



## **Comparison of Various Scoring Systems in Predicting the Outcome in Acute Alcoholic Pancreatitis**

Dr. Devipriya Rajendran <sup>1</sup>, Dr. Anand Vadivel <sup>2</sup>, Dr. Sumathi Periyasamy <sup>3</sup>

*1. Junior Resident in Department of General Surgery GKMC Salem*

*2 –Specialist Gastroenterology NMC Royal HOSPITAL Abudhabi.*

*3. Associate Professor in Department of General Surgery GKMC Salem.*

**\*Correspondence to:** Dr. Devipriya Rajendran, Junior resident in Department of general surgery. GKMC Salem.

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**Abstract**

**Background:** *Acute Alcoholic pancreatitis is a common disease with wide clinical scenario. It may vary in severity, from mild self-limiting to pancreatic necrosis with life-threatening sequelae. Severity of acute Alcoholic pancreatitis is linked to the presence of systemic organ dysfunctions and/or necrotizing pancreatitis. Various scoring systems were involved in identifying the severity of the disease. The standard single score to identify the severity remains uncertain.*

**Aim and objectives:** *The present study was aimed to assess the clinical profile and the efficacy of various scoring systems in predicting the complications and outcome of patients with alcoholic pancreatitis.*

**Methodology:** *This prospective observational study was carried out for two years in a tertiary care center from South India, Tamil Nadu [Salem Medical College and Hospital]. The diagnosis of AP was made based on Atlanta criteria<sup>5</sup>, with history of alcohol intake > 21units /week and a total of 84 patients were included. All patients were assessed by Bedside index for severity in AP (had 38.7 % early discharge score. These scores were analyzed to predict the severity of pancreatitis and complications with the help of categorical data Chi –Square test.*

**Results:** *A total of 84 patients were included in this study. Incidence of alcoholic pancreatitis is mostly seen in males, particularly of middle age group. All the patients had significant alcohol history. Out of them 85.7% of patients also revealed smoking history. In this study, since alcohol is abused by young male population than others, they are the major study group. Most of the patients had no co morbidities (73.8%). ICU stay seen in 46.4 % of patients (< 2week). On evaluation, 77.4% patients of the study population had mild pancreatitis; while 22.6% patients had severe acute pancreatitis.*

*Duration of discharge is directly proportional to the severity of pancreatitis. 70.2 % patients of the study population had mild pancreatitis, while 29.7% patients had SAP as determined by CT, which is taken as the standard to predict the severity of pancreatitis for the most common symptom of abdominal pain or it could be due to referral bias. All scores were predicting the complication significantly [P-value<0.05].*

**Conclusion:** *All the scoring systems were compared and found to be equally effective in predicting the complications. None of the scoring systems were found to be inferior to the other in predicting complications. Their variables are also not much complex and cumbersome; hence they are found to be user friendly scores.*

**Keywords:** *Acute pancreatitis, Alcoholic Pancreatitis., BISAP, Harmless Acute Pancreatitis Score [HAPS], Glasgow score, SIRS, and Modified Balthazar score.*

## **Introduction**

Acute pancreatitis (AP) is a serious condition, with increased incidence at present [1]. It also shows an unpredictable outcome. Patient may improve with supportive care as in two thirds or may show serious local and systemic complications due to an intense inflammatory response, such as multi organ failure or necrosis. [2]

