

Comparison of CTSI and BISAP Scoring in the Assessment of Severity and Mortality in Cases of Acute Pancreatitis

Abraham Benjamin Muthunayagam¹, Chitra R², Muruganand Myilsamy³, Vinoth⁴

^{1,2,3,4}Assistant Professor, Department of General Surgery, PSG Institute of Medical Sciences and Research, Coimbatore, Tamil Nadu 641004, India

How to cite this article:

Abraham Benjamin Muthunayagam, Chitra R, Muruganand Myilsamy et al. Comparison of CTSI and BISAP Scoring in the Assessment of Severity and Mortality in Cases of Acute Pancreatitis. *New Indian J Surg.* 2019;10(6):559-566.

Abstract

Background: Acute pancreatitis is a disease where earlier initiation of treatment in case of complication gives a better prognosis to the patient. It has been firmly established that the BISAP scoring system is superior to the other clinical scoring system and the superiority of the CTSI scoring has been established for almost a decade. Yet, there are very few studies that directly compare these two scores directly. Hence, such a study is of utmost importance at this time as it can decrease the financial burden for the patient as well as provide a simple scoring system for the surgeon. This study compares CTSI and BISAP scoring in the assessment of severity and mortality of acute pancreatitis, and assess the validity, the specificity and the sensitivity of both the scoring systems.

Methodology: In 35 patients diagnosed with acute pancreatitis, the BISAP score was calculated, and after 48 hours of onset of symptoms, CTSI scoring done. The data was then analyzed with STATA statistical software.

Results: BISAP score showed a sensitivity of 100% and specificity of 36.8% in establishing the mortality of acute pancreatitis with cut-off value taken as > 1. If the cut-off value is taken as > 2, the sensitivity became 56.3% and specificity became 79%. CTSI score showed a sensitivity of 64% and specificity of 100% in establishing the onset of complications in cases of acute pancreatitis.

Conclusion: Our study showed that BISAP score is comparable to CTSI in predicting the prognosis and

mortality of cases of acute pancreatitis but does not compare with CTSI in establishing degree of necrosis. Hence, BISAP score is a simple, cost-effective scoring system that can be implemented in tertiary and even most primary healthcare centres.

Keywords: BISAP; CTSI; Acute pancreatitis; Predicting morbidity; Complications of acute pancreatitis; Pancreatic necrosis BISAP; CTSI; Acute pancreatitis; Predicting morbidity; Complications of acute pancreatitis; Pancreatic necrosis.

Introduction

Acute inflammation of pancreas named acute pancreatitis, is becoming common abdominal disease posing some major challenge to general and intestinal surgeons around the world.^{1,2} It is one of the most challenging disease that leads to various local and systemic complications. Acute pancreatitis presents with the hallmark features of acute pancreatic inflammation which is associated with little or no fibrosis. The presentation of acute pancreatitis may range from a pancreatic inflammation that is mild and self-limiting to life threatening pancreatic necrosis with secondary infection and multi-organ failure.³ The acute pancreatitis incidence world wide varies from 5 to 80 per 1, 00,000 acute population. Finland and United States of America records the highest incidence of acute pancreatitis worldwide.⁴ The incidence of acute pancreatitis varies among different racial and ethnic group. Alcohol consumption without moderation is an important cause for acute pancreatitis in India, with smoking being an independent risk for developing acute pancreatitis.⁵ Acute pancreatitis can be classified,

Corresponding Author: Chitra R, Assistant Professor, Department of General Surgery, PSG Institute of Medical Sciences and Research, Coimbatore, Tamil Nadu 641004, India.

