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COMPARATIVE EVALUATION OF BISAP SCORE AND COMPUTED TOMOGRAPHY SEVERITY INDEX AS A PREDICTOR FOR SEVERITY OF ACUTE PANCREATITIS

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ABSTRACT

Background: Acute pancreatitis is a catastrophic condition with many complications and poses a great challenge to the treating surgeon. 10-20% of the patients who develop complications will not recover with simple supportive therapy. The purpose of this study was to compare the clinical scoring systems and radiological scoring for predicting the severity of acute pancreatitis on admission. **Methods:** This prospective study was conducted from October 2020 to September 2022. Patient admitted with diagnosis of acute pancreatitis included in this study. Comparative study done for BISAP scoring and MCTSI score for prediction of severity of acute pancreatitis. **Results:** BISAP score is highly sensitivity (100%), specificity (65%) at score more than 3 and MCTSI score sensitivity (85%), Specificity (75%) at score more than 7. **Conclusions:** BISAP score is better predictor of severity in acute pancreatitis and can safely be utilized to predict severity of acute pancreatitis in situations where use of CT is limited due to cost factor or availability. BISAP score is a scoring system that can be easily made (bedside scoring) and it is better than MCTSI score.

KEYWORDS : Acute pancreatitis, BISAP score, MCTSI score

INTRODUCTION

Acute Pancreatitis is a common disorder due to development of acute inflammation of normally existing Pancreas.[1] The incidence of acute pancreatitis (AP) has increased during the past 20 years. AP is responsible for more than 300,000 hospital admissions annually in the United States. Most patients develop a mild and self- limited course; however, 10% to 20% of patients have a rapidly progressive inflammatory response associated with prolonged length of hospital stay and significant morbidity and mortality.

Patients with mild pancreatitis have a mortality rate of less than 1%, but in severe pancreatitis, this increases up to 10% to 50%.[6] The highest mortality rates in this group of patients are those who present with multiple organ dysfunction syndrome. Mortality in pancreatitis has a bimodal distribution. In the first two weeks (early phase), it is a result of multiple organ dysfunction caused by the intense inflammatory cascade triggered by pancreatic inflammation. Mortality after two weeks (late phase) is often caused by septic complications.

Acute Pancreatitis was diagnosed when two of the three following criteria were met:
1. Elevated Amylase/Lipase defined as three times the upper limits of normal
2. Radiological evidence of pancreatitis,
3. Abdominal pain.

METHODS

Study Design: Prospective study of patients admitted at Rajah Muthiah Medical College Hospital, Chidambaram for Acute pancreatitis.

Source of Data: Study to be conducted among the patients who is diagnosed to have Acute pancreatitis and admitted at Rajah Muthiah Medical college Hospital, Chidambaram during the study period.

Study Period: October 2020 to September 2022.

Study Population: 50 patients attending the surgical emergency ward with clinical features of Acute pancreatitis admitted in Rajah Muthiah Medical College Hospital, Chidambaram.

Inclusion Criteria:
• Characteristic abdominal pain.
• Serum amylase/lipase (>3 times of its normal value).
• Presents with in 24 hours of onset of symptoms
• Age: 30 to 70
• Chest x – ray PA view , x ray erect abdomen

Exclusion Criteria:
• Pancreatic abscess
• Pancreatic pseudocyst
• Patients with more than 24 hours of acute onset of abdominal pain
• CKD and renal failures patients
• CVA patients

Table 1: BISAP Score component.

| Component	Point
Blood urea nitrogen (BUN) >25 mg/dl	1 point
Impaired mental status (Glasgow coma scale <15)	1 point
SIRS, defined as ≥2 of the following:	
Temperature <36 degree C or >38 degree C; Respiratory rate >20 beats per minute or PaCO2<32 mmHg;	1 point
Pulse >90 beats/min	
WBC count <4×109 or >12×109/l or >10% immature bands	
Age >60 years	1 point
Pleural effusion on imaging (chest X-ray or ultra-sonography)	1 point

<3 Mild pancreatitis; ≥3 severe pancreatitis

Table 2: CT severity index.

