developed to identify patients at high risk for mortality or severe disease early during the course of acute pancreatitis. Majority of the scoring systems like Modified Glasgow Score and Ranson's Criteria require diverse biochemical parameters, which are limited in the hospital settings in developing countries like India. Moreover early therapeutic window is missed in these scoring systems, as they are assessed after 48 hours. The APACHE II scoring system also requires collection of large number of parameters. To overcome the above limitations, a simple and accurate clinical scoring system, theBISAP –Bedside Index for Severity in Acute Pancreatitis was introduced. The scoring system conveniently stratifies the patients according to the risk of mortality, and identifies the patients at increased risk of mortality early in the therapeutic window, thus enabling effective future management. **BISAP Score:** It includes

Section: Research Paper
ISSN 2063-5346

the following parameters, 1.Blood urea nitrogen >25 mg/dl. 2.Impaired mental status (Glasgow coma score <15). 3.Systemic inflammatory response syndrome (SIRS). SIRS is defined as presence of two or more of the following criteria: a. Pulse >90bpm, b. Respiratory rate >20/min or PaCO2<32mmhg, c. Temperature >38 or <360C, d. WBC count >12000 or <4000 cells/mm3 or >10% immature bands 4.Age > 60 years. 5.Pleural effusion, detected on imaging (chest X-ray or USG or CT scan Each point on BISA Pscore is worth one point within 24 hours of presentation. There is steady increase in the risk for mortality with the increasing number of points. BISAP score is an uncomplicated, quick and reasonably reliable method for assessment of disease severity on admission. A score of ≥3 indicates a severe acute pancreatitis. **Discussion:** Prediction of Severity of Acute Pancreatitis is important in order to decrease morbidity and hospital stays. Many scoring systems have been developed to determine the severity of acute pancreatitis early so that better care can be provided to patients. An ideal scoring system should be simple, safe, cheap and less time consuming. BISAP score is one of the scoring systems to predict the severity of acute pancreatitis. It has got 5 variable that can be done quickly in Emergency ward within 24 hours.

Introduction: Acute pancreatitis is the most common gastrointestinal disease for which patients are acutely hospitalized and its incidence is rising. Around 80% of patients with acute pancreatitis have a mild disease course where symptoms usually resolve within 1 week. Approximately 20% of patients develop severe acute pancreatitis with organ failure and/or necrotizing pancreatitis. Necrotizing pancreatitis is defined by pancreatic parenchymal necrosis and/or peripancreatic fat necrosis. Those patients are at risk for a persistent systemic inflammatory response syndrome and/or (multiple) organ failure. Sterile pancreatic necrosis and sterile peripancreatic collections can usually be treated successfully with conservative measures. However, 30% of patients develop secondary infection of necrosis, most often 3 to 4 weeks after the onset of disease. When secondary infection of necrosis occurs, morbidity and mortality increase dramatically. Overall mortality in severe pancreatitis is high (15% to 30%) compared with mild pancreatitis (0% to 1%).

Etiology

Gallstones are the most frequent cause of pancreatitis in the Western world, in approximately 50% to 60% of patients, followed by alcohol in 20%. Other infrequent causes of acute pancreatitis are: hypercalcemia, hypertriglyceridemia, medications, hereditary causes, sphincter of Oddi dysfunction, pancreas divisum, and infections. Before the final diagnosis of idiopathic pancreatitis is made, it is important to rule out causes that have therapeutic implications; biliary sludge can be ruled out by endoscopic ultrasonography and pancreatic neoplasms can be ruled out by contrast-enhanced computed tomography (CECT).

Clinical Presentation

The diagnosis of acute pancreatitis requires two of the following three features: (1) abdominal pain consistent with acute pancreatitis (acute onset of a persistent, severe, epigastric pain often radiating to the back); (2) serum lipase activity (or amylase activity) at least three times greater than the upper limit of normal; and (3) characteristic findings of acute pancreatitis on CECT and less commonly, magnetic resonance imaging (MRI) or transabdominal ultrasonography. Usually, the first two criteria are present and CECT is not required for diagnosis. However, CECT may be helpful in patients who have abdominal pain for several days with already normalized amylase and lipase levels. Caution is advised with CECT in the first 72 to 96 hours of disease because CECT often fails to demonstrate pancreatic necrosis and peripancreatic collections in this time period.