E-mail: drchitrar@gmail.com

Received on 29.08.2019, **Accepted on** 23.10.2019

based on the severity of the disease at presentation as acute oedematous pancreatitis, acute persistent pancreatitis and acute hemorrhagic pancreatitis.⁶ In order to effectively treat the disease, the patients at risk of developing serious complications should be monitored and identified as early in the disease process as possible, since earlier the initiation of treatment, the better the prognosis of the patient.⁷ About 10 to 20% of patients suffering from acute pancreatitis develop Severe Attack of Acute pancreatitis (SAP),⁸ which constitute nearly 20% of the total deaths due to acute pancreatitis.⁹ This can be controlled by predicting the severity of the disease and subjecting the patient to vigorous treatment to improve their chances of survival. The prognosis of the disease, unfortunately, cannot be determined with a good accuracy using the serum levels of amylase and lipase but can be done by using the several assessment criteria available to predict the severity and the prognosis of the disease. An ideal criteria should be a simple, noninvasive and accurate with the quantitative tests readily available for the easy prediction. Unfortunately, the commonly used methods such as Ranson's the APACHEII score, modified Glasgow score and Acute Physiology and Chronic Health Examination system scoring all come with various limitations. Both the Ranson's score and also the modified Glasgow score makes use of details not regularly collected when the patient gets hospitalized and requires 2 days to complete as the signs are clear only after 48 hours of onset of symptoms.¹⁰ In addition, the Ranson's score is not accurate when the scores are not the extremes (3 to 6) but have good accuracy in predicting at the extremes of scores such that a score of less than 3 means higher chances of survival and a score of greater than 6 predicts death.⁸ In 1990, the Computed Tomography Severity Index (CTSI) was developed by Balthazar. It was followed internationally with success for nearly a decade, however, it has a few major limitations as it failed to correlate with the patient outcome. This led on to the formation of a modified CTSI in 2004 which helps better in the prediction of the duration of hospital stay. Overcoming these drawbacks, the BISAP scoring Severity in Acute Pancreatitis was introduced in 2008. It identifies the patients at higher mortality risk before the onset of organ failure¹¹ and is a reliable and accurate method to classify patients with acute pancreatitis for research as well as clinical purpose. Though the BISAP scoring is simpler compared to the APACHE II, its predictive value is not significantly different from that of the APACHE II scoring. Although various studies exist, they compare the predictability between different clinical

scoring systems or radiological scoring system. It has been firmly established that the BISAP scoring system is superior to the other clinical scoring system and the superiority of the CTSI scoring has been established for almost a decade. Yet, there are very few studies that directly compare these two studies directly and it is not yet established if a CT scan is an absolute necessity for the prognosis of AP, when at the time of admission BISAP scoring had been done. Hence, such a study is of utmost importance at this time as it can decrease the financial burden for the patient as well as provide a simple scoring system for the surgeon. The primary aim of this study was to compare CTSI and BISAP scoring in the assessment of severity and mortality of acute pancreatitis. With the secondary objectives being, to assess the validity, the specificity and the sensitivity of the CTSI and the BISAP scoring system.

Contrast enhanced CT severity score index was introduced by Balthazar in 1990¹² to help give a better idea of the degree of the pancreatic necrosis and categorized into 3 Groups: Less than 30%, 30%-50%, and greater than 50%. It was a good system to predict the local complications of pancreatitis but did not correlate well with the clinical scoring systems.¹³ Modified CT Severity Index, was introduced by Koenrad J Mortelet of extra pancreatic complications et al. in 2004¹⁴ as a result of identification of extra pancreatic complications giving rise to findings outside the pancreas on CT in addition to pancreatic necrosis. The addition of extrapancreatic complications helped in improving the accuracy and to decide the need for intervention in the future. Pancreatic necrosis of any grade was associated with a mortality of 23% and with no necrosis the mortality dropped down to 0%. In addition to this a necrosis of greater than 30% was associated with an increased mortality and morbidity. A higher CTSI score was associated with a longer hospital stay and increased mortality than patients having a lower score.¹⁵ Interstitial and necrotizing pancreatitis cannot be differentiated in CECT as soon as the patient presents with acute pancreatitis and it might require three to five days for the picture to develop. A lower CTSI score of about 1 or 2 is associated with almost no serious complications and has low rates of morbidity and serious complications with a score of about 3 to 6. On the other hand, a score of 7 to 10 is associated with a morbidity rate of 92% and a mortality rate of 17%. The modified CTSI scoring takes into consideration both the pancreatic necrosis and also the extrapancreatic complications such as pleural effusion, vasculitis etc. The MRI is more sensitive than CT in detecting mild acute pancreatitis and can help classify the pancreatic necrosis seen on CT

