ORIGINAL ARTICLE

Comparative Evaluation of Bedside Index of Severity in Acute Pancreatitis Bisap) & Modified Computed Tomography Severity Index (MCTSI) in Assessing Severity of Acute Pancreatitis

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ABSTRACT

Objective: To compare diagnostic accuracy of BISAP and MCTSI in predicting the severity of Acute pancreatitis.
Study design: cross sectional study.
Setting: Surgical department Khyber Teaching Hospital, Peshawar and Bacha Khan Medical Complex, Swabi.
Duration: 6 months Jan, 2021 to June, 2021
Material and Methods: In this study a total of 246 patients were observed. The demographic, clinical and laboratory data of all consecutive patients with a primary diagnosis of AP admitted/transferred to our ward were prospectively collected and then this data were retrospectively analyzed. The day of admission is defined as the first 24hr of hospitalization in our ward or in the referring hospital/ward. Contrast enhanced CT(CECT) and BISAP score were calculated after 72hrs in all patients and they were categorized into three severity grades of Acute pancreatitis based on Atlanta classification 2012 as discussed in operational definition. BISAP score greater than 4 and MCTSI score greater than 8 were considered severe acute pancreatitis.
Results: In this study mean age was 45 years with SD ± 16.21. Forty three percent patients were male while 57% patients were female. MCTSI had sensitivity 89.83%, specificity 60%, Positive predictive value was 98.14%, Negative predictive value was 20% and the overall diagnostic accuracy was 88.61%. While BISAP had sensitivity 82.05%, specificity 70%, Positive predictive value was 98.49%, Negative predictive value was 14.89% and the overall diagnostic accuracy was 82.52%.
Conclusion: Our study concludes that the diagnostic accuracy of MCTSI is better than BISAP score in predicting the severity of acute pancreatitis.
Keywords: MCTSI, BISAP score, severe acute pancreatitis.

INTRODUCTION

In most cases, mild and self-limiting acute pancreatitis with minimal systemic manifestations is the most common form of acute pancreatitis (AP incidence worldwide ranges between 5&80 per 100,000 people with a prevalence of 20%)(1). However, systemic and local complications occur in 15-20% of patients with severe acute pancreatitis. With a wide range of sensitivity and specificity to choose from, each scoring system has evolved over time. Clinical, laboratory, and radiographic studies are included in these scoring systems, such as BISAP, Qsofa, PANC-3 Criteria, CRP-levels, D-dimer levels, CTSI and modified CTSI(2)etc.

Acute pancreatitis has been categorised using the Atlanta Classification(3) since 1992. To keep up with the most recent findings in acute pancreatitis research, it was updated in 2012 to include three additional criteria: (1) abdominal pain consistent with acute pancreatitis; (2) serum lipase activity (or amylase activity) at least three times higher than the upper limit of normal; and (3) characteristic findings of acute pancreatitis on contrast-enhanced computed tomography (CECT) or, less frequently, magnetic resonance imaging (MRI)..... These fluid collections are morphologically described in this classification, which breaks down the severity of AP into three categories: mild, moderate, and severe. Acute necrotizing pancreatitis (ANP) and acute interstitial edematous pancreatitis (AIE) have also been identified as different AP types based on the CECT criteria. Peripancreatic necrosis is separated from pancreatic parenchymal necrosis and both are classified as ANP. ANP and peripancreatic necrosis are also classified as ANP. Based on the presence of organ failure (OF), which is assessed using the modified Marshall scoring system(4), and local and/or systemic complications, the severity of the illness is classified (exacerbation of co-morbid conditions). The presence and persistence of systemic inflammatory response syndrome indicate severe AP, which is characterised by persistent OF (SIRS). A single organ or a number of organs may be affected by persistent OF, and patients with this condition typically experience local complications. The mortality rate for these patients has been reported to be as high as 36–50 percent, and this could rise even higher if they develop infected necrosis.

APACHE-2, Ranson, and Glasgow scores have all been created since 1970, and they are all multifactorial systems. A set of criteria known as the Balthazar criteria was created in 1990. It has been hypothesised that new predictive scoring systems like BISAP and Qsofa can accurately forecast the severity of acute pancreatitis and identify individuals at risk for in-hospital mortality. Glasgow, BISAP (Bedside Index of Severity in AP), MCTSI (Modified CT Severity Index) and APACHE 2 (acute physiology and chronic health evaluation scoring system) are the four most often used scoring systems for AP (5).

