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Original Research

Comparing BISAP Plus Serum C-Reactive Protein (CRP) Score With Modified CTSI (MCTSI) In Patients Diagnosed With Acute Pancreatitis

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ABSTRACT

Introduction - Acute Pancreatitis is a common condition presenting as acute abdomen. Various clinical scoring scales are available to evaluate the severity and prognosis of the acute pancreatitis. **Aim – To** compare the BISAP plus serum CRP with MCTSI in patients of acute pancreatitis. **Results** - When BISAP and CRP was compared to MCTSI , sensitivity was 84%, specificity was 100%, PPV was 100% NPV was 36.45 with p value of test <0.001 highly significant. **Conclusion** - We can conclude that addition of CRP with BISAP score has benefit in detecting severity of acute pancreatitis and were equally efficient as MCTS index

Key words- Acute Pancreatitis, Serum C-Reactive Protein (CRP), BISAP, modified CTSI (MCTSI).

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INTRODUCTION

In 1925, Sir Berkeley Moynihan declared that "acute pancreatitis is the most terrible of all the calamities occurring in conjunction with the abdominal viscera," which still holds true today[1,2]. Acute Pancreatitis is a common condition presenting as acute abdomen. This condition is broadly classified into two subtypes: first, oedematous or mild acute pancreatitis and second, a necrotizing or severe acute pancreatitis.[3] To assess the severity of AP various clinical scoring scales such as Ranson's criteria, Glasgow scales, simplified acute physiology (SAP) score , acute physiology and chronic health evaluation II (APACHE II) score, BISAP score and MCTSI criteria are used. CRP is a proven predictor of severity for acute pancreatitis when serum level over 150mg/L is measured within 48 hours after onset of symptoms. CT severity index (CTSI) derived by Balthazar grading of pancreatitis and the extent of pancreatic necrosis is now widely used in describing CT findings of acute pancreatitis and serves as the radiological scoring system[4]. Mortele in 2004 introduced Modified Computed Tomography Severity Index(MCTSI)[5], so the aim of present study is to assess the severity of acute pancreatitis by comparing BISAP plus serum C-reactive protein (CRP) score with modified CTSI in patients diagnosed with acute pancreatitis within 24 hrs of admission.

MATERIAL AND METHOD:

It was Prospective observational study. Total of 50 patients were taken for who were admitted to surgery department of Rajindra Hospital, Patiala, diagnosed to have Acute Pancreatitis(AP) from December 2015 to December 2017. Inclusion criteria involves the patients having acute pain in the abdomen within 24 hrs before admission in hospital. Serum amylase or lipase level raised more than 3 times normal cut off value. Ultrasonography of the abdomen within first 24hrs of hospitalization demonstrating changes consistent with acute pancreatitis. CECT whole abdomen proven cases of acute pancreatitis.

Exclusion criteria involves the patients admitted with acute pancreatitis, associated with other diseases at the time of admission (eg. CAD, DM, CKD, CLD etc.) Chronic pancreatitis patients and pancreatic malignancy.

MCTSI (Mortele et al 2004) was calculated.

Measurement of CRP levels
It was done in Microbiology Department of Rajindra Hospital, Patiala by using latex agglutination method and CRP levels more than 150 mg/L were taken as indicator of severe pancreatitis.

BISAP plus CRP score
BISAP score was calculated for every patient admitted to hospital and CRP more than 150mg/L was taken as CRP positive, and added with BISAP score and given 1 point. New score was calculated for every patient with inclusion of CRP.

Statistical analysis
Data was collected and analysed using SPSS v16 software, frequency and percentage were calculated BISAP plus CRP score was compared with MCTSI in assessing different prognostic indicators of acute pancreatitis. sensitivity, specificity PPV, NPV and area under curve was calculated and compared.

RESULTS

Table 1- Distribution of Modified CT severity index (MCTSI) score

MCTSI	**Frequency**	**Percentage(%)**
MILD(0-2)	4	08.0
MOD((4-6)	31	62.0
SEVERE(8-10)	15	30.0
Total	50	100.0

Modified CT severity index score (0-2) as mild , (4-6) as moderate and (8-10) as severe . In our study 4 (8%) patient - mild group, 31(62%) in moderate group and 15(30%) patient in severe group

Table 2 - Distribution of BISAP (with CRP) SCORE

BISAP(with CRP) SCORE	**Frequency**
<3	11(22%)
≥3	39(78%)
Total	50(100%)

In present study standard BISAP score with serum CRP was calculated and severity graded by score of < 3 (less severe) and > 3 (severe) for BISAP with CRP.