as pancreatic parenchyma necrosis, peripancreatic collection of necrotic fluid, hemorrhagic foci, pseudocyst, abscess and pancreatic duct obstruction. The Bedside Index for Severity in Acute Pancreatitis (BISAP), was developed retrospectively by Wu et al.¹⁶ in 2008, estimate clinically, the risk of in-hospital mortality in acute pancreatitis patients. It includes 5 variables with one point each and the sum of these are obtained in the first 24 hours of the study. In addition, it uses only the vital clinical signs, laboratory tests and imaging that are usually obtained at the time of admission. A score of 3 or more is associated with a 7.4 times higher risk of developing organ failure and 12.7 times the risk of persistent organ failure as compared to the patients with a score of less than 3. A score of 2 or more in one or more of the three organ systems i.e., respiratory, renal and cardiovascular system signifies organ failure. Organ failure is calculated in the first 72 hours of hospitalization depending on the most extreme clinical or laboratory value during each 24 hour time frame. Patients presenting with organ failure within 48 hours had a worse outcome and those presenting with organ failure after 48 hours had a higher chances of persistent organ failure. The BISAP scoring system is comparatively simpler than Ranson's and APACHE II score and the BISAP scoring had a predictive accuracy comparable to that of APACHE II score.

Materials and Methods

This Prospective observational study, with a convenient sample size of 35 Inpatients in the department of General Surgery with clinical diagnosis of Acute Pancreatitis. Patient diagnosed clinically as acute pancreatitis were included in the study. Those with Acute-on-chronic pancreatitis, admission after 24 hours of onset of symptoms were excluded. Tools used were Glasgow coma scale, Blood urea nitrogen, SIRS scale, X-ray, CT Scan.

Methodology

For the Patient presenting with epigastric pain, initially the Mental status was assessed with Glasgow Coma Scale (GCS), when Patients were diagnosed clinically as acute pancreatitis, Written consent was obtained. Evaluation was then done to look for signs of systemic inflammatory response syndrome. Blood was collected for Blood Urea Nitrogen (BUN) within 24 hours of Presenting symptoms. X-Ray was done to look for pleural effusion, BISAP Scoring was then done with the

above parameters, CT scan was done after 48 hours for CTSI scoring.

Statistical Analysis

Data collected were entered in Excel Spread sheet and analyzed using STATA statistical software package release.¹⁷ We used the two sided independent samples *t*-test to compare means across dichotomous variables (i.e., men *vs* women); the one-way ANOVA test for comparison of means across multi-level variables. Simple calculations like Percentages, Proportions and Mean values were derived. A type I error of 0.05 was considered in all analyses. Using ROC - AUC, the sensitivity, specificity, positive and negative predictive value of the test is calculated. All Diagnostic test evaluation analysis i.e., Sensitivity, Specificity, Positive Predictive Values, and Negative Predictive Values of diagnostic tests are done using Medical statistical software and STATA statistical software package release.¹⁷

Observation and Results

The mean age of the patients in our study was 43.2 with a standard deviation of 17.5. the youngest patient in our group was 16 years old and the oldest patient was 93 years old. The mean duration of stay of the patients in our study was 10.8 days with a standard deviation of 11.1 days. The shortest duration of stay was 3 days and the maximum duration of stay was 71 days. The patients in our study had a mean BISAP score of 6.4 ± 2.4 and the mean CTSI scoring was 2.1 ± 1.1 (Table 1).