Section: Research Paper
ISSN 2063-5346

Severity and Scoring of Acute Pancreatitis

Table 1: Severity of acute pancreatitis as defined in the 2012 Revised atlanta classifivation

Complications	**2012 Revised Atlanta Classification**		
	Mild	**Moderate**	**Severe**
Local complications	No	Yes	Yes
Systemic complications			
Transient organ failure	No	Yes	Yes
Persistent organ failure	No	No	Yes
Exacerbation of preexisting comorbidity	No	Yes	Yes

Table 2: Scoring systems in acute pancreatitis

	Cutoff for predicted severe acute pancreatitis
APACHE II	≥8 in first 24 h
BISAP	≥3 in first 24 h
Modified Glasgow (or imrie)	≥3 in first 48 h
Ranson	≥3 in first 48 h
Urea at admission	>60mmoL/L
C-reactive protein	>150 U/L in first 72h

*After onset of symptoms.
APACHE, Acute physiology and chronic health evalution; BISAP, bedside index for severity in acute pancreatitis

Pathophysiology

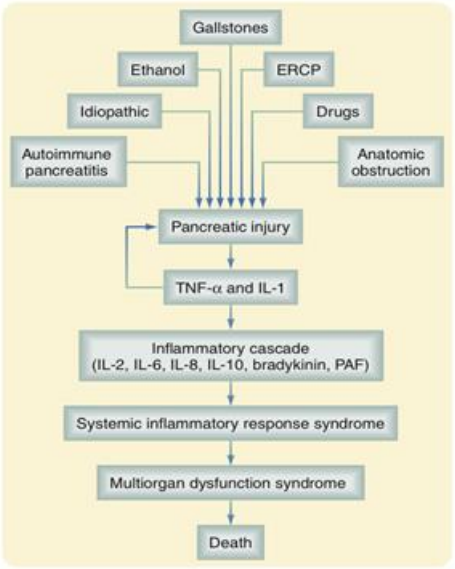

Figure 1

Section: Research Paper
ISSN 2063-5346

BISAP Score

The Bedside Index for Severity in Acute Pancreatitis (BISAP) score has been developed to identify patients at high risk for mortality or severe disease early during the course of acute pancreatitis.

It includes the following parameters

1.Blood urea nitrogen >25 mg/dl.

2.Impaired mental status (Glasgow coma score <15).

3.Systemic inflammatory response syndrome (SIRS).SIRS is defined as presence of two or more of the following criteria: a.Pulse >90bpm

b.Respiratory rate >20/min or PaCO2<32mmhg

c.Temperature >38 or <360C

d.WBC count >12000 or <4000 cells/mm3 or >10% immature bands

4.Age > 60 years.

5.Pleural effusion, detected on imaging (chest X-ray or USG or CT scan)

◆Each point on BISAPscore is worth one point within 24 hours of presentation.

◆There is steady increase in the risk for mortality with the increasing number of points.

◆BISAPscore is an uncomplicated, quick and reasonably reliable method for assessment of disease severity on admission.

◆A score of ≥3 indicates a severe acute pancreatitis

Aim

To Analyse the accuracy of BISAP score for predicting mortality and severity of Acute pancreatitis.

Study design: Prospective study

Study place: Government medical college hospital, Nagapattinam.

Study sample: 100

Inclusion criteria: All patients admitted with Acute pancreatitis within 24 hours

Exclusion criteria: Patient with pre existing medical conditions

Patient not willing for study

Results

Table

Age	Male	Female
20-30	28	5
31-40	32	5
41-50	15	3
51-60	10	2

Results of the study showed Males are mostly affected than females with high incidence in the age group between 30-40.

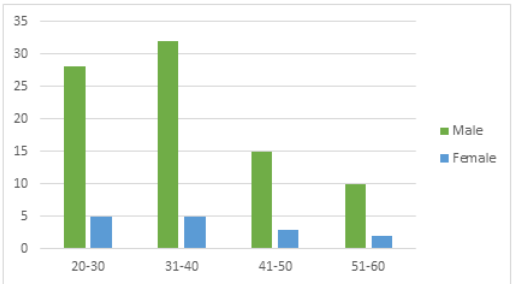

Figure 2

Section: Research Paper
ISSN 2063-5346

Those with BISAP score more than 3 has high morbidity and high duration of hospital stay. Those with BISAP score less than 3 has short duration of stay and less morbidity. Most of them discharged within 3 days of admission.

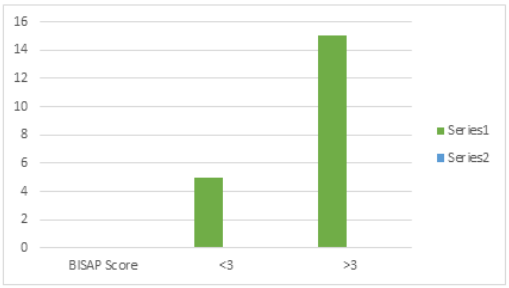

Figure 3

Duration in hospital	1 day	2days	3 days	4 days	5 days	Death
<3	25	25	12	8	5	0
>3	3	2	3	5	10	2

