Original Article

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Evaluation of Ranson's Score, Glasgow, Apache II, Apache O, Balthazar CTSI in Acute Pancreatitis Patients

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Abstract

Background: Pancreatitis is an inflammation of the glandular parenchyma leading to injury or destruction of acinar components. This study was conducted to evaluate Ranson's score, Glasgow, APACHE II, APACHE O, Balthazar CTSI in acute pancreatitis patients. **Subjects and Methods:** This study was conducted at Department of surgical Gastroenterology, Global hospital Hyderabad to evaluate Ranson's score, Glasgow, APACHE II, APACHE O, Balthazar CTSI in acute pancreatitis patients. **Results:** 34% of the patients in the study were aged 31-40 years and only 6% of the patients were aged >60 years. The etiologic factors for acute pancreatitis in the study group included alcoholism (n= 27, 50.94%), Idiopathic (n=15, 28.30%), biliary pancreatitis (n= 10, 18.87%) and hypertriglyceridemia (n=1, 1.89%). A significant difference in all scoring systems was found between cases of mild and severe pancreatitis (P< 0.05). Among the multifactor scoring systems, Ranson's was found to be a better predictor than APACHE-II. There was not much difference between APACHE-O and APACHE-II. Overall, CTSI found to be the best predictor, followed by APACHE-II. **Conclusion:** The authors found that there was no significant difference among the multifactor scoring systems, although Glasgow and APACHE-II fare better.

Keywords: Acute Pancreatitis, APACHE-II, Scoring systems

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Introduction

Pancreatitis is an inflammation of the glandular parenchyma leading to injury or destruction of acinar components. Acute pancreatitis is a common and potentially lethal acute inflammatory process with a highly variable clinical course. [1] Acute pancreatitis embodies a large spectrum of diseases that can range from mild edema to severe necrosis of the pancreas. Its presentation may vary from a mild, self-limiting abdominal pain, to a fulminant illness that can rapidly lead to sepsis, multiorgan failure, and death. [2]

Biliary tract stones and prolonged ethanol abuse account for most attacks of pancreatitis. Most patients with acute pancreatitis have a mild form of the disease that will respond to supportive treatment. Approximately 20% of affected individuals will develop a severe clinical course in association with the development of a systemic inflammatory response syndrome (SIRS), multiple organ failure (MOF), and on occasion death. Severe attacks of pancreatitis are associated with prolonged hospitalization, significant morbidity, and mortality ranging between 30% and 50%. [3]

There are several approaches that have been used in an attempt to predict the severity and prognosis of acute pancreatitis. These include clinical assessment, multifactor scoring system, imaging techniques and biochemical markers. Beyond several multifactorial scoring systems, a multitude of biochemical variables has been studied in acute pancreatitis and proven to be good predictors of disease severity. There is yet no single marker that could serve as an optimal predictor of disease severity in acute pancreatitis. [4]

Many studies have evaluated the efficacy of the various approaches in predicting the severity of acute pancreatitis. Several multi-factorial scoring systems based on clinical and biochemical data have been used over the past few decades. These include Ranson's score, Glasgow, APACHE II, APACHE O, Balthazar, CTSI, to predict the severity of acute pancreatitis. Each of these scoring systems has its own limitations, including the low sensitivity and specificity, the complexity of the scoring system as well as the inability to obtain a final score until 48 hours after admission. [5]

This study was conducted to evaluate Ranson's score, Glasgow, APACHE II, APACHE O, Balthazar CTSI in acute pancreatitis patients.

Subjects and Methods

The study was conducted at the Department of Surgical Gastroenterology, Global Hospitals, Hyderabad. The present study comprised of 53 patients who presented with a diagnosis of Acute Pancreatitis. The diagnostic criteria used for Acute Pancreatitis were made based on clinical features such as the history of pain abdomen with/without radiation to the back with tenderness/guarding in the upper abdomen and biochemical analysis such as S. amylase and/or S. lipase more than/equal to three times the upper limit and ultrasound or CT scan findings suggestive of acute pancreatitis such as pancreatic edema, pancreatic necrosis, peri-pancreatic fluid collections etc. All patients were informed regarding the study and their written consent was obtained. Ethical clearance was obtained from the institutional ethical committee. Inclusion criteria were all patients who present with acute pancreatitis with the above diagnostic criteria and patients who presented within 72 hours of the onset of symptoms. Exclusion criteria were all patients who presented more than 72 hours after the onset of symptoms.

A detailed history, including present complaints, past illness, personal history, treatment history, was taken, including etiological risk factors. A detailed general and systemic examination were done. Vital signs, weight and height were recorded. The presence of organ failures at admission was noted. Atlanta consensus symposium 1992 criteria were used for defining organ failure.

All the patients were subjected to complete blood counts, S. electrolytes, blood sugar, liver function tests, LDH, BUN, S. creatinine, Arterial blood gas analysis, chest x-ray, ultrasound abdomen, contrast-enhanced CT Scan abdomen, C-reactive protein (CRP), Interleukin-6 (IL-6), PMN-Elastase (PMN-E), Procalcitonin (PCT). In all patients, RANSON"s score, GLASGOW score, APACHE-II score, APACHE-O score and Balthazar's CTSI score were recorded. The results were statistically analyzed.

Results

[Table 1] shows that the mean age (SD) of the patients was 37.60 (14.83) years and the median age is 35 years with a range of 12 to 77years. 34% of the patients in the study were aged 31-40 years and only 6% of the patients were aged >60 years.