Table 1: CTSI and BISAP scoring

Variable	n	Mean	SD	Min	Max
CTSI	35	6.4	2.4	2	10
BISAP	35	2.1	1.1	0	4

The patients in our study had a mean BISAP score of 6.4 ± 2.4 and the mean CTSI scoring was 2.1 ± 1.1 .

In our study, 29 patients comprising of 82.9% were males and 6 patients comprising of 17.1% are females. In our study, out of a total of 35 patients, 13 patients were non-alcoholic, making up for 37.1% of the study population and 22 were alcoholics, making up for 62.9% of the study population. Out of the 35 patients, 9 were diagnosed with acute pancreatitis, 20 had alcoholic pancreatitis and 6 patients had biliary pancreatitis. In our study, during the course of disease, 28.6% developed no complications where's 5.7% of the

study population developed local complications and 65.7% developed systemic complications. In this study, according to CTSI scoring, 14.3% had mild disease, 40% had intermediate and 45.7% had severe disease. In our study, 14% had a BISAP score of 0, 5.7 % had a BISAP score of 1, 42.9% had a BISAP score of 2, 28.6% had a BISAP score of 3 and 8.6 had a BISAP score of 4. Our study comprises of 29 men and 6 women. The mean age of presentation among women was 51.5 years and that of the men was 41.4 years. This was not statistically significant. The mean duration of stay in women was 9.5 days \pm 4.3 days and that in men was 11.1 \pm 12.0 days. It was not statistically significant between the 2 Groups. The mean CTSI score in women was 7 \pm 1.1 and that in men was 6.3 \pm 2.6. It was not statistically significant between the Two Groups. The mean BISAP score in women was 2.3 \pm 0.5 and that in men was 2.1 \pm 1.2. It was not statistically significant. Our study comprises of 13 non-alcoholics and 22 alcoholics. The mean age of presentation among alcoholics was 37.9 \pm 11.4 years, which was statistically significant compared to that in non-alcoholics with 52.1 \pm 22.4 years. The duration of stay among alcoholics was 11.9 \pm 13.7 and that among non-alcoholics was 9.1 \pm 3.4 but not statistically significant. The mean CTSI scoring on non-alcoholics was 6.5 \pm 2.4, and that among alcoholics was 6.3 \pm 2.5. It is not statistically significant. The mean BISAP score in alcoholics was 2 \pm 1.2 and that among non-alcoholics was 2.2 \pm 1.0. It was not statistically significant. The mean age of the patients with mild disease was 51.2 \pm 19.0 and those with intermediate disease was 42.7 \pm 16.8 and that of severe disease was 41.1 \pm 18.1. It is not statistically significant. The duration of stay in mild disease was 6.8 \pm 2.2, that in intermediate disease was 9.1 \pm 4.4 and that in severe disease was 13.6 \pm 15.6. It wasn't statistically significant. The mean BISAP scoring for mild range of CTSI was 0.2 and that for intermediate CTSI was 2.1 and that for severe CTSI was 2.8 (Table 2). This was found to be statistically significant among the groups. The mean age of patients with acute pancreatitis was 54.8 \pm 25.3, that in the alcoholic pancreatitis is 38 \pm 11.7 and in biliary pancreatitis it was 43 \pm 13.4. The age difference was not statistically significant. The mean duration of stay was 8 \pm 4.1 in acute pancreatitis, in alcoholic pancreatitis it was 12.7 \pm 14.2 and in biliary pancreatitis, it was 9 \pm 3.2. It was not statistically significant. The mean CTSI in acute pancreatitis 6.9 \pm 2.3, alcoholic pancreatitis was 6.3 \pm 2.6 and biliary pancreatitis was 6 \pm 2.2. This was not statistically significant. The mean BISAP in acute pancreatitis was 2.4 \pm 0.9,