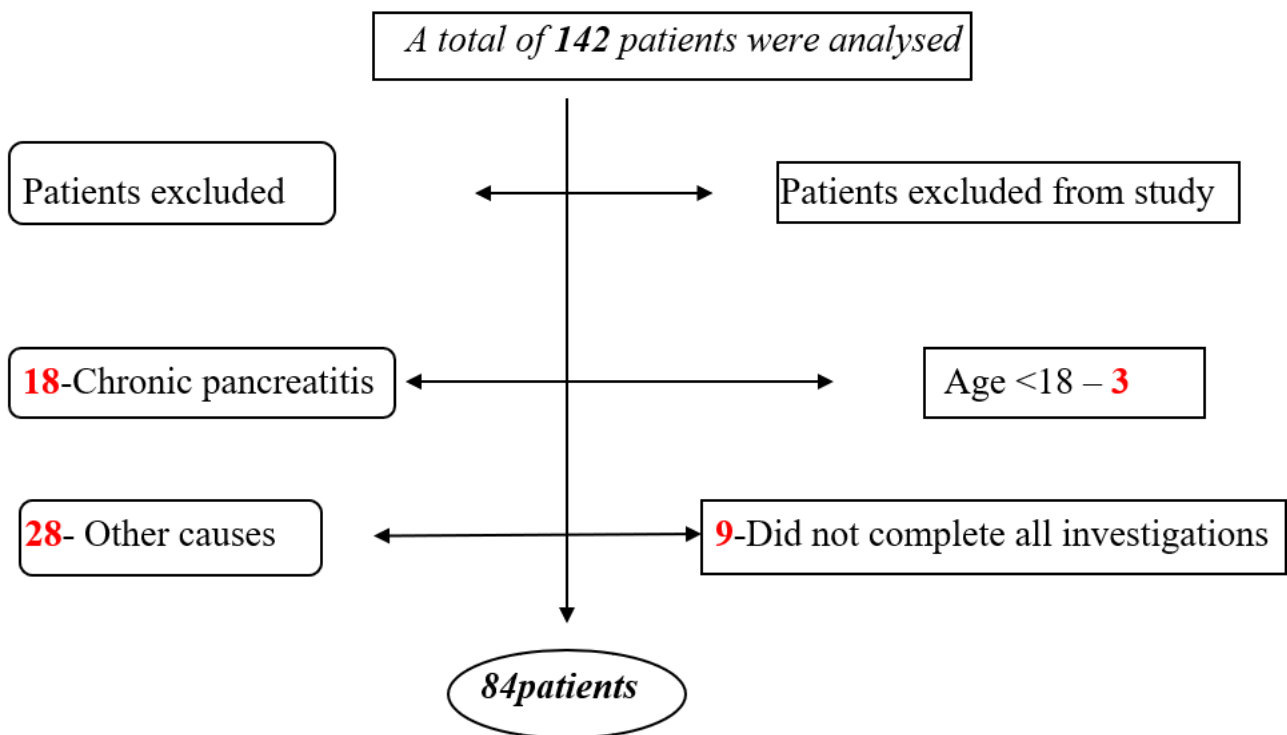
These patients should be triaged on admission, as severe pancreatitis group requires intensive resuscitation (SAP). Initial intensive fluid resuscitation within first 24-48 hours management may alter the course of SAP. If there is > 24 hour delay in treating with fluids mortality rate doubles [3]. Outcome in AP also depends on pancreatic necrosis. Pancreatic necrosis patients show morbidity of 80% and a mortality ranging from 6 to 40%.

## **Materials and Methods**

A total of eighty four (n=84) patients of acute pancreatitis were enrolled in the study based on the inclusion criteria - Age > 18 years, history of alcohol intake > 21units /week. The Atlanta classification [5] was used for diagnosis of AP. They were followed prospectively for 6 months after discharge from the hospital or till

death, whichever was earlier. Informed consent was obtained from all participants, and this study was approved by the Institute Ethics Committee. All patients with Pancreatitis of other etiology, Chronic Pancreatitis, Patient with known co morbid disorders of respiratory, cardiovascular or renal systems were excluded from the study.

A total of eighty four (n=84) patients of acute pancreatitis were enrolled in the study based on the inclusion criteria. The exclusion of other patients is given in Figure below.



**Figure 1:** Patient flow chart

Various clinical and biochemical parameters were studied on admission and 48 hours after admission. Data were collected regarding demographics, detailed history and physical examination, including complete hemogram, Liver Function Tests, Blood urea, Serum creatinine, Blood Glucose, Serum Triglycerides, Serum Calcium and Computerized Tomography abdomen.

All patients were assessed for Bedside index for severity in AP (BISAP), Harmless Acute Pancreatitis Score [HAPS], Glasgow score, SIRS, and Modified Balthazar score. Patients were followed up until discharge or death.

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## Statistical Analysis

The collected data were analysed with IBM.SPSS statistics software 23.0 Version. To describe about the data descriptive statistics frequency analysis, percentage analysis were used. To find the significance in categorical data Chi-Square test was used. In the above statistical tool the probability value less than 0 .05 is considered as significant level.

## Results

A total of 142 patients were analyzed. Out of them 84 patients were included in the study. Prevalence of alcoholic pancreatitis is common in the age group of 20 to 39 year (57.1%). Abdominal pain with obstipation was

the predominant presenting complaint in the group (41.7% - 35 patients). The presentation of abdominal pain and abdominal pain with distension is 17.9% each. 15.5% of patients presented with abdominal pain, nausea and vomiting. Only least number of patients (7.1%) presented with abdominal pain and fever. As many of the patients were young alcoholics, 73.8% (62 patients) had no other co morbidities.

