Prospective observational study to evaluate the association of various parameters associated with severity of acute pancreatitis

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Abstract

Aim: The aim of this study was to evaluate the parameters associated with severity of acute pancreatitis. **Methods:** This Prospective observational study was done in the Department of General Surgery, Madhubani Medical College and Hospital, Madhubani, Bihar, India, for 1 year. Total 80 patients diagnosed as acute pancreatitis on the basis of clinical signs, biochemical markers and radiological signs were included in this study. they were investigated by various blood investigations like haemoglobin, total leukocyte count, differential count, haematocrit, calcium, Blood urea nitrogen (BUN), arterial blood gas analysis, serum electrolytes, Random blood sugar (RBS), liver function tests, Lactate dehydrogenase (LDH), serum amylase, serum lipase, ultrasound abdomen and contrast Computed tomography (CT) for those indicated. The two commonly used scoring systems in our institution were also analysed viz. Ranson's score and modified Glasgow score. **Results:** Majority cases were seen in between 40 to 50 years 30(37.5%). In our study the 56 cases were mild acute pancreatitis (70%), 15 cases were moderately severe acute pancreatitis (18.5%) and 9 cases severe acute pancreatitis (11.25%). In our study the majority of cases who presented with acute pancreatitis were of alcohol induced type, 56 (70%). Gall stone pancreatitis accounted for 14 (17.5%) cases. In our study 50 (62.5%) patients had diabetes mellitus, 32 (40%) had hypertension and 40 (50%) had dyslipidemia. Major co-morbidity was diabetes mellitus among the studied population. In our study the 38 cases were having a Body mass index (BMI) of 18.5 to 24.9 (47.5%) and 8 (10%) were having a BMI of above 30 and 34 (42.5%) had BMI between 18.5 to 19.9. Majority of the cases 56 (70%) who presented were having habit of consuming alcohol. 4 (5%) patients in our study died due to complications of severe acute pancreatitis. The mean BMI in those with mild acute pancreatitis was 25.47±0.21 (Standard error (SE)), moderately severe acute pancreatitis was 29.54±0.62 and severe acute pancreatitis was 29.87±1.67. **Conclusion:** One should not wait for any single scoring system to get scored for effective treatment. A diagnosis of pancreatitis should be made using clinical, laboratory and radiological means and treatment in the form of aggressive crystalloid resuscitation should be started with intensive care monitoring at the earliest.

Keywords: Acute pancreatitis, Severity of pancreatitis, Predictors of severity of pancreatitis.

Introduction

The course of acute pancreatitis (AP) is highly variable in clinical presentation and its severity. In the majority of patients, the course is mild and can be resolved spontaneously, but in about 20% of patients it may progress to a severe necrotizing form with organ failure and mortality of up to 10 to 50%. Because of this potential for deterioration and fatal outcome, the stratification of the severity of AP is essential[1-4]. Various methods have been used for predicting the severity of AP and its outcome, such as clinical evaluation, imaging evaluation [contrast-enhanced computed tomography (CECT), magnetic resonance imaging (MRI), and contrast-enhanced ultrasound (CEUS)], and testing of various biochemical markers[5-7].

Imaging methods have contributed significantly to the staging of severity and prognostic assessment of AP. The most common imaging method of staging of AP is based on CECT. Abdominal CECT scan has been used to determine the degree of severity, extent of necrosis, fluid collections, pseudo cysts, abscesses, and prognosis of clinical outcome of AP[8-10]. Except for modified Ranson's criteria, the other scoring systems have the same severity scoring parameters generally, regardless of the etiology of AP. In the modified Ranson scoring system, the variables to define severity are dissimilar according to etiology[11]. For nongallstone-induced AP, the parameters are more stringent compared with gallstone-induced AP. In practice, the majority of patients with gallstone-induced AP have a mild clinical course. In this point of view, different risk factors might contribute to AP severity based on different etiologies. For example, obesity is considered to be an independent risk factor for SAP[12,13], though there has been a conflicting report[14]. Especially in Asian populations, worse clinical outcomes tend to occur in patients with low body mass index (BMI)[15,16]. The studies done in Indian subcontinent revealed the leading aetiology as alcoholism (42%) followed by gall stones (24%) and trauma (17%). The study also showed more incidence in males (75%) and more in the age of 30s. The attacks were found to be severe in those with alcoholic pancreatitis[17].

The assessment of severity is one of the most important issues in the management of acute pancreatitis. Various scoring systems fail to point out the patients going for severe disease and the expense for calculating various scores was also high. So, the study was aimed at the individual variables which can give early signal of patients going in for severe disease and as the volume of admission due to acute pancreatitis is high in this region this topic was taken up for study. The aim of this study was to evaluate the parameters associated with severity of acute pancreatitis.

