A COMPARATIVE STUDY BETWEEN APACHE II AND RANSON SCORING SYSTEMS IN PREDICTING THE SEVERITY OF ACUTE PANCREATITIS

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ABSTRACT

BACKGROUND

Acute pancreatitis is a condition which involves a wide variety of clinical signs and symptom. The course of which ranges from a mild self-limiting inflammatory process to a more fulminant course which could involve multiorgan dysfunction and lead to mortality. There are several scoring systems in predicting the severity of acute pancreatitis of which the commonly used are APACHE II and Ranson's scoring systems. But the usage of these two are still under debate and hence the essential for the study.

The aim and objective of the study is to compare the RANSON scoring system with APACHE II in predicting the severity of acute pancreatitis.

MATERIALS AND METHODS

The present study is a prospective study of 50 cases of acute pancreatitis admitted in Government Tiruvannamalai Medical College Hospital, Tiruvannamalai, during the study period from May 2015 to September 2015. Fifty cases for the purpose of the study were selected on the basis of the nonprobability (purposive) sampling method.

CONCLUSION

The study includes 50 patients with acute pancreatitis, peak incidence was in the fourth decade with alcohol accounting for 30.3% of the attacks while gallstones accounted for 40.4%. An APACHE II score of ≥10 on admission predicted a complicated outcome in patients with acute pancreatitis with a sensitivity of 100%, specificity of 80%, positive predictive value of 62% and negative predictive value of 100%. Scores below 10 predicted an uncomplicated outcome. On admission APACHE II score was a better predictor of systemic complications (sensitivity 100%) than RANSON score (sensitivity 66.7%). Patients with APACHE II scores>10 benefitted from initial ICU care with aggressive therapy aimed at disease cure and dealing with the complications. Hence APACHE II Scoring can be used as a reliable tool in predicting the severity and prognosis than RANSON scoring in patients with Acute Pancreatitis.

KEYWORDS

Apache II, Ranson's.

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BACKGROUND

Acute pancreatitis is a condition which involves a wide variety of clinical signs and symptom. The course of which ranges from a mild self-limiting inflammatory process to a more fulminant course which could involve multiorgan dysfunction and lead to mortality[1,2,3,4]

The crux of the treatment lies in early diagnosis and appropriate management. Acute pancreatitis should be differentiated from other diagnoses and patients should be stratified accordingly and managed appropriately.[5]

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There are several scoring systems in predicting the severity of acute pancreatitis of which the commonly used are APACHE II and Ranson's scoring systems. But the usage of these two are still under debate and hence the essential for the study.

Objectives

To compare the RANSON scoring system[6,7,8] with APACHE II in predicting the severity of acute pancreatitis.

MATERIALS AND METHODS

The present study is a prospective study of 50 cases of acute pancreatitis admitted in Government Tiruvannamalai Medical College Hospital, Tiruvannamalai, during the study period from May 2015 to September 2015. Fifty cases for the purpose of the study were selected on the basis of the nonprobability (purposive) sampling method.

Source of Study

All patients diagnosed with acute pancreatitis admitted in

Government Tiruvannamalai Medical College and Hospital, Tiruvannamalai.

Inclusion Criteria
All patients diagnosed with acute pancreatitis based on the clinical suspicion and elevated serum amylase.

Exclusion Criteria
- Hyperamylasaemia due to other causes
- Chronic pancreatitis
- Acute on chronic pancreatitis
- Previously diagnosed case of acute pancreatitis

Method of Collection of Data
All patients diagnosed with acute pancreatitis based on the clinical suspicion and increased serum amylase levels admitted in Government Tiruvannamalai Medical College and Hospital are assessed with multiple clinical and laboratory variables of both Ranson and Apache II scoring system and the final score of the patient from both the scoring systems are assessed to know their efficacy in predicting the severity of the disease (higher the score more severe the disease).