Table 3- Comparison of prognosis in acute pancreatitis with MCTSI

MCTSI	Local complications		Systemic complications		Pancreatic necrosis		ICU stay		Mortality	
	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent
Mild (score upto 4)	0	4	0	4	0	4	0	4	0	4
Severe (score more than 4)	21	25	12	34	24	22	8	38	6	40
p- value	0.569 >0.05 NS		0.553 >0.05 NS		0.06 >0.05 NS		0.589 >0.05 NS		0.545 >0.05 NS	
Specificity Sensitivity PPV NPV	13.8% 100% 45.7% 100%		10.5% 100% 26.1% 100%		15.4% 100% 52.2% 100%		9.5% 100% 17.4% 100%		9.1% 100% 13% 100%	
AUC (area under curve)	0.569		0.553		0.577		0.548		0.545	

Prognosis of acute pancreatitis was evaluated by assessing major outcome, local complication was present in 21 patient systemic complication was present in 12, pancreatic necrosis in 24 , ICU stay in 8 and mortality in 6 patient.

MCTSI index mild - 2&4 and severe - 6,8&10

For local complication MCTSI has excellent sensitivity (100%) and NPV(100%) but has low specificity (13.8%) and p value less than 0.05 data is not significant. For systemic complications MCTSI has excellent sensitivity and NPV (both 100%) and low specificity(10.5%) p value more than 0.05 , data not significant.

For pancreatic necrosis sensitivity and NPV is 100% specificity is 15.4% p value more than 0.05 data not significant.

For ICU stay it has good sensitivity and NPV (100%) but specificity is 15.4% p value more than 0.05 , data not significant

For mortality both sensitivity and NPV is is 100% but specificity is 9.1% .p value is more than 0.05 data not significant.

Table 4 - Comparison of prognosis in acute pancreatitis with BISAP plus CRP score

BISAP plus CRP score	Local complications		Systemic complications		Pancreatic necrosis		ICU stay		Mortality	
	Present	Absent	Present	Absent	Present	Absent	Present	Absent	Present	Absent
Mild <3	1	10	1	10	1	10	1	10	1	10
Severe ≥3	20	19	11	28	23	26	7	32	5	24
p- value	0.012 <0.05 HS		0.184 >0.05 NS		0.004 <0.05 HS		0.430 >0.05 NS		0.604 >0.05 NS	
Specificity	34.5%		26.3%		38.5%		23.8%		22.7%	
Sensitivity	95.2%		91.7%%		95.8%		87.5%		83.3%	
PPV	51.3%		17.9%		59%		17.9%		12.8%	
NPV	90.9%		90.9%		90.9%		90.9%		90.9%	
AUC (area under curve)	0.649		0.590		0.671		0.537		0.530	

While comparing BISAP plus CRP score with prognosis in acute pancreatitis, this proved to be better predicting pancreatic necrosis with area under curve 0.671, p value is less than 0.05 data is significant. With sensitivity 95.8% and NPV 90.9%

For local complications sensitivity is 95.2% and NPV 90.9% but has low specificity 34.5% and PPV is 51.3%. p value is less than 0.05 and data is significant.

For systemic complications sensitivity is 95.2% and specificity is 34.5% with NPV90.9 % and PPV is 51.3%. AUC for this test is 0.649.

For ICU stay sensitivity is 87.5% specificity is 23.8% NPV is 90.9%, PPV is 17.9%, AUC for test is 0.537 , p value is more than 0.05 data is not significant.

For mortality specificity is 22.7%, sensitivity is 83.3%, PPV is 12.8% and NPV is 90.9%,. AUC is 0.530 p value is more than 0.05 data not significant.

