

## Original Research Article

# Determination of severity of acute pancreatitis

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### ABSTRACT

**Background:** Acute pancreatitis is an inflammatory process with a highly variable clinical course. The present study was conducted to assess severity of acute pancreatitis.

**Methods:** The present study was conducted on 53 patients of acute pancreatitis of both genders. A thorough clinical examination was performed. Ranson's score (RS), Glasgow score (GS), acute physiology and chronic health evaluation (APACHE-II) score, APACHE-O score and Balthazar's computed tomography severity index (CTSI) score was recorded.

**Results:** Out of 53 patients, males were 47 and females were 6. Patients were divided into acute pancreatitis (32) and severe pancreatitis (21). Results of the bivariate analysis of Ranson scoring system in mild periodontitis was 0.84 in severe was 2.95, Glasgow score was 0.66 in mild and 2.48 in severe, APACHE-II had 6.94 in mild and 10.33 in severe, APACHE-O had 7.34 in mild and 11 in severe and CTSI had 1.9 in mild and 6.15 in severe.

**Conclusions:** Authors found that all the scoring systems are useful in assessing the severity of acute pancreatitis.

**Keywords:** Acute pancreatitis, Severity, Glasgow

### INTRODUCTION

Acute pancreatitis (AP) is an inflammatory process with a highly variable clinical course. Most patients with AP have a mild disease that resolves spontaneously without sequelae, however, 10-20% of patients experience a severe attack with high mortality up to 30%.<sup>1</sup> This high risk group of patients may benefit from aggressive fluid resuscitation, close monitoring for development of organ failure, proper administration of antibiotics and specific therapeutic procedures, such as endoscopic sphincterotomy and radiologic intervention.<sup>2</sup> Therefore, early assessment of the severity and identification of patients at risk is important for early intensive therapy and timely intervention, and has been shown to improve prognosis and survival.<sup>3</sup> The criteria 2002 were complicated and composed of 18 items of prognostic factors; 5 clinical sign items, 10 blood test items, computed tomography (CT) findings, the presence of systemic inflammatory response

syndrome (SIRS) and age. The attending physician cannot remember all or even most of the factors. Moreover, these numerous parameters are not available soon enough or not available as the routine laboratory tests at all hospitals.<sup>4</sup>

These include the 11 criteria described by Ranson et al in the 1970s, the Glasgow score (eight criteria), multiple organ system (MOSS) score (12 criteria), bedside index for severity in acute pancreatitis (BISAP) score (5 criteria), and the acute physiology and chronic health evaluation (APACHE II) score (14 criteria).<sup>5</sup> The sensitivity and specificity of these scoring systems for predicting severe acute pancreatitis range between 55% and 90%, depending on the cut-off number and the timing of scoring.<sup>6</sup> Limitations of these scoring systems have been either the inability to obtain a complete score until at least 48 hours into the illness (Ranson and Glasgow scores) or the complexity of the scoring system itself (APACHE II). The APACHE-II score has not been developed specifically for

acute pancreatitis but has been proven to be an early and reliable tool.<sup>7</sup> The present study was conducted to assess severity of acute pancreatitis.

**METHODS**

All patients who presented with a diagnosis of acute pancreatitis were evaluated prospectively from February 2017 to May 2018 at Department of Surgical Gastroenterology at a tertiary care hospital in Hyderabad, India.

The diagnostic criteria used for acute pancreatitis in this study were- clinical: history of pain abdomen with/without radiation to the back with tenderness/guarding in upper abdomen; biochemical: serum amylase and/or serum lipase more than/equal to three times the upper limit; radiology: ultrasound or CT scan findings suggestive of acute pancreatitis such as pancreatic edema, pancreatic necrosis and peri-pancreatic fluid collections.

**Inclusion criteria**

All patients who were present with acute pancreatitis with the above diagnostic criteria were included in the study.

Patients who presented within 72 hours of the onset of symptoms were included in the study.

**Exclusion criteria**

All patients who presented more than 72 hours after the onset of symptoms.

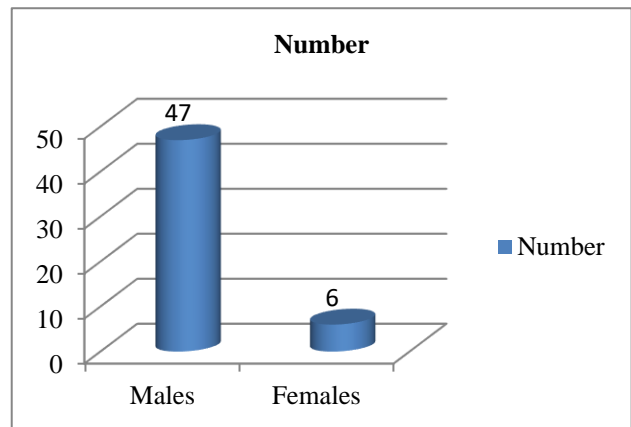
A detailed history was taken from all patients. A thorough clinical examination was performed. Ranson’s score, Glasgow score, APACHE-II score, APACHE-O score and Balthazar’s CTSI score was recorded.