RESULTS
Of the 50 patients, age range was 24-60 years (mean- 42 years), 29 (58%) were men and 21(42%) women. The causes of acute pancreatitis included biliary stone 22 (44%), alcoholism 16 (32%), idiopathic 12 (24%). 10 (20%) patients were chronic smokers and 13 (26%) had at-least one co-morbid disease. The common concomitant diseases were hypertension (37.5%), diabetes mellitus (25%), ischaemic heart disease (5%).

Overall, 12 (24%) patients suffered from severe pancreatitis and 38 (76%) had mild acute pancreatitis of which all 12 had severe attack as per APACHE II score (>8) and only 4 of these were considered severe by RANSON score (>3). The systemic complications were multi organ failure in 3 (6%), respiratory 2 (4%) and renal 2 (4%) all seen in patients with severe score as per APACHE II. No death occurred, and mortality was nil. Local complications occurred in 3 patients (6%) and both had acute fluid collection. All the complications were seen in patients with severe score as per APACHE II and none as per RANSON score.

Ranson Scores

Score	Frequency	Percentage
<3	46	92%
3– 4	4	8%
5-6	Nil	-
>6	Nil	-
Total	**50**	**100%**
Table 1. Ranson Scoring System Results		

(Score>3 suggests severe pancreatitis)

In our study only 4 patients had score more than 3, suggesting that only 8% of them were considered to be having severe pancreatitis as per Ranson's criteria.

APACHE II Scores

Score	Frequency	Percentage
0-5	36	72%
6– 10	7	14%
11–15	4	8%
>15	3	6%
TOTAL	**50**	**100%**
Table 2. Apache II Scoring System Results		

(Score>8 suggest severe pancreatitis)

In our study 12 patients were diagnosed to have score more than 8 of the 50 cases, suggesting that 24% had severe pancreatitis as per Apache II scoring criteria.

Data was analysed using Wilcoxon sign rank test & Fishers exact test. The value at cut-off point was expressed as sensitivity, specificity, PPV, NPV & area under the ROC curve**.** P<0.05 was considered to be significant.

Severity of acute Pancreatitis Score	Median	Interquartile Range	Z	P
APACHE II	2	7	4.491	<0.0005
Ranson	0	1		
Table 3. Analysed Data of Ranson and APACHE II Scores				

	Ranson		Total
	Mild	Severe	
Serum amylase Positive Count % within Ranson	1 25%	3 75%	4 8%
Negative Count % within Ranson	45 86.7%	1 25%	46 92%
Total Count % within Ranson	46 100.0%	3 100.0%	50 100.0%
Table 4. Predictive Performance- Area Under Curve = 0.667			

P<0.0005, Sensitivity=66.7%,
Specificity=86.7%, PPV=33%, NPV=96%

DISCUSSION
Severe acute pancreatitis usually declares itself shortly after the onset of symptoms and delayed progression from mild to severe disease is uncommon.[9] Assessment of the severity of acute pancreatitis is important for early identification of patients who may benefit from additional supportive and specific therapeutic procedures. It is also important to standardize clinical data for comparison of results between centres,[1] Ideal predicting criteria should therefore be simple, non-invasive, accurate and quantitative, and the assessment tests should be readily available at the time of diagnosis. Amongst the multi-factorial scoring systems, Ranson system is classical though the Apache II system appears to provide the best accuracy. This study has demonstrated that the Apache II scoring system is better than the Ranson system in predicting the severity of acute pancreatitis. The AUC of Apache II score was 0.717 and that of Ranson was 0.667, Sensitivity of Apache II was 100% and that of Ranson 66.7%, Specificity of Apache II was 80% and Ranson 86.7%, PPV of Apache

II 62% and Ranson 33%, NPV of Apache II 100% and Ranson 96% respectively.

The incidence of acute severe pancreatitis in this study was 24% (12 cases), Apache II score showed 76% mild (38 cases) &24% (12 cases) severe pancreatitis and Ranson score showed 8% (46 cases) mild & 92% (4 cases) severe. These results were probably due to Apache II system having more number of variables and also includes the chronic health status of the patient than the Ranson scoring system resulting in Apache II being more accurate in predicting the severity of pancreatitis.