Ranson≥8, BISAP≥2,APACHE-2≥8,CTSI≥3 and CRP24≥21.4 were found to be statistically significant cutoff values for the prediction of severe AP by Joon Hyun Cho et al.

Ranson, BISAP, APACHE2, CTSI, and CRP24 all had AUC3s of 0.69, 0.74, 0.78, 0.69, and 0.68, respectively, in predicting severe AP; these values were all within the 95% confidence interval (CI).

Prediction of severe acute pancreatitis using APACHE-2 was found to be the most accurate. CRP24 and APACHE 2 did not show statistically significant differences when compared to each other (6).

Consequently, my study's primary goal is to compare and analyse various scoring systems in gauging severity in local settings, since Pakistan lacks significant information on this topic.

MATERIALS AND METHODS

This cross sectional study was conducted at Surgical department Khyber Teaching Hospital, Peshawar and Bacha Khan Medical Complex, Swabi, during from Jan, 2021 to June, 2021. Total 246 patients of either gender presented with acute pancreatitis with ages 18 to 65 years having gall stone were included in this study.

Patients with other/idiopathic causes of acute pancreatitis like alcohol, hyperlipidemia, hypercalcemia etc were excluded.

The demographic, clinical and laboratory data of all consecutive patients with a primary diagnosis of AP admitted/transferred to our ward were prospectively collected and then this data were retrospectively analyzed. The day of admission is defined as the first 24hr of hospitalization in our ward or in the referring hospital/ward. Contrast enhanced CT(CECT) and BISAP score were calculated after 72hrs in all patients and they were categorized into three severity grades of Acute pancreatitis based on Atlanta classification 2012 as discussed in operational definition. BISAP score greater than 4 and MCTSI score greater than 8 were considered severe acute pancreatitis.

All the data was analysis on the statistical programs like spss20.Epiinfo 7. Mean ±S.D were calculated for quantitative variables like age while frequencies and percentages were calculated for categorical variables like gender, BISAP , MCTSI etc.2"2 table were used to calculate sensitivity, negative predictive value ,positive predictive value and diagnostic accuracy. Effects modifier like age and gender were addressed through stratification. Post stratification 2"2 table were used to calculate sensitivity, specificity, negative predictive and positive predictive values, and diagnostic accuracy.

RESULTS

In this study the age distribution was analyzed as 93(38%) patients were in age range 18-30 years while 153(62%) patients were in age range 31-65 years. Mean age was 45 years with SD ± 16.21. (table No 1).

Table 1: Age Distribution (n=246)

Age	Frequency	Percentage
18-30 years	93	38%
31-65 years	153	62%
Total	246	100%

Mean age was 45 years with SD ± 16.2

Gender distribution was analyzed as 106 (43%) patients were male while 140 (57%) patients were female. (table No 2).

Table 2: Gender Distribution (n=246)

Gender	Frequency	Percentage
Male	106	43%
Female	140	57%
Total	246	100%

Severe acute pancreatitis on contrast enhanced computed tomography was analyzed as SAP on contrast enhanced computed tomography was positive in 236 (96%) patients and was negative in 10 (4%) patients. (table No 3).

Table 3: Severe Acute Pancreatitis On Contrast Enhanced Computed Tomography (Gold Standard) (n=246)

Contrast enhanced computed tomography	Frequency	Percentage
Positive	236	96%
Negative	10	4%
Total	246	100%

Severe acute pancreatitis on modified computed tomography severity index was analyzed as SAP on modified computed tomography severity index was positive in 216(88%) patients and was negative in 30(12%) patients. (table No 4).

Table 4: Severe Acute Pancreatitis On Modified Computed Tomography Severity Index (n=246)

Mctsi	Frequency	Percentage
Positive	216	88%
Negative	30	12%
Total	246	100%

Severe acute pancreatitis on BISAP score was analyzed as SAP on BISAP score was positive in 199 (81%) patients and was negative in 47 (19%) patients. (table No 5).

Table 5: Severe Acute Pancreatitis On Bisap Score (n=246)

Bisap	Frequency	Percentage
Positive	199	81%
Negative	47	19%
Total	246	100%

Diagnostic accuracy of SAP on MCTSI taking contrast enhanced computed tomography as gold standard was analyzed as the sensitivity was 89.83%, specificity was 60%, Positive predictive value was 98.14%, Negative predictive value was 20% and the overall diagnostic accuracy was 88.61%. (table No 6).