All patients were evaluated with various scoring systems, BISAP score <3 was observed in 88.1 % (74 Patients) and > 3 was 11.9 % (10 patients) .HAPS score: In the group, 38.1% (32 patients) had score of 1. 34.5 % (29 patients) had score of 2. 23.8 % ( 20 patients) had score of 3. 3.6 % ( 3 patients) had score of 4. Glasgow score: Score of 1-2 is seen in 65.5 % (55 patients). 34.5 % (29 patients) had score of >= 3. APACHE score: 73.8% (62 patients) had score of <4. 16.7 % ( 14 patients) had score of 5-9. 9.5 % ( 8 patients) had score of 10-14. SIRS score: 63 .1% (53 patients) had score of <2. 36.9 % (31 patients) had score >2. Modified BALTHAZAR scores: Majority of patient's i.e. 70.2 % (59) had score of 0-3. 21.4 % (18 patients) had score 4-6. 8.3% ( 7 patients) had score 7-10.

ICU stay: 46.4 % (39 patients) had severe pancreatitis and have been admitted in ICU. Remaining 45 patients (53.6%) had no necessity for ICU stay

Longer length of hospital stay is seen in 10.7 % (9 patients) i.e. greater than 4 weeks. 2.4 % (2 patients) had hospital stay of 4 weeks. 9.5 % (8 patients) had stay of 3 weeks. 40.5 % (34 patients) had stay of 2 weeks. 36.9 % (31 patients) had hospital stay of 1 week.

## Comparison of BISAP with complication:

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In patients with BISAP <3, 95.9% of patients (47 out of 49) had no complications. With BISAP >3, patient showed 100% local and systemic complication. BISAP showed highly significant p value in predicting complications. Hence BISAP score is reliable in predicting complications.

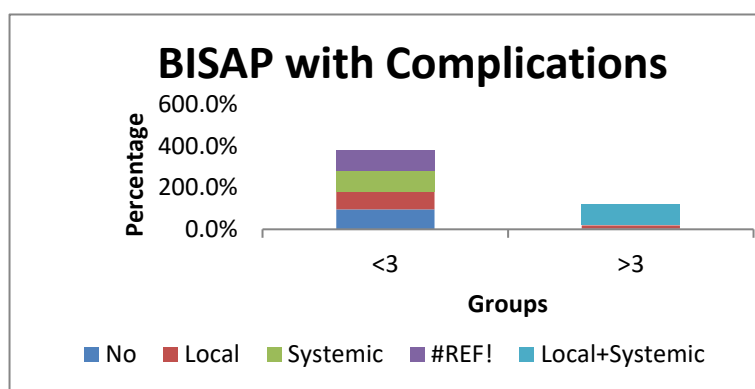
Comparison between BISAP with Complications										
			COMPLICATIONS					Total	$\chi^2$ - value	P-value
			No	Local	Systemic	Death	Local Systemic			
BISAP	< 3	Count	47	18	6	3	0	74	26.886	0.0005 **
		%	95.9%	85.7%	100.0%	50.0%	0.0%			
	> 3	Count	2	3	0	3	2	10		
		%	4.1%	14.3%	0.0%	50.0%	100.0%	11.9%		
Total		Count	49	21	6	6	2	84		
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		

\*\* Highly Significant at P < 0.01 level

**Table 2:** Role of BISAP scores in predicting complications:

Score	No	Local	Systemic	Death	Local+Systemic
<3	95.9%	85.7%	100.0%	50.0%	
>3	4.1%	14.3%		50.0%	100.0%