Final outcome of the patient in terms of severity of pancreatitis viz. mild pancreatitis or severe pancreatitis was the end point of the study against which all the variables were compared. The Atlanta consensus symposium definitions of mild and severe pancreatitis

were used. Results were tabulated and subjected to statistically analysis. The data was initially explored using descriptive statistics to derive the mean, median and range of continuous variables and the frequency distribution of categorical variables. Bivariate analysis was used to explore potential associations with severity of pancreatitis. A p value less than 0.05 was considered significant. Clearance was obtained from the Institutional ethics committee.

**RESULTS**

Out of 53 patient, males were 47 and females were 6 (Figure 1).

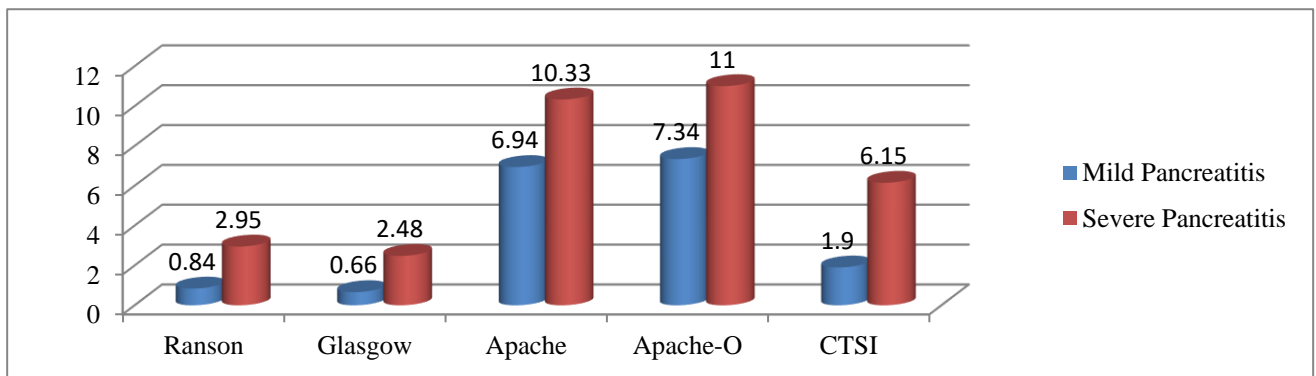


**Figure 1: Distribution of patients.**

**Table 1: Type of pancreatitis.**

Type	Number	%
Mild	32	60
Severe	21	40

The results of the bivariate analysis of Ranson scoring system in mild periodontitis was 0.84 in severe was 2.95, Glasgow score was 0.66 in mild and 2.48 in severe, Apache had 6.94 in mild and 10.33 in severe, Apache-O had 7.34 in mild and 11 in severe and CTSI had 1.9 in mild and 6.15 in severe (Figure 2).



**Figure 2: Bivariate analysis of all variables .**

## DISCUSSION

In patients with acute pancreatitis, early gradation of disease severity is essential to provide optimum supportive care in intensive units, high dependency units or wards especially with limited health-care resources as well as to plan for timely interventional procedures viz. endoscopic retrograde cholangiopancreatography (ERCP) in biliary pancreatitis. About 50% of deaths occur within 1 week of the attack, mostly from multi-organ dysfunction syndrome. It is hard to identify severe cases earlier than 2-3 days of symptom onset, by which time the network of patho-physiological mechanisms leading to multi-organ 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.<sup>7</sup>

Severe acute pancreatitis implies the presence of organ failure, local complications, or pancreatic necrosis and associated disruption of the pancreatic blood supply. Several prognostic markers have been developed for severity stratification in acute pancreatitis.<sup>8</sup> The three most common causes of AP are gallstone/biliary related, alcohol related and idiopathic. These three causes account for the majority of cases of AP. Biliary pathology was estimated to be 28%-38% of the cases while alcohol accounted for 19-41% of the cases. Prior reports have shown a significant relation of gender and race in regards to etiology of AP.<sup>9</sup> Overall, a markedly higher frequency of AP was seen among blacks than whites, followed closely by Hispanics, Asians, and then American Indians. Patients with AP due to alcohol use were significantly younger and were more likely to be male and/or black, with blacks having the highest frequency of alcohol related pancreatic disease. Females are more likely to have biliary related pancreatitis. The increase in incidence of AP has been mostly seen in woman ages <35 and men between the ages of 35 and 54.<sup>10</sup> 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 alcoholic over biliary pancreatitis in our study. Garg et al found a very high incidence of biliary pancreatitis in their study which is understandable as North India is a belt for gall stone disease.<sup>11</sup>

In the present study, out of 53 patients, males were 47 and females were 6.