Material and methods

This Prospective observational study was done in the Department of General Surgery, Madhubani Medical College and Hospital, Madhubani, Bihar, India, for 1 year, after taking the approval of the protocol review committee and institutional ethics committee.

Total 80 consecutive patients who presented with features of acute pancreatitis between 18-68 years age group and diagnosed as acute pancreatitis on the basis of clinical signs, biochemical markers and radiological signs were included in this study.

Methodology

Patients who were having chronic pancreatitis and those who didn't wish to be included in the study were excluded from the study. All patients were properly examined after a detailed history taking using the proforma. Then, they were investigated by various blood investigations like haemoglobin, total leukocyte count, differential count,

haematocrit, calcium, Blood urea nitrogen (BUN), arterial blood gas analysis, serum electrolytes, Random blood sugar (RBS), liver function tests, Lactate dehydrogenase (LDH), serum amylase, serum lipase, ultrasound abdomen and contrast Computed tomography (CT) for those indicated. Various variables included in different prognostic scores for acute pancreatitis were studied individually. The two commonly used scoring systems in our institution were also analysed viz. Ranson's score and modified Glasgow score[11,17].

Statistical analysis

Data obtained was complied with Microsoft excel. Finally, all these variables were correlated with the severity of the disease to find out the association and significance using appropriate statistical methods like Pearson Chi-square test, ANOVA and Kruskal Wallis test.

Results

During the study period 80 cases of acute pancreatitis were admitted in general surgery department, out of which 58(72.5%) were males and 22 (27.5%) were females. Age of the patient in our study varied from 18 to 68 years, the youngest being 19 years and oldest being 68 years. Majority cases were seen in between 40 to 50 years 30(37.5%). (Table1) In our study the 56 cases were mild acute pancreatitis (70%), 15 cases were moderately severe acute pancreatitis (18.5%) and 9 cases severe acute pancreatitis (11.25%). (Table 2) In our study the majority of cases who presented with acute pancreatitis were of alcohol induced type, 56 (70%). Gall stone pancreatitis accounted for 14 (17.5%) cases. Drugs, tumours, Post Endoscopic retrograde cholangiopancreatography (ERCP) and hypertriglyceridemia accounted for the rest (Table 3).

Table 1: Age distribution

Age (years)	Number of patients=80	Percentage
Below 30	6	7.5
30 to 40	19	23.75
40to 50	30	37.5
50 to 60	15	18.75
Above 60	10	12.5

Table 2. Type of Pancreatitis

Pancreatitis	Number of patients	Percentage
Mild acute pancreatitis	56	70
Moderately Severe Acute Pancreatitis	15	18.75
Severe acute Pancreatitis	9	11.25

Table 3: Aetiology distribution

Aetiology	Number of patients	Percentage
Alcohol induced	56	70
Gallstones	14	17.5
Idiopathic	5	6.25
Drugs	1	1.25
Post ERCP	1	1.25
Tumor	2	2.50
Hypertriglyceridemia	1	1.25

In our study 50 (62.5%) patients had diabetes mellitus, 32 (40%) had hypertension and 40 (50%) had dyslipidemia. Major co-morbidity was diabetes mellitus among the studied population. In our study the 38 cases were having a Body mass index (BMI) of 18.5 to 24.9 (47.5%) and 8 (10%) were having a

The mean BMI in those with mild acute pancreatitis was 25.47±0.21 (Standard error (SE)), moderately severe acute pancreatitis was 29.54±0.62 and severe acute pancreatitis was 29.87±1.67. ANOVA test was done and found significant difference in mean values of BMI across mild,

BMI of above 30 and 34 (42.5%) had BMI between 18.5 to 19.9. Majority of the cases 56 (70%) who presented were having habit of consuming alcohol. 4 (5%) patients in our study died due to complications of severe acute pancreatitis. One due to acute respiratory distress syndrome (ARDS) and the other due to multi organ failure.

moderate and severe acute pancreatitis with F value of 17.79 and p value of 0.001 (significant) seen in those with hypertension. On analysis hypertension was found to be statistically significant with Pearson Chi- square test value of 9.87, df of 2 and a p value of 0.005.

Table 4 BMI and Pulse rate of the patients

Pancreatitis	BMI of the patients	Pulse rate
Mild acute pancreatitis	25.47±0.21	85.31±1.11
Moderately Severe Acute Pancreatitis	29.54±0.62	94.16±3.34
Severe acute Pancreatitis	29.87±1.67	106.84±4.12.

In our study it was found that those with diabetes mellitus developed more severe disease. It was found to be statistically significant with Pearson Chi-square test value of 9.06, degree of freedom (df) of 2 and a p value of 0.015.