Age (years)	Present study (33 cases)	Yeung Y. P Study (101 cases)
Mean Age in years	42 years	68 years
Range	24-60 years	20-96 years

Table 5. Comparison of AGE in Present Study with Standard Literature

SEX	Present Study	Yeung Y. P Study
Male	29 (58%)	43 (42.6%)
Female	21 (42%)	58 (57.4%)

Table 6. Comparison of the SEX in Present Study with Standard Literature

CAUSE	Present Study	Yeung Y. P Study
Biliary stones	22 (44%)	59 (58.4%)
Alcohol	16 (32%)	3 (3.0%)
Idiopathic	12 (24%)	23 (22.8%)
Other factors	Nil	16 (15.8%)

Table Comparison of the Causative Factors

In this study, acute pancreatitis was found more commonly in males than females; male: female ratio being 58%:42% and mean age was 42 years. These results can be compared to the Savio G. Barreto and Jude Rodrigues study where the male female ratio was 96.1%:3.9% and mean age was 40 years, by Kimmo I. Halonena et al it was 83.7:16.3 and mean age was 43.62 yrs. Indicating increased incidence in males and also the decade of life being most frequent incidence of age group.

In the present study alcohol was the etiological factor in 32% of patients and gallstones in 44% compared to alcohol l being 92.6% and gallstones 19% in Savio G. Barreto and Jude Rodrigues study and in Kimmo I. alcohol accounted to 79.1% and gallstones to 13.2% showing that alcoholism most frequently the etiological facto.

Of the 50 patients, 38 (76%) had mild disease while 12(24%) had severe Disease (based on Atlanta Criteria for Severe Acute Pancreatitis; APACHE II score >8 was considered severe, and RANSON score>3 was severe). In Savio G. Barreto and Jude Rodrigues study 67% had mild disease while 33% patients had severe disease. 74.07% had mild disease and 25.93% had severe disease Abbasi J. Akhtar et al study.

Comparing outcomes in patient groups based on a range of APACHE II scores, it was observed that complications like acute fluid collection, major organ failure were more common when APACHE II scores exceeded 10 and patients considered severe as Per RANSON score had no complications.

Contrary to expectation, pseudocysts were observed in 3 patients whose APACHE II scores on admission were less than 5. These patients presented to the hospital later than 48 hours after the onset of symptoms by which time the severity of the attack may have subsided and the recorded scores were spuriously low.

The sensitivity, specificity, positive predictive value and negative predictive value were comparable with other studies in prediction of severity. On admission APACHE II scores were very sensitive for prediction of major organ failure.

The APACHE II system is the only system which takes into account all the major risk factors that influence outcome from disease, including the acute physiological derangements as well as patient ability to recover which may be diminished by advancing age or chronic disease. The range of APACHE II score is wide providing better spread between mild and severe attacks, because varying weights are assigned to increasingly abnormal values, rather than all or none judgements than RANSON scoring system.

CONCLUSION

The study includes 50 patients with acute pancreatitis, peak incidence was in the fourth decade with alcohol accounting for 30.3% of the attacks while gallstones accounted for 40.4%.

An APACHE II score of ≥10 on admission predicted a complicated outcome in patients Peak with acute pancreatitis with a sensitivity of 100%, specificity of 80%, positive predictive value of 62% and negative predictive value of 100%. Scores below 10 predicted an uncomplicated outcome.

On admission APACHE II score was a better predictor of systemic complications (sensitivity 100%) than RANSON score (sensitivity 66.7%). Patients with APACHE II scores >10 benefitted from initial ICU care with aggressive therapy aimed at disease cure and dealing with the complications.

Hence APACHE II Scoring can be used as a reliable tool in predicting the severity and prognosis than RANSON scoring in patients with Acute Pancreatitis.

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