Cho et al conducted a study to measure the predictive accuracy of each scoring system under the receiver-operating curve.<sup>12</sup> Of 161 patients, 21 (13%) were classified as severe AP, and 3 (1.9%) died. Statistically significant cutoff values for prediction of severe AP were Ranson  $\geq 3$ , BISAP  $\geq 2$ , APACHE-II  $\geq 8$ , CTSI  $\geq 3$ , and

CRP24  $\geq 21.4$ . Area under curve (AUC) for Ranson, BISAP, APACHE-II, CTSI, and CRP24 in predicting severe AP were 0.69 (95%: 0.62-0.76), 0.74 (95%: 0.66-0.80), 0.78 (95%: 0.70-0.84), 0.69 (95%: 0.61-0.76), and 0.68 (95%: 0.57-0.78), respectively. APACHE-II demonstrated the highest accuracy for prediction of severe AP, however, no statistically significant pair-wise differences were observed between APACHE-II and the other scoring systems, including CRP24.

We found that patients were divided into acute pancreatitis (32) and severe pancreatitis (21). Results of the bivariate analysis of Ranson scoring system in mild periodontitis was 0.84 in severe was 2.95, Glasgow score was 0.66 in mild and 2.48 in severe, APACHE-II had 6.94 in mild and 10.33 in severe, APACHE-O had 7.34 in mild and 11 in severe and CTSI had 1.9 in mild and 6.15 in severe. Khanna et al assessed BISAP, APACHE-II, MOSS, and SIRS scores using data within 24 hours of admission, whereas Ranson and Glasgow scores after 48 hours of admission; CTSI was calculated on day 4 whereas interleukin-6 (IL-6) and C-reactive protein (CRP) values at end of study.<sup>13</sup> Predictive accuracy of scoring systems, sensitivity, specificity, and positive and negative predictive values of various markers in prediction of severe acute pancreatitis, organ failure, pancreatic necrosis, admission to intensive care units and mortality were calculated. Of 72 patients, 31 patients had organ failure and local complication classified as severe acute pancreatitis, 17 had pancreatic necrosis, and 9 died (12.5%). Area under curves for Ranson, Glasgow, MOSS, SIRS, APACHE-II, BISAP, CTSI, IL-6, and CRP in predicting SAP were 0.85, 0.75, 0.73, 0.73, 0.88, 0.80, 0.90, and 0.91, respectively, for pancreatic necrosis 0.70, 0.64, 0.61, 0.61, 0.68, 0.61, 0.75, 0.86, and 0.90, respectively, and for mortality 0.84, 0.83, 0.77, 0.76, 0.86, 0.83, 0.57, 0.80, and 0.75, respectively.

Recently, reports of APACHE-O score as a predictor of severity have been published in comparison with APACHE-II. In our study, we found 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 a sensitivity of 62%, NPV of 78%, overall accuracy of 77% and an area under the receiver operating characteristics (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.

Yeung et al in his study found no difference between the two scores both at admission and at 48 hours after admission.<sup>14</sup> He observed an AUROC of 0.904 for both scores at admission and an AUROC of 0.955 and 0.957 for APACHE-II and APACHE-O respectively at 48 hours. Papachristou et al similarly found no difference between the two scores with an AUROC of 0.893 and 0.895 for APACHE-II and APACHE-O respectively. Both these authors concluded that addition of obesity score does not

improve the APACHE-II score in prediction severe pancreatitis.

In contrast, Johnson et al studied 186 patients and concluded that simple addition of obesity score improves the APACHE-II score. He observed AUROC of 0.892 versus 0.918 for APACHE II and APACHE-O systems.<sup>7</sup> The limitation of the present study is small sample size.

## CONCLUSION

Authors found that all the scoring systems are useful in assessing the severity of acute pancreatitis. Among the clinico-biochemical multi-factor scoring systems, Ranson's was the best predictor. Glasgow system had better results than Ranson's with a cut off of 2 rather than 3 which is commonly followed worldwide. Similarly APACHE-II was a better predictor with a cut off of 9 rather than the standard cut-off of 8 as per the Atlanta consensus statement. Addition of obesity (APACHE-O) did not significantly improve the APACHE-II score. Balthazar's CTSI is a very good predictor of severity and is the best among the multi-factor scoring systems.

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