alcoholic pancreatitis was 2.1 \pm 1.3 and biliary pancreatitis was 1.8 \pm 1. This was not statistically significant. The mean age of patients presenting with local complications was 48 \pm 21.2 and those with systemic complications was 41.8 \pm 19.2 and without complications it was 45.3 \pm 13.6. In our study, patients with local complications had a mean duration of stay of 10.5 \pm 2.1 days and those with systemic complications had 12.5 \pm 13.3 days while patients with no complications had a mean duration of stay of 7 \pm 2.8 days. The patients with local complications had a mean CTSI score of 7.5 \pm 2.1 and those without systemic complications had a score of 7.3 \pm 1.9 and the patients without complications had a mean CTSI score of 4 \pm 1.9. This was found to be statistically significant. The patients with local complications had a mean BISAP score of 3 \pm 1.4 and those with systemic complications had a score of 2.6 \pm 0.7 and the patients without complications had a mean Score of 0.9 \pm 1.0. This was found to be statistically significant.

Table 2: Comparison of CTSI and BISAP scoring

CTSI Severity	Mild		Intermediate		Severe		p - Value
	Mean	SD	Mean	SD	Mean	SD	
CTSI	2.0	0.0	5.6	0.9	8.5	0.9	<0.01
BISAP	0.2	0.4	2.1	0.8	2.8	0.8	<0.01

Discussion

In our study carried out in a tertiary care hospital in South India, we included 35 cases of acute pancreatitis according to our inclusion criteria. We analyzed the effectiveness of BISAP scoring in predicting the severity of acute pancreatitis and how well it correlates with the CT severity index, a scoring system that is already being utilized in our hospital. In our study, the mean age of the patients was 43.2 \pm 17.5 years, where the youngest patient was 16 years old and the oldest patient was 93 years old. Hence, a wide range was selected. In a study, conducted by Ajay K Khanna comparing multiple scoring systems like CTSI, Ranson, Glasgow, BISAP, Procalcitonin, the mean age of presentation was 40.5.¹⁶ The mean age of presentation seen in most acute pancreatitis is seen to be around 40 to 50 years. The mean duration of stay of the patients was 10.8 \pm 11.1 days with the shortest duration of stay being 3 days and the longest duration of stay was 71 days in one patient. In our study, patients with mild symptoms and no complications all recovered with conservative management. Cases of severe acute pancreatitis however, required a longer duration

of hospitalization with high grade antibiotics and in cases that developed systemic complications, even required ICU care and ventilator support. A study conducted by Papachristou et al.¹⁷ showed a mean hospital stay of 7 days but also showed a wide variation with the shortest duration of 2 days and the longest being 105 days. Our study included 6 women comprising of 17.1% and 29 men comprising of 82.9%. This male preponderance has been seen in all such studies evaluating cases of acute pancreatitis.^{16,18} In this study, 13 patients comprising of 37.1% were non-alcoholics and patients comprising of 62.9% were alcoholics. This is in accordance with the established fact that the majority of the cases of acute pancreatitis are ethanol induced. This has been proven in multiple studies like the one conducted by SJ Baig et al.¹⁹ The mean CTSI scoring in our study was 6.4 ± 2.4 with 14.35% having mild disease, 40% with intermediate disease and 45.7% with severe disease according to CTSI scoring. Majority of the cases were moderate or severe with only a small percentage having mild disease. This could be attributed to the fact that most mild cases of pancreatitis recover with conservative management over even a short duration like 2 days and the patient never would have undergone a CECT of the abdomen. The mean BISAP scoring was 2.1 ± 1.1 with 14.3% with a score of 0, 5.7% with a score 1, 42.9% with a score 2, 28.6% with a score 3 and 8.6% had a scoring of 4. A score of more than 2 correlated with the number of cases that showed moderate and severe diseases in CTSI scores. Of the 35 cases in our study 20 cases (57.1%) were alcoholic pancreatitis forming the majority, 6 cases (17.1%) were biliary pancreatitis and 9 cases (25.7%) were of the idiopathic type. In our study, a significant majority of cases were alcohol induced pancreatitis. A study by Venkateswara Rao Katta showed alcoholic pancreatitis as the common diagnosis (66%) but in another studies by Bezwada Srinivasa Rao et al.,²⁰ biliary pancreatitis was the majority diagnosis. In Studies by Garg PK et al.²¹ and by Gislason H²² et al. the occurrence of gallstone pancreatitis was highest followed by alcoholic pancreatitis. 2 patients (5.7%) had local complications and 23 patients (65.7%) had systemic complications while 10 patients (28.6%) did not develop any complications in this study. The local complications encountered in this study was pseudocyst of the pancreas for both the patients and they were managed with pig tail drainage. The patients that developed severe diseases however developed systemic complications like ARDS, AKI, SEPSIS and this lead to need for ICU care and an extended duration of stay. The mean presenting