**Figure 2:** Role of BISAP scores in predicting complications:



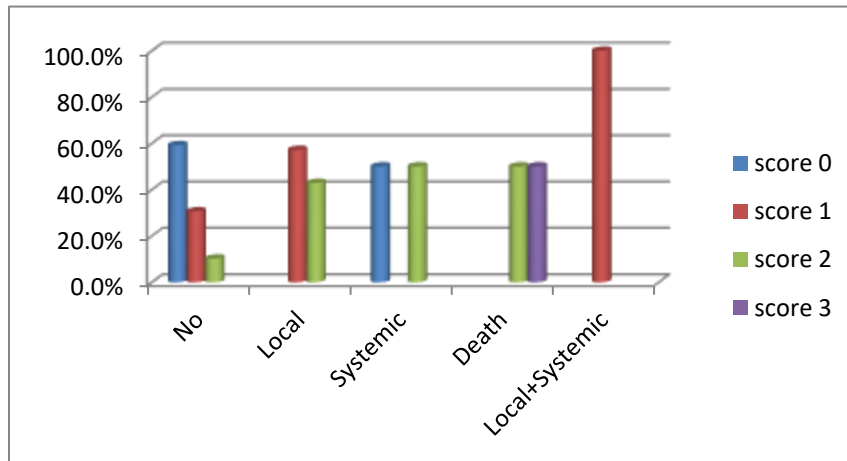
**Comparison of HAPS with complication:**

On evaluating with HAPS score, patients showing HAPS score 1 ,incidence of local/systemic complications and death is low (only 3/32) and 59.2% had no complications whereas with HAPS score 3, 18 of 23 patients higher morbidity and mortality (100%).HAPS showed highly significant p value (<0.01) in predicting complications.

**Table 5:** Role of HAPS scores in predicting complications:

Comparison between HAPS with Complications nn										
		COMPLICATIONS					Total	χ <sup>2</sup> - value	P- value	
		No	Local	Systemic	Death	Local+Systemic				
HAPS	0	Count	29	0	3	0	0	76.890	0.0005 **	
		%	59.2%	0.0%	50.0%	0.0%	0.0%			38.1%
	1	Count	15	12	0	0	2			29
		%	30.6%	57.1%	0.0%	0.0%	100.0%			34.5%
	2	Count	5	9	3	3	0			20
		%	10.2%	42.9%	50.0%	50.0%	0.0%			23.8%
	3	Count	0	0	0	3	0			3
		%	0.0%	0.0%	0.0%	50.0%	0.0%			3.6%
Total	Count	49	21	6	6	2	84			
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

\*\* Highly Significant at P < 0.01 level



score	No	Local	Systemic	Death	Local+Systemic
0	59.2%		50.0%		
1	30.6%	57.1%			100.0%
2	10.2%	42.9%	50.0%	50.0%	
3				50.0%	

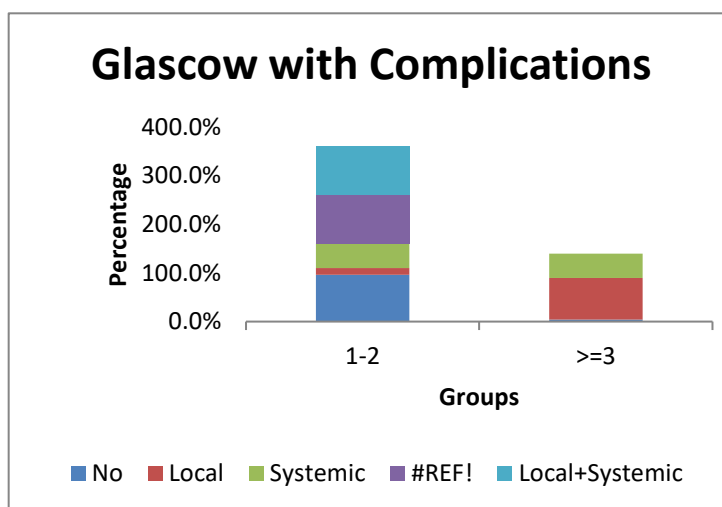
**Comparison of Glasgow score with complication:**

Grouping with Glasgow score, out of all patients with score 1-2, 95.9% had no complications. Score with more than 3 showed 100% mortality. Hence, Glasgow score showed highly significant p value (<0.01) in predicting complications.