Parameters	Points
Grading of pancreatitis	
Normal pancreas	0

Enlargement of pancreas	1
Peripancreatic inflammation	2
Single acute peripancreatic fluid collection	3
≥2 acute peripancreatic fluid collection	4
Pancreatic necrosis	
None	0
≤30%	2
30%-50%	4
≥50%	6

RESULTS

The 50 persons with features of acute pancreatitis were enrolled in this study after obtaining an informed consent.
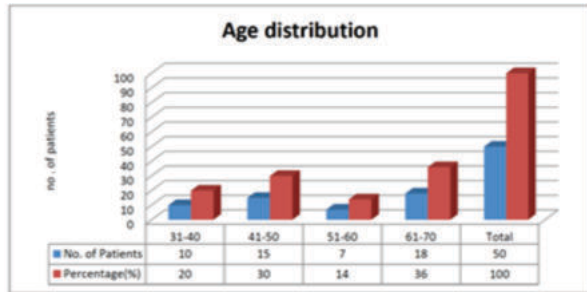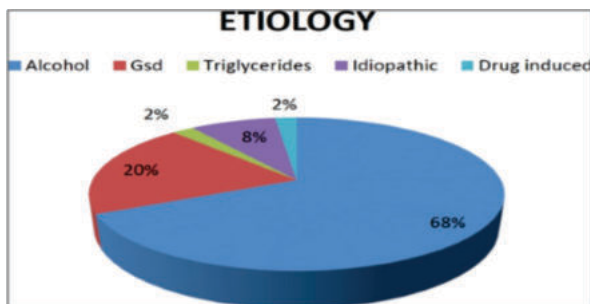

Graph-1: Age distribution

The age group of patients enrolled in this study ranges from 30 to 70 yrs. The peak incidence of the disease was noted in the 6th decade of life.

Gender Distributions

Out of 50 patients enrolled in this study there were 45 male and 5 female patients.
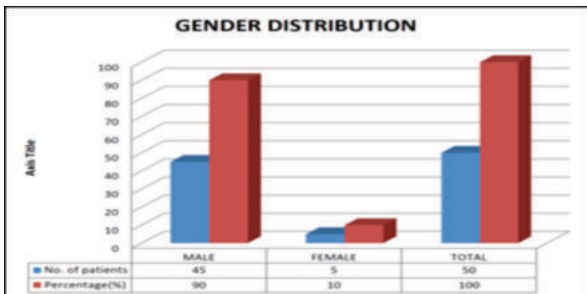
Graph – 2: Gender Distributions

Graph – 3: Etiology

AGE
Table 3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	50	35	68	52.26	10.222
Valid N (listwise)	50				

Table 4: Age Group

	Frequency	Percent	Valid Percent	Cumulative Percent
30-45	16	32.0	32.0	32.0
46-60	16	32.0	32.0	64.0

Valid				
>60	18	36.0	36.0	100.0
Total	50	100.0	100.0	

Table 5: Age Group 2

		Frequency	Percent	Valid Percent	Cumulative Percent
	1.00	11	22.0	22.0	22.0
	2.00	14	28.0	28.0	50.0
Valid	3.00	7	14.0	14.0	64.0
	4.00	18	36.0	36.0	100.0
	Total	50	100.0	100.0	
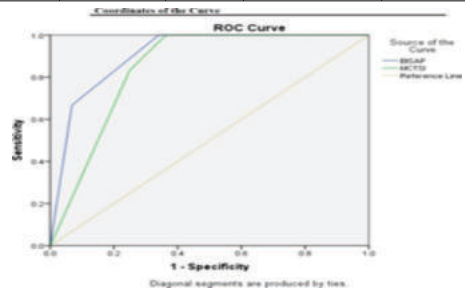
Graph – 4: ROC curve

Table 6: BISAP Group * Outcome Crosstabulation

	Outcome		Total
	Alive	Dead	
Count	20	0	20
% within BISAP GROUP	100.0%	0.0%	100.0%
1.00			
% within OUTCOME	45.5%	0.0%	40.0%
% of Total	40.0%	0.0%	40.0%
BISAP GROUP			
Count	24	6	30
% within BISAP GROUP	80.0%	20.0%	100.0%
2.00			
% within OUTCOME	54.5%	100.0%	60.0%
% of Total	48.0%	12.0%	60.0%
Count	44	6	50
% within BISAP GROUP	88.0%	12.0%	100.0%
Total			
% within OUTCOME	100.0%	100.0%	100.0%
% of Total	88.0%	12.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2- sided)	Exact Sig. (2- sided)	Exact Sig.A (1- sided)
Pearson Chi-Square	4.545a	1	.033	.069	.037
Continuity Correctionb	2.849	1	.091		
Likelihood Ratio	6.668	1	.010		
Fisher's Exact Test					
N of Valid Cases	50				

Table 7: Coordinates of the Curve

Test Result Variable(s)	Positive if Greater Than or Equal Toα	Sensitivity	1 – Specificity
BISAP	.00	1.000	1.000
	1.50	1.000	.760
	2.50	.960	.240
	3.50	.800	.040
	4.50	.280	.000
	6.00	.000	.000