Table 6: Modified Computed Tomography Severity Index Vs Contrast Enhanced Computed Tomography (n=246)

		CTSI findings		
		+	-	Total
MCTSI Findings	+	A 212 TP	B 4 FN	216(88%)
	-	C 24 FP	D 6 TN	30(12%)
	Total	236(96%)	10(4%)	246

Sensitivity= 89.83%, Specificity = 60%, Positive predictive value = 98.14%, Negative predictive value = 20%, Diagnostic Accuracy = 88.61%

Diagnostic accuracy of SAP on BISAP taking contrast enhanced computed tomography as gold standard was analyzed as the sensitivity was 82.05%, specificity was 70%, Positive predictive value was 98.49%, Negative predictive value was 14.89% and the overall diagnostic accuracy was 82.52%. (table No 7).

Table 7: Bisap Vs Contrast Enhanced Computed Tomography (n=246)

		CTSI findings		
		+	-	Total
BISAP score findings	+	A 196 TP	B 3 FN	199(81%)
	-	C 40 FP	D 7 TN	47(19%)
	Total	236(96%)	10(4%)	246

Sensitivity= 82.05%, Specificity = 70%, Positive predictive value = 98.49%, Negative predictive value = 14.89%, Diagnostic Accuracy = 82.52%

DISCUSSION

Acute pancreatitis (AP) is a condition in which the pancreas becomes inflamed and necrotizes due to inflammation of the interstitial tissues, which can be minor and self-limiting, or severe and accompanied with local necrotizing inflammation and systemic complications [1]. A number of changes have been made to the AP nomenclature during the past several years [2]. Severe acute pancreatitis (SAP) is classified as having local or systemic consequences in accordance with the Atlanta classification and its several modifications [2].

The mean age was 45 years, with a standard deviation of 16.21 years. Male patients were 43% of the total, while female patients comprised 57% of the total. It was shown that MCTSI had an overall diagnostic accuracy of 88.61 percent, a specificity rate of 89.83 percent and a positive predictive value of 98.14%. Overall diagnosis accuracy was 82.52% for BISAP, with specificity of 70.5%, positive and negative predictive values of 98.49% and 14.89% respectively. BISAP (bedside index for severity in acute pancreatitis) is a simple, easy to obtain and clinically oriented scoring system that can predict mortality and severity of AP early in the course of disease, i.e. within 24 hours, and has a reported specificity of 74.2 percent, PPV of 63.4 percent, and NPV 78.1 percent and an overall accuracy of 70.8 percent with a BISAP accuracy of 74.2 percent In contrast, MCTSI's sensitivity was 88.27 percent, specificity was 58 percent, positive predictive value

was 96.02 percent, negative predictive value was 22 percent. A total of 86.34 percent of the diagnoses were correct overall.

According to Yang YX et al [8], the BISAP cutoff point of 3 had a higher specificity and accuracy than the previous BISAP cutoff point of 2 in predicting SAP. When it comes to diagnosing SAP, this study found that the sensitivity of SAP detection was 74.8 per cent and the specificity of SAP detection was 83.6 per cent.

Another study by Gao W et al [9] found that 12 cohorts from 10 studies were used in their research. A BISAP score of 3 had a 76 percent mortality sensitivity (95% CI, 53 percent -60 percent) and an 88 percent specificity (95 percent CI, 90 percent -91 percent). While MCTSI exhibited a sensitivity of 88%, specificity of 60%, a positive predictive value of 97.33% and negative predictive value of 24.3% (95 percent confidence intervals), the positive and negative likelihood ratios were 5.65 and 0.48 (95 percent confidence intervals, 4.23-7.55), respectively. A total of 87.03 percent of the diagnoses were correct overall.

It was found that MCTSI's diagnostic accuracy was superior to BISAP's because it had a sensitivity of 89.11%; specificity of 63%; positive predictive value of 92.47%; negative predictive value of 20.1%, according to Papachristou et al [10] study. BISAP score sensitivity was 77.5, specificity was 89.5, positive predictive value (PPV) was 86.7 and negative predictive value (NPV) was 33.3% when it came to accurately diagnosing SAP. Setting a cutoff value of 3 showed comparable sensitivity (38.6 percent), specificity (93.2 percent), PPV (59.1 percent), and NPV (59.1 percent) in the current investigation (85.6 percent). For BISAP, the optimal cutoff value was 2, which produced a sensitivity of 71.4 percent, a specificity of 83.1 percent, a positive predictive value (PPV) of 68.1 percent, and a negative predictive value (NPV) of 89.5 percent using the Youden index [11].

CONCLUSION

Our study concludes that the diagnostic accuracy of MCTSI is better than BISAP score in predicting the severity of acute pancreatitis.

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