**Table 7:** Role of Glasgow score in predicting complications:

Comparison between GLASGOW with Complications										
			COMPLICATIONS					Total	χ <sup>2</sup> - value	P-value
			No	Local	Systemic	Death	Local+Systemic			
GLASGOW	1-2	Count	47	3	3	0	2	55	57.502	0.0005**
		%	95.9%	14.3%	50.0%	0.0%	100.0%	65.5%		
	>=3	Count	2	18	3	6	0	29		
		%	4.1%	85.7%	50.0%	100.0%	0.0%	34.5%		
Total	Count	49	21	6	6	2	84			
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		

\*\* Highly Significant at P < 0.01 level





score	No	Local	Systemic	Death	Local+Systemic
1-2	95.9%	14.3%	50.0%		100.0%
>3	4.1%	85.7%	50.0%	100.0%	

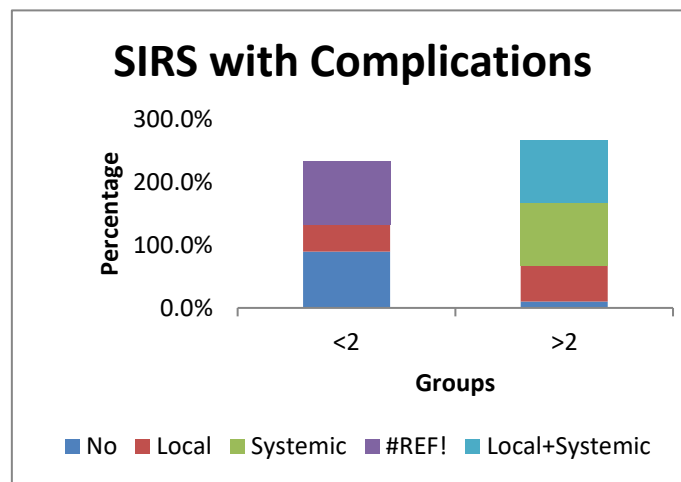
**Comparison of SIRS with complication:**

In the study group, 49 patients had no complications. Out of 49 patients 44 (89.8%) were in SIRS score <2 and 5 patients (10.2%) were in SIRS >2. With SIRS score >2 there is 100% mortality and high morbidity (26 patients out of 31). Thus we infer that SIRS score is highly significant in predicting complications.

Comparison between SIRS with Complications										
			COMPLICATIONS					Total	$\chi^2$ - value	P-value
			No	Local	Systemic	Death	Local+Systemic			
SIRS	< 2	Count	44	9	0	0	0	53	42.632	0.0005 **
		%	89.8%	42.9%	0.0%	0.0%	0.0%	63.1%		
	> 2	Count	5	12	6	6	2	31		
		%	10.2%	57.1%	100.0%	100.0%	100.0%	36.9%		
Total	Count	49	21	6	6	2	84			
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%			

\*\* Highly Significant at P < 0.01 level

score	No	Local	Systemic	Death	Local+Systemic
<2	89.8%	42.9%			
>2	10.2%	57.1%	100.0%	100.0%	100.0%



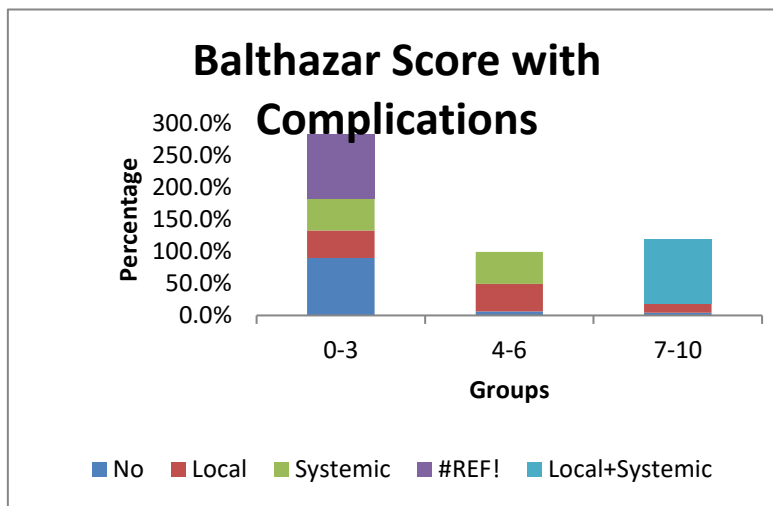
**Modified BALTHAZAR score with complications**

On classifying patients with Modified BALTHAZAR score, patients with score 0 to 6, rate of local and systemic complications is less than or equal to 50%. Patients with score 7 to 10, 100% mortality is observed.

Modified BALTHAZAR score showed highly significant p value (0.01) in predicting complications.