In our study it was observed that severe disease was our study the mean pulse rate in mild pancreatitis was 85.31±1.11 (SE), moderately severe pancreatitis was 94.16±3.34 and severe acute pancreatitis was 106.84±4.12. ANOVA test showed significant difference in mean values of pulse rate across mild, moderate and severe pancreatitis with an F value of 14.59 and p value of 0.001 (significant) .(table 4)

In our study there was statistical significance between systolic blood pressure (BP) score and severity with a Pearson Chi-square value of 24.87, df of 4 and a p value of 0.001 (significant). There was statistical significance observed between respiratory rate and severity in our study with a Pearson Chi-square value of 21.78, df of 4 and a p value of 0.001 (significant).

In our study the mean total count for mild acute pancreatitis was 12875±384.21 (SE), moderately severe pancreatitis was 16871±1096.07 and severe pancreatitis was 17362±2874.21. ANOVA test showed significant difference in mean values of total count in mild, moderate and severe pancreatitis with an F value of 10.01 and p value of 0.001 (significant). There was statistical significance observed between BUN and severity with a Pearson Chi-square value of 38.12, df of 2 and a p value of 0.001 (significant).

In our study there was statistical significance observed between base deficit with severity of pancreatitis with a Pearson Chi-square value of 57.03, df of 4 and a p value of 0.001 (significant).

Discussion

In this study period 80 cases of acute pancreatitis were admitted in general surgery department, out of which 58(72.5%) were males and 22 (27.5%) were females. Age of the patient in our study varied from 18 to 68 years, the youngest being 19 years and oldest being 68 years.

Majority cases were seen in between 40 to 50 years 30(37.5%). In our study the 56 cases were mild acute pancreatitis (70%), 15 cases were moderately severe acute pancreatitis (18.5%) and 9 cases severe acute pancreatitis (11.25%). In our study the majority of cases who presented with acute pancreatitis were of alcohol induced type, 56 (70%). Gall stone pancreatitis accounted for 14 (17.5%) cases., in agreement with a study by Rithin et al in which the mean age was 40.9 years and alcohol being common aetiology in 72% of the patients[18]. Similar results were mentioned by Baig et al, in which alcoholism accounted for 41.14% of cases forming the majority followed by gall stones contrary to the studies outside India which showed 51.7% cases due to gall stones and 48.3% cases due to alcohol in a study conducted by Maher et al.[19,20] In a study by Bota et al 41.6% cases were due to gall stones and 37.1% cases were due to alcohol consumption[21].

In our study the 56 cases were mild acute pancreatitis (70%), 15 cases were moderately severe acute pancreatitis (18.5%) and 9 cases severe acute pancreatitis (11.25%). Both were due to complications of pancreatitis viz. ARDS and multi organ failure. The mortality rate in the study by Bota et al was 4.6% and that in a study by Simoes et al was 5.7%.[17,21] Among the various aetiologies encountered in our study, alcohol was the most common (70%) followed by gall stones (17.5%).

In our study systolic BP score and creatinine score showed significance with the severity of disease as mentioned in the revised Atlanta classification[22]. Significance was also seen with total count and was in agreement with a study by Maher et al.[20]

Laboratory parameters like serum amylase, serum lipase, LDH, CRP, creatinine, total count, arterial pH, serum calcium and fall in hematocrit correlated well with the severity of pancreatitis, while liver function tests other than Aspartate aminotransferase (AST), serum sodium, serum potassium, RBS, platelet count and hemoglobin had no significant correlation with the severity of the disease. This was in agreement with the study conducted by Maher et al.[20] The significant association with CRP was also demonstrated in a study by Campos et al.[23]

CT scan is not routinely done for all pancreatitis patients. But CTSI is considered to be the gold standard for imaging in acute pancreatitis[24]. In our study CT scan showed significant correlation with severity of the disease. Exposure to radiation and multiple scans to assess progress and complications are limitations in the use of CECT. It carries a risk of anaphylactic reactions to IV contrast. Moreover, contrast cannot be used in patients with renal insufficiency. In our study CT scan was done for 12 cases and 2 patients had peri pancreatic inflammation with necrosis less than 30% and 1 had peri pancreatic inflammation with single fluid collection. None had infected necrosis. There was no surgical intervention done in our study cases. CTSI showed significance with severity which is in agreement with study by Simoes et al.[17]

Presence of pleural effusion in chest x-ray showed significant correlation with severity. In our study 6 out of 9 cases of severe acute pancreatitis and 9 out of 15 cases of moderately severe pancreatitis showed pleural effusion. This shows significance of presence of pleural effusion with severity which was in agreement with the study of Maher et al.[20]

Conclusion

One should not wait for any single scoring system to get scored for effective treatment. A diagnosis of pancreatitis should be made using clinical, laboratory and radiological means and treatment in the form of aggressive crystalloid resuscitation should be started with intensive care monitoring at the earliest.

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