MCTSI	-1.00	1.000	1.000
	1.00	1.000	.960
	3.00	.960	.360
	5.00	.880	.000
	7.00	.640	.000
	9.00	.000	.000

Table-8: MCTSI Group * Outcome Cross tabulation

		Outcome		Total
		Alive	Dead	
	Count	33	1	34
% within MCTSI Group 1.00		97.1%	2.9%	100.0%
% within Outcome		75.0%	16.7%	68.0%
% of Total		66.0%	2.0%	68.0%
MCTSI Group				
	Count	11	5	16
% within MCTSI GROUP 2.00		68.8%	31.2%	100.0%
% within OUTCOME		25.0%	83.3%	32.0%
% of Total		22.0%	10.0%	32.0%
	Count	44	6	50
% within MCTSI GROUP Total		88.0%	12.0%	100.0%
% within OUTCOME		100.0%	100.0%	100.0%
% of Total		88.0%	12.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2- sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	8.257a	1	.004		
Continuity Correctionb	5.794	1	.016		
Likelihood Ratio	7.795	1	.005		
Fisher's Exact Test	50			.010	.010

Table-9: Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	f	5	10.0	10.0	10.0
	m	45	90.0	90.0	100.0
	Total	50	100.0	100.0	

Table-10: Etiology

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Alcohol	34	68.0	68.0	68.0
	drug induced	1	2.0	2.0	70.0
	GSD	10	20.0	20.0	90.0
	Idiopathic	3	6.0	6.0	96.0
	Idipathic	1	2.0	2.0	98.0
	Triglyceride	1	2.0	2.0	100.0
	Total	50	100.0	100.0	

DISCUSSION

Acute pancreatitis is a common disorder with multiorgan involvement. Severe pancreatitis have high morbidity and mortality. Early admission at the time of onset of abdominal pain is the early prediction of severity of acute pancreatitis. In this study, the scoring systems clinical and radiological (BISAP and MCTSI) were compared and analysed to assess the severity in patients with acute pancreatitis and this study is similar to other comparative studies done by others.[3]

Acute pancreatitis found 12 times more common in males than females. This study explains thus alcohol has found to be most common etiological factor and it's more common in males.

Patient's less than 30 years were excluded because the normal values of pulse rate and respiratory rate found to be higher at younger age group. So, if these patients would have included in this study, they might have got higher scores incorrectly and could have predicted incorrectly as at risk for developing severe pancreatitis, even with mild disease.

In this study the mean age was 52.6 years. The mean age of non- survivors in this study was found to be 61 years as compared to survivors 43.33 years. Taking 70 years as cut off value, has increasing incidence of mortality.[2] Thus, age is major significant factor in predicting the severity acute pancreatitis.

The most common etiological factor in this study was alcohol and gall stones as second most common cause 68% and 20 % respectively. The mean length of hospital was 8.32±7.742. BISAP & MCTSI is correlated well for mortality with high positive value of 0.904 which is highly significant (0.01).[5] The ROC analysis for Mortality showed BISAP score has AUC of 0.904, P value (0.001) which is more than MCTSI score which has AUC of 0.845, P value (0.007). So BISAP is highly accurate with P value (0.001) & confidence interval of 0.873. BISAP score is highly sensitive (100 %), specificity (60%) at score more than 3.5 & MCTSI score sensitivity (85 %), specificity (77%) at score >7.[4]

Cross tabulation test shows Chi –Square value of 4.545 with degree of freedom of 1 & P value 0.33 for BISAP scoring which is Better Severity Predictor when compared to MCTSI which has Chi – Square Value of 8.352 with degree of freedom 1 & P value 0.04. The ROC curve for complications showed BISAsP score AUC (0.903) with P value (0.001) and MCTSI score AUC (0.850) with P value (0.008), So BISAP is HIGHLY ACCURATE in detecting complications when compared to the MCTSI score. BISAP score of more than 2 has high sensitivity 96 % & specificity 76% And MCTSI score of more than 3 has sensitivity 96% & specificity 64% in detecting complications.

BISAP score found to have more sensitivity, specificity as well as Diagnostic accuracy than MCTSI score in predicting the severity of acute pancreatitis. Hence BISAP score found to predict a greater number of patients and likelihood of progressing to severity of disease. Larven et al stated that the same in their study 42. Thus BISAP is considered as early predicting scoring system for assessing the severity than MCTSI score.

CONCLUSION

- This study shows Alcohol (68%) was found to be the most common etiological factor for acute pancreatitis.
- Males gender were most commonly affected by disease than female gender.
- The most common age group of patients affected were around 60 years
- The BISAP clinical scoring predicts the Mortality significantly over the MCTSI radiological scoring in patients with severe acute pancreatitis.[7]
- The BISAP score predicted the disease severity significantly over the MCTSI score in patients with acute pancreatitis.

From this study, we conclude that BISAP score could be simple and accurate clinical scoring system for the evaluation of disease severity in acute pancreatitis, so CT needed not be taken in first 24 hours of admission.

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