age of women was 51.5 ± 30.9 years and that among men was 41.4 ± 13.5 years. Hence, men presented at an earlier age than women but it was not statistically significant. This could be attributed to the fact that alcoholism is more common among males in our society. The duration of stay among women was 9.1 ± 3.4 days and among men it is 11.9 ± 13.7 days. The duration of stay was not significantly high among men compared to women. The mean CTSI did not vary significantly as among women it was 7 ± 1.1 and in it men was 6.3 ± 2.6 . The same is true in case of BISAP scoring with mean in women being 2.3 ± 0.5 and that in men being 2.1 ± 1.2 . Hence, the severity of the disease does not depend on the sex of the patient. No studies have provided evidence to the contrary. The age of presentation in alcoholic's 37.9 ± 11.4 years was significantly lower than in alcoholics 52.1 ± 22.4 years. Hence, alcoholics presented with acute pancreatitis at a younger age compared to non-alcoholics. But the duration of stay among alcoholics 11.9 ± 13.7 days did not vary significantly compared to non-alcoholics 9.1 ± 3.4 days, although a shorter duration of stay was noted in non-alcoholics, it was not found to be statistically significant. The mean CTSI in non-alcoholics, was 6.5 ± 2.4 and in alcoholics it was 6.3 ± 2.5 . It did not vary considerably between the Two Groups. Similarly the BISAP score among non alcoholics 2 ± 1 alcoholics 2.2 ± 1.0 did not vary significantly from that among alcoholics 2 ± 1.2 . Hence. the severity and the prognosis of the disease does not depend upon the alcoholic status of the patient. The mean age of patients presenting with local complications was 48 ± 21.2 and those with systemic complications was 41.8 ± 19.2 and without complications it was 45.3 ± 13.6 . There was no statistical significance among the groups. Hence, age wasn't a factor in the patient developing local or systemic complications. In our study, patients with local complications had a mean duration of stay of 10.5 ± 2.1 days and those with systemic complications had 12.5 ± 13.3 days this was significant compared to patients with no complications who had a mean duration of stay of 7 ± 2.8 days. Though the mean durations of stay did not show a significant difference between patients with local and systemic complications, the patients who had the longest durations of stay were mostly patients with systemic complications. In this study, the patients with local complications had a mean CTSI score of 7.5 ± 2.1 and those without systemic complications had a score of 7.3 ± 1.9 and the patients without complications had a mean CTSI score of 4 ± 1.9 which was found to be statistically highly significant with a *p* - value of < 0.01 (Fig. 1).