Comparison between Modified BALTHAZAR score with Complications										
			COMPLICATIONS					Total	χ <sup>2</sup> - value	P- value
			No	Local	Systemic	Death	Local+Systemic			
Modified BALTHAZAR score	0 - 3	Count	44	9	3	3	0	59	44.994	0.0005 **
		%	89.8%	42.9%	50.0%	50.0%	0.0%	70.2%		
	4 - 6	Count	3	9	3	3	0	18		
		%	6.1%	42.9%	50.0%	50.0%	0.0%	21.4%		
	7 - 10	Count	2	3	0	0	2	7		
		%	4.1%	14.3%	0.0%	0.0%	100.0%	8.3%		
Total		Count	49	21	6	6	2	84		
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		

\*\* Highly Significant at P < 0.01 level



score	No	Local	Systemic	Death	Local+Systemic
0-3	89.8%	42.9%	50.0%	50.0%	
4-6	6.1%	42.9%	50.0%	50.0%	
7-10	4.1%	14.3%			100.0%

**Discussion**

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Pancreatitis show varying morbidity and mortality especially the severe necrotizing type. This mortality will be even more if there is bacterial contamination. Severe form of the disease may have a lesser mortality if diagnosed and treated early. Both mild and severe forms requires vigilant evaluation and management.

In our study pancreatitis predicting scores SIRS, BISAP, Glasgow, HAPS and CTSI (modified BALTHAZAR score) were analyzed to predict the severity of pancreatitis. Scores with Simpler and easily available parameters and markers were taken for the study. With limited resources, the simplest and the most economical of the scores or markers would be of great help in management of cases.

Out of 142 patients alcohol induced pancreatitis was higher (51%) than gall Stone induced pancreatitis. This can be explained by the greater incidence of alcohol abuse in Tamilnadu. Incidence of alcoholic pancreatitis is mostly seen in young males, particularly of middle age group. All the patients had significant alcohol history. Out of them 85.7% were associated with smoking history. In this study, alcohol which is mostly abused by men than women and younger age group than old, prevalence is more in young males. Most of the patients had no co morbidities (73.8%), because Prevalence of alcoholic pancreatitis was high in the young healthy males who were addicted to the alcohol. This incidence is similar to Venkata Krishnan et al. from Chennai epidemiology of study.

In our study HAPS, BISAP, Glasgow, modified BALTHAZAR and SIRS are taken for evaluation, all of which have easily obtainable variables and can be calculated at the time of admission. This study evaluated the efficacy of these scores in comparison with complications and CT severity in predicting severe acute pancreatitis. This study suggests all the pancreatic predictive scores have an excellent predictive value in predicting the outcome of acute pancreatitis. None of the scores were superior to the other in predicting SAP. This is in similarity with studies by Papachristou, Park, and Khanna [7,8]

Score > 3 of BISAP had 80% of complications including death in all patients. BISAP showed highly significant p value in predicting complications. The study correlates with the study by Gompertz et al's study in Spain who reported a BISAP sensitivity, specificity, positive and negative predictive value of 71.4, 99.1, 83.3 and 98.3% respectively.[9]

HAPS score in this study was similar to BISAP score, HAPS score 0 (90.6%) had no complications and early discharge. High score was associated with death in all patients. HAPS showed highly significant p value (<0.01) in predicting complications. This is concordance with the study by Lankisch et al [10] who stated that HAPS had a 98% efficacy in predicting SAP.

Singh et al[11] showed that SIRS when present on admission had a sensitivity of 85%-100% in predicting SAP and a NPV of 98%-100%. SIRS score < 2 score (83 %) had no complication & > 2 had only (16 %) no complication.

With the Glasgow score < 2, 50 patients had early discharge (< 2 weeks) & and with the score > 3 hospital stay increased in 73.7 %. Glasgow score < 2 – 85.4 % patients had no complication & with score > 2 – 93.1 % had complications. This is similar to Deepa et al[12] Glasgow criteria had high sensitivity (85.1%), NPV (79.4) in predicting ICU-admission.

### **Mortality**

There were 6 (7.1%) deaths in the study population; all the patients had high pancreatitis predicting scores. The mortality is higher than as reported by Mann and the national survey of Japan[13].

### **Conclusion**

We compared various scoring systems like BISAP, HAPS, SIRS, Glasgow, modified BALTHAZAR with the outcome of patients. The patients who were with lesser scores had better outcome with no or mild complications. Patients who had greater pancreatitis scores on admission had severe complications or death in hospital. Hence we conclude that all the scores taken for the study predicted the outcome, further course and even the complications associated with acute alcoholic pancreatitis.

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