Table 5 - **Comparison of BISAP (with CRP) and MCTSI**

			MCTSI		Total
			less severe	severe	
BISAP AND CRP SCORE	BISAP AND CRP SCORE <3	Count	4	7	11
		% within BISAP AND CRP SCORE	36.4%	63.6 %	100.0%
		% within MCTSI	100.0%	15.%	22.0%
	BISAP AND CRP SCORE >=3	Count	0	39	39
		% within BISAP AND CRP SCORE	.0%	100.0 %	100.0%
		% within MCTSI	.0%	84.8%	78.0%
Total		Count	4	46	50
		% within BISAP AND CRP score	8.0%	92.0 %	100.0%
		% within MCTSI	100.0%	100.0%	100.0%

Senstivity	Specificity	Positive Predictive value	Negative Predictive value	P Value
84%	100%	100%	36.4%	0.001 (<0.05) HS

CRP was included in standard BISAP score, CRP level more than 150 mg/L was taken as positive value. A revised score was calculated with BISAP plus CRP , BISAP(CRP), cut off value 3 was taken and this score now compared with MCTSI and results analysed When BISAP and CRP was compared to MCTSI , sensitivity was 84%, specificity was 100%, PPV was 100% NPV was 36.45 with p value of test <0.001 highly significant.

DISCUSSION

In our study, acc. to MCTSI score patients categorized as maximum of 31 out of 50 (62%) had moderate, 15 out of 50(30%) had severe and 4 out of 50(8%) patients had mild pancreatitis. In a study by **Mortele et al**[5],42 out of 66(63.63%) patients had mild pancreatitis, 19 out of 66 (28.78%) had moderate and 5 out of 66(7.57%) had severe pancreatitis In our study, when BISAP score graded AP as mild(<2) in 6 out of 50 (12%) and severe(≥2) in 44 out of 50 (88%) patients. In contrast to a study by **Papachristou GI et al**[6],138 out of 185(74.6%) patients had mild and 47 out of 185(25.4%) patients had severe pancreatitis. The presence of higher number of patients severe pancreatitis in our study is attributed to the fact that our hospital being a tertiary care centre, very sick patients having severe pancreatitis were referred to us. **Mortele et al**[5] found that MCTSI is superior to CTSI in predicting the severity of pancreatitis In this study a total of 10 (15%) out of the 66 patients underwent surgical after grading **Balthazar et al**[7] in 1990 reported that mild pancreatitis exhibited 3% mortality and 8 % morbidity. Patients with CTSI of 4-6 had 6% mortality and 35% morbidity while CTSI of 7-10 exhibited 17% mortality and 92% complication rate. **Mir et al**[8] in a prospective study on 350 patients of acute pancreatitis observed that Group C patients with severe pancreatitis had the highest complication rate (91.6%) and highest mortality rate (16.67%). Group A patients with mild pancreatitis had the lowest complication rate (6.25%) and 0% mortality.**Simchuk EJ et al**[9] (2000) out of 268 patients,11 patients died.(4%). A CTSI >5 significantly correlated with death (P = 0.0005), prolonged hospital stay (P <0.0001), and need for necrosectomy(P <0.0001). Patients with a CTSI >5 were 8 times more likely to die In our study,24 patient out of 50 developed necrosis, BISAP plus CRP score was less than 3 in 1(4%) patient and more than and equal to 3 in 23(96%) patient . The data was found to be statistically significant. In a study done by **Khanna A K et al**[10]17 pt. developed necrosis out of which 7 (41.1%) had BISAP score less than 2 and 10 (58.9%)had score more than equal to 2.Both scoring system correlated positively with MCTSI.BISAP PLUS CRP score has better specificity (100%) and PPV(100%) as compared to BISAP score alone having specificity of (75%). PPV (97.7%), but BISAP PLUS CRP score has definitely lower sensitivity(84%) and NPV (36.4%).In a study done by **Leung TK** et al[11](2005), complications included pseudocyst formation in 21 (20%) and abdominal abscess in two cases. This study concluded that complications are often the major reasons that resulted in the death of AP patients. The management of complications is important to reduce the mortality rate. In this study, they found that the higher CTSI associated with higher complication rate.

CONCLUSION

When BISAP and CRP was compared to MCTSI , sensitivity was 84%, specificity was 100%, PPV was 100% NPV was 36.45 with p value of test <0.001 highly significant. It is concluded that addition of CRP with BISAP score has benefit in detecting severity of acute pancreatitis and were equally efficient as MCTS index.

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