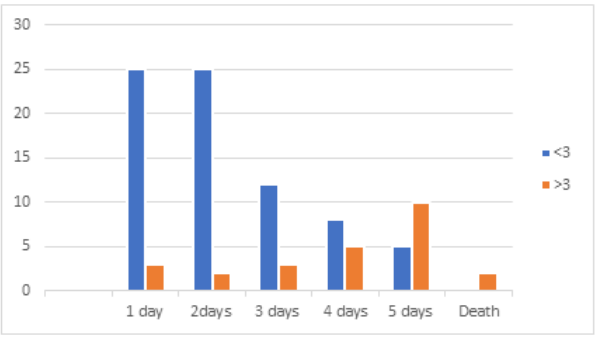

Figure 4

Outcome	<3	>3
Discharged	75	23
Death	0	2

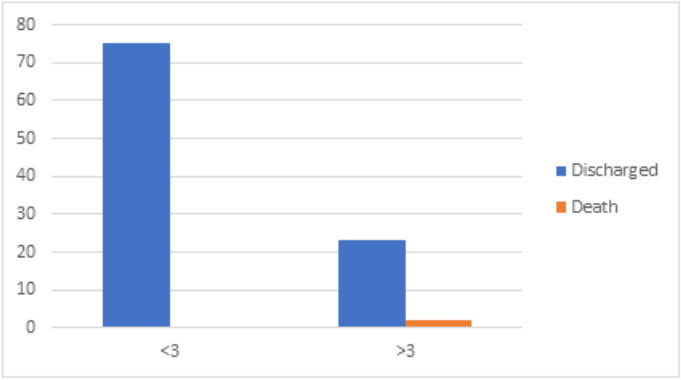

Figure 5

Most of the patients with score less than 3 discharged safely without any complications.

Discussion

Whereas classification relates to the present or past severity of acute pancreatitis, prediction is about the future and ultimate severity and outcome of the patient. Accurately predicting

acute pancreatitis severity is important in making triage decisions about whether a patient should be transferred to a tertiary hospital or an intensive care unit and in making decisions about fluid therapy and whether an ERCP is indicated, as well as other issues.65 There is a very long history of attempts to find prognostic or predictive markers that accurately stratify the risk, with the most widely used being the Ranson's criteria (Table 33-7) or modified Glasgow criteria. Both use clinical and biochemical parameters scored over the first 48 hours of admission. When there are three or more positive criteria, the disease is considered "predicted severe." There are many other approaches to predicting severity. At 24 hours after admission an APACHE II score of 8 or more or a serum C-reactive protein level of >150 mg/dL has a similar accuracy in predicting severity as Ranson's criteria.66 The more recently proposed Bedside Index for Severity of Acute Pancreatitis (BISAP) is calculated from blood urea nitrogen (> 25 mg/dL), impaired mental status (GCS <15), presence of systemic inflammatory response syndrome, age >60 years, and pleural effusion. It has the advantage of simple and easily done within 24 hours.

Table 3: Renson prognostic criteria for Nongallstone Pancreatitis

At presentation	Age >55years
	Blood glucosele level >200mg/dL
	White blood cell count>16,000 cells/mm^2
	Lactate dehydrogenase level >350IU/L
	Aspartate aminotransferase level >250IU/L
	Age >55years
After 48 hours of admission	Hematocrit*: decrease >10%
	Serum calcium level <8mg/dL
	Base deficit>4m Eq/L
	Blood urea nitrogen level: increase >5mg/dL
	Fluid requirement >6L
	PaO_2<60mm Hg
Ranson score≥3 defines severe pancreatitis.	

*Compared with admission value.

Table 2: Computed tomography Severity Index (CTSI) for acute pancreatitis

Feature	**Points**
Pancreatic Inflammation	0
Focal or diffuse pancreatic enlargement	1
Intrinsic pancreatic alterations with peripancreatic fat inflammatory changes	2
Single fluid collection or phlegmon	3
Two or more fluid collections or gas, in or adjacent to the pancreas	4
Pancreatic Necrosis	
None	0
≤30%	2
30%-50%	4
>50%	6

CTSI 0-3, mortality 3%, morbidity 8%; CTSI 4-6, mortality 6%, Morbidity 35%, CTSI 7-10, mortality 17%, morbidity 92%.

Section: Research Paper
ISSN 2063-5346

References

1. Banks PA, Bollen TL, Dervenis C, Gooszen HG, Johnson CD, Sarr MG, et al. Classification of acute pancreatitis—2012: revision of the Atlanta classification and definitions by international consensus. *Gut*. 2013;62(1):102–11. 10.1136/gutjnl-2012-302779.
2. Tenner S, Baillie J, DeWitt J, Vege SS, American College of G. American College of Gastroenterology guideline: management of acute pancreatitis. *The American journal of gastroenterology*. 2013;108(9):1400–15; 16 10.1038/ajg.2013.218.
3. Senapati D, Debata PK, Jenasamant SS, Nayak AK, Gowda SM, Swain NN. A prospective study of the Bedside Index for Severity in Acute Pancreatitis (BISAP) score in acute pancreatitis: an Indian perspective. *Pancreatology: official journal of the International Association of Pancreatology*. 2014;14(5):335–9. 10.1016/j.pan.2014.07.007
4. Shackelford textbook of Surgery, 8th edition.
5. Sabiston textbook of surgery, 21st edition.