[Table 2] shows that the etiologic factors for acute pancreatitis in the study group included alcoholism (n= 27, 50.94%), Idiopathic (n=15, 28.30%), biliary pancreatitis (n= 10, 18.87%) and hypertriglyceridemia (n=1, 1.89%).

Table 1: Age distribution of patients

Age group (Years)	Number	Percentage
10-20	6	13
21-30	8	17
31-40	17	34
41-50	11	20.7
51-60	8	17
61-70	0	0
>70	3	6

Table 2: Etiology of acute pancreatitis

Etiology	Number	Percentage
Alcoholic	27	50.9
Gall stone disease	10	18.8
Idiopathic	15	28.3
Hypertriglyceriden	1	1.8
Total	53	100

[Table 3] depicts the results of the bivariate analysis exploring the association of different variables with severity of pancreatitis. A significant difference in all scoring system was found between cases of mild and severe pancreatitis (P< 0.05).

Table 3: Bivariate analysis of all variables

Variable (mean± SD)	Mild Pancreatitis (n=32)	Severe Pancreatitis (n=21)	p-value(anova test)
RANSON	0.84±0.95	2.95±1.77	0.0000
GLASGOW	0.66±0.79	2.48±1.50	0.0000
APACHE-II	6.94±2.09	10.33±3.64	0.0001
APACHE-O	7.34±2.10	11±4.24	0.0001
CTSI	1.90±0.44	6.15±2.54	0.0000

[Table 4] shows that among the multifactor scoring systems, Ranson's was found to be a better predictor than APACHE-II. There was not much difference between APACHE-O and APACHE-II. Overall, CTSI found to be the best predictor, followed by APACHE-II.

Discussion

In patients with acute pancreatitis, early gradation of disease severity is essential to provide optimum supportive care in

Table 4: Comparison of all the predictors

Variables	AUC ROC	St Error	95% CL
RANSON	0.7783	0.0582	0.72607 - 0.95404
GLASGOW	0.7463	0.0580	0.63263 - 0.85992
APACHE-II	0.7173	0.0620	0.63374 - 0.87668
APACHE-O	0.7470	0.0599	0.58940 - 0.82429
CTSI	0.9055	0.0420	0.82323 - 0.98778

intensive units, high dependency units, or wards, especially with limited health-care resources as well as to plan for timely interventional procedures viz ERCP in biliary pancreatitis. About 50% of deaths occur within 1 week of the attack, mostly from multiorgan dysfunction syndrome. It is hard to identify severe cases earlier than 2–3 days of symptom onset, by which time the network of pathophysiological mechanisms leading to multiorgan dysfunction syndrome is established. An ideal prognostic system would be based on a single test and have a high negative predictive value and should also be universally available, reproducible and non-expensive.6 This study was conducted to evaluate Ranson's score, Glasgow, APACHE II, APACHE O, Balthazar CTSI in acute pancreatitis patients.

In the present study, there were 53 patients. 34% of the patients in the study were aged 31-40 years and only 6% of the patients were aged >60 years. Alcohol was the most common etiology in our study, while gall stone disease was the common etiology in other studies. With the wide availability of ERCP, many of the biliary pancreatitis patients are managed by the Medical Gastroenterologists, which were not considered in this study. Also, quite a number of mild pancreatitis cases are treated at district hospitals. This probably explains the preponderance of alcoholics over biliary pancreatitis in our study. Woo et al, [6] found a very high incidence of biliary pancreatitis in their study, which is understandable as North India is a belt for gall stone disease.

Ranson's scoring system, since its description by Ranson in 1974, is still used by clinicians worldwide. Our study also confirmed it to be a good predictor of severity with AUROC of 0.7783. Our results were comparable to others. Our study showed the Glasgow system to be a good predictor of severity with an AUROC of 0.7463. The sensitivity and overall accuracy in our study were lower than the ones shown by different authors. Similar observations of improved accuracy with change in cut-off to >=2 were made by Yeung et al. [7]

Amongst the multifactor scoring systems, the APACHE system appears to provide the best accuracy. We studied APACHE-II using all the cut-offs, including the cut- off of 8 as in the Atlanta consensus statement. We found AUROC of 0.7173. We had improved results using a cut off of 9 in the form of overall accuracy (77%) and AUROC (0.7552), however sensitivity and NPV dropped. Our results were comparable to those of various other authors, although results were slightly lower than them. This could be due to the wide variation of the cut-off values and the duration that have been used by Mckay et al. [8]

Recently, reports of APACHE-O score as a predictor of severity have been published in comparison with APACHE-II. In our study, we found the APACHE-O scoring system to be a good predictor of severity, but it did not show any gross improvement over the APACHE-II scoring system. APACHE-O scoring system had AUROC of 0.7470. Our results are less when compared to other authors, but it corroborates well with other studies in comparison with APACHE-II. We found similar results by other authors. Singh et al, [9] in his study, found no difference between the two scores both at admission and at 48 hours after admission.

Our study showed Balthazar's CTSI to be a very good predictor of severity with AUROC of 0.906. Mounzer et al, [10] in their study found CTSI to be a good predictor of severity, but they proposed a modified CT index that had a better interobserver agreement and was found to be a better predictor of hospital stay and organ failure when compared to conventional CTSI. Papachristou et al., [11] in their retrospective analysis, observed CTSI be a good predictor of severity of pancreatitis with an odds ratio of 8 and 17 for predicting death and length of hospital stay respectively.

Conclusion

The authors found that there was no significant difference among the multifactor scoring systems, although Glasgow and APACHE-II fare better.

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