In our study, CTSI score showed a sensitivity of 64% and a specificity of 100% in establishing the prognosis of a case of acute pancreatitis with cut off value taken as > 6 (Table 3). Hence, it is clear that the CTSI scoring helps in predicting the prognosis in patients. Study conducted by Papachristou et al.¹⁷ showed that CTSI had a sensitivity of 85.7 and a specificity of 71.0. In this study, the patients who developed local complications had a mean BISAP score of 3 ± 1.4 and those who developed systemic

complications had a score of 2.6 ± 0.7 . Patients who did not develop any complications had a mean BISAP Score of 0.9 ± 1.0 . This was found to be statistically highly significant and correlated with the findings established by CTSI score (Fig. 2). Hence, BISAP is also as good an indicator in predicting the prognosis of acute pancreatitis. In a study by Lifan Chen et al.²² BISAP score showed a sensitivity of 93.1% and specificity of 51.4% in determining organ failure. It showed a sensitivity

Table 3: Sensitivity and Specificity of CTSI

CTSI	Sensitivity	95% CI	Specificity	95% CI	+ PV	95% CI	-PV	95% CI
≥ 2	100	86.3 - 100.0	0	0.0 - 30.8	71.4	53.7 - 85.4		
> 2	96	79.6 - 99.9	40	12.2 - 73.8	80	61.1 - 92.4	80	28.4 - 99.5
> 4	92	74.0 - 99.0	60	26.2 - 87.8	85.2	66.3 - 95.8	75	32.1 - 97.5
> 6	64	42.5 - 82.0	100	69.2 - 100.0	100	79.4 - 100.0	52.6	28.9 - 75.6
> 7	60	38.7 - 78.9	100	69.2 - 100.0	100	78.2 - 100.0	50	27.2 - 72.8
> 8	24	9.4 - 45.1	100	69.2 - 100.0	100	54.1 - 100.0	34.5	17.9 - 54.3
> 9	12	2.5 - 31.2	100	69.2 - 100.0	100	29.2 - 100.0	31.2	16.1 - 50.0
> 10	0	0.0 - 13.7	100	69.2 - 100.0			28.6	14.6 - 46.3

Using Local and Systemic complications as cases

Area under the ROC curve (AUC)

Area under the ROC curve (AUC)	0.892
Standard Errora	0.0492
95% Confidence intervalb	0.740565 to 0.971245
z statistic	7.974
Significance level p (Area = 0.5)	< 0.0001

a. DeLong et al., 1988

b. Binomial exact

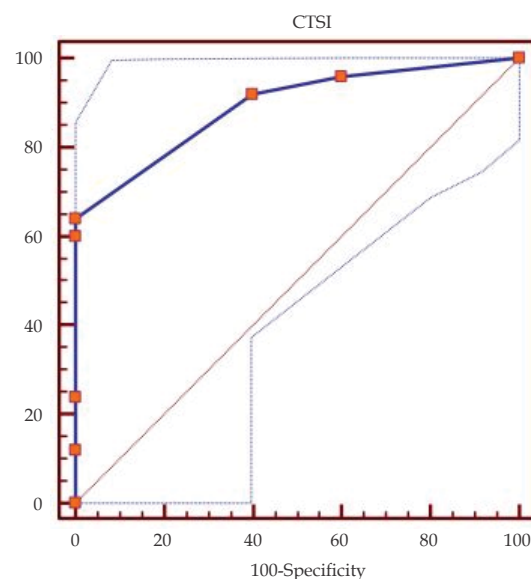


Fig. 1: In this study, the patients with local complications had a mean CTSI score of 7.5 ± 2.1 and those without systemic complications had a score of 7.3 ± 1.9 and the patients without complications had a mean CTSI score of 4 ± 1.9 which was found to be statistically highly significant with a p -value of < 0.01 .

of 84.6% and specificity of 46.7% in determining pancreatic necrosis in the same study. In our study, BISAP score showed a sensitivity of 100% and specificity of 36.8% in establishing the prognosis of acute pancreatitis with cut-off value taken as > 1. If the cut-off value is taken as > 2, the sensitivity became 56.3% and specificity became 79% (Table 4). Though simple and fast to calculate, with few variables involved in its scoring mechanism that is one of the advantages of using the BISAP scoring system. Though in terms of predicting pancreatic necrosis, it is not comparable to CTSI, BISAP score

is just as effective in predicting the prognosis of a as patient the CTSI. Though BISAP score is considered to be too simple because it only includes 5 variables, that is not exactly accurate as one of the variables involved is SIRS which in turn involved 4 variables on its own.

Limitations

Small study population. Only the CTSI and BISAP scoring systems were compared.

Table 4: Sensitivity and Specificity of BISAP scoring system

BISAP	Sensitivity	CI	Specificity	CI	PPV	CI	NPV	C.I
≥ 0	100.0	79.4 - 100.0	0.0	0.0 - 17.6	45.7	28.8 - 63.4		
> 0	100.0	79.4 - 100.0	26.3	9.1 - 51.2	53.3	34.3 - 71.7	100.0	47.8 - 100.0
> 1	100.0	79.4 - 100.0	36.8	16.3 - 61.6	57.1	37.2 - 75.5	100.0	54.1 - 100.0
> 2	56.3	29.9 - 80.2	79.0	54.4 - 93.9	69.2	38.6 - 90.9	68.2	45.1 - 86.1
> 3	18.8	4.0 - 45.6	100.0	82.4 - 100.0	100.0	29.2 - 100.0	59.4	40.6 - 76.3
> 4	0.0	0.0 - 20.6	100.0	82.4 - 100.0			54.3	36.6 - 71.2

Using CTSI score ≥ 7 as cases

Area under the ROC Curve (AUC)

Area under the ROC curve (AUC)	0.8
Standard Errora	0.1
95% Confidence intervalb	0.604049 to 0.899243
z statistic	3.9
Significance level p	< 0.01

a. DeLong et al., 1988

b. Binomial exact

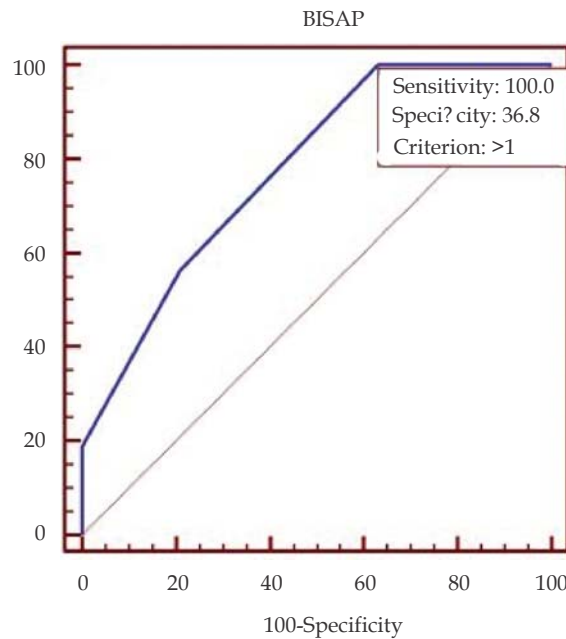


Fig. 2: In this study, the patients who developed local complications had a mean BISAP score of 3 ± 1.4 and those who developed systemic complications had a score of 2.6 ± 0.7 . Patients who did not develop any complications had a mean BISAP Score of 0.9 ± 1.0 . This was found to be statistically highly significant and correlated with the findings established by CTSI score.

Conclusion

Acute pancreatitis is common in the middle age but can occur earlier or later. Acute pancreatitis is more common in alcoholics and also in men, which can be due to the higher number of alcoholics among men. Alcoholics presented with acute pancreatitis at a younger age compared to non-alcoholics. The severity and the prognosis of the disease did not depend on the age, sex, alcoholic status of the patient. Local and systemic complications were associated with a higher mean CTSI and BISAP scores compared to those without complications. Our study showed that BISAP score is comparable to CTSI in predicting the prognosis and morbidity of cases of acute pancreatitis. Hence, BISAP score is a simple, cost-effective scoring system that can be implemented in tertiary and even most primary healthcare centres.

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