Original research article

Clinic-etiologic profile and factors associated with severity of acute pancreatitis: an observational study

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Abstract

Aim: to evaluate the parameters associated with severity of acute pancreatitis.

Material and methods: This Prospective observational study was done in the Department of Surgery, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India for 1 year. Total 100 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: Out of 100 patients, 76(76%) were males and 24 (24%) were females. Majority cases were seen in between 40 to 50 years 35 (35%). 70 cases were mild acute pancreatitis (70%), 18 cases were moderately severe acute pancreatitis (18%) and 12 cases severe acute pancreatitis (12%). The majority of cases who presented with acute pancreatitis were of alcohol induced type, 67 (67%). Gall stone pancreatitis accounted for 19 (19%) cases. 60 (60%) patients had diabetes mellitus, 42(42%) had hypertension and 48 (48%) had dyslipidemia. Major co-morbidity was diabetes mellitus among the studied population. In our study the 39 cases were having a Body mass index (BMI) of 18.5 to 24.9 (50%) and 8 (8%) were having a BMI of above 30 and 39 (44%) had BMI 18.5 to 19.9. Majority of the cases 70 (70%) who presented were having habit of consuming alcohol. 4 (4%) patients in our study died due to complications of severe acute pancreatitis.

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

Acute pancreatitis (AP) is a sudden inflammatory condition of the pancreas. Although conservative management results in clinical improvement in most patients, approximately 5% to 10% of cases progress to life-threatening conditions, including multiorgan failure, with significant morbidity and mortality.[1] There is an increasing trend in the annual incidence of AP in Western countries.[2-4] Of the various etiologies of AP, the two most common are

gallstones and alcohol abuse, which represent more than 60% of all cases.[2,5] Gallstone- and alcohol-induced AP should be treated as distinct entities, and the different etiologic factors may affect the clinical outcome, severity, and recurrence. A better understanding of the etiology is directly linked to more favorable outcomes and is important for the establishment of treatment strategies and prevention of recurrent AP. Severe AP (SAP) is associated with relatively high morbidity and mortality rates.[6-8] The Acute Physiology and Chronic Health Evaluation scale (APACHE II), Bedside Index of Severity in Acute Pancreatitis (BISAP), Ranson's criteria, Glasgow criteria, and computed tomography severity index are risk stratification systems for the prediction of the clinical course and prognosis of AP. Generally, APACHE II is the most widely used method for risk stratification in AP, while BISAP is an uncomplicated system with a score that is easy to calculate.[9,10] 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 Surgery, Anugrah Narayan Magadh Medical College and Hospital, Gaya, Bihar, India, for 1 year. after taking the approval of the protocol review committee and institutional ethics committee.

Total 100 consecutive patients who presented with features of acute pancreatitis between 18-75 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]

Results

During the study period 100 cases of acute pancreatitis were admitted in general surgery department, out of which 76(76%) were males and 24 (24%) were females. Age of the patient in our study varied from 18 to 75 years, the youngest being 22 years and oldest being 75 years. Majority cases were seen in between 40 to 50 years 35 (35%). (Table1) In our study the 70 cases were mild acute pancreatitis (70%), 18 cases were moderately severe acute pancreatitis (18%) and 12 cases severe acute pancreatitis (12%). (Table 2) In our study the majority of cases who presented with acute pancreatitis were of alcohol induced type, 67 (67%). Gall stone pancreatitis accounted for 19 (19%) 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	Percentage
Below 30	9	9
30 to 40	24	24
40to 50	35	35
50 to 60	19	19
Above 60	13	13

Table 2: Type of Pancreatitis

Pancreatitis	Number of patients	Percentage
Mild acute pancreatitis	70	70
Moderately Severe Acute Pancreatitis	18	18
Severe acute Pancreatitis	12	12

Table 3: Aetiology distribution

Aetiology	Number of patients	Percentage
Alcohol induced	67	67
Gallstones	19	19
Idiopathic	9	9
Drugs	1	1
Post ERCP	1	1
Tumor	2	2
Hypertriglyceridemia	1	1

In our study 60 (60%) patients had diabetes mellitus, 42 (42%) had hypertension and 48 (48%) had dyslipidemia. Major co-morbidity was diabetes mellitus among the studied population. In our study the 39 cases were having a Body mass index (BMI) of 18.5 to 24.9 (50%) and 8 (8%) were having a BMI of above 30 and 39 (44%) had BMI between 18.5 to 19.9. Majority of the cases 70 (70%) who presented were having habit of consuming alcohol. 4 (4%) 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.

The mean BMI in those with mild acute pancreatitis was 24.37±0.31 (Standard error (SE)), moderately severe acute pancreatitis was 28.44±0.72 and severe acute pancreatitis was 28.97±1.77. ANOVA test was done and found significant difference in mean values of BMI across mild, moderate and severe acute pancreatitis with F value of 18.16 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 10.77, 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	24.37±0.31	84.21±1.21
Moderately Severe Acute Pancreatitis	28.44±0.72	93.06±3.44
Severe acute Pancreatitis	28.97±1.77	105.74±4.22.

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 8.12, degree of freedom (df) of 2 and a p value of 0.012.

In our study it was observed that severe disease was our study the mean pulse rate in mild pancreatitis was 84.21±1.21 (SE), moderately severe pancreatitis was 93.06±3.44 and severe acute pancreatitis was 105.74±4.22. ANOVA test showed significant difference in mean values of pulse rate across mild, moderate and severe pancreatitis with an F value of 16.74 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 26.11, 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 23.21, 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 16521±1156.87 and severe pancreatitis was 17022±2044.21. ANOVA test showed significant difference in mean values of total count in mild, moderate and severe pancreatitis with an F value of 11.11 and p value of 0.001 (significant). There was statistical significance observed between BUN and severity with a Pearson Chi-square value of 40.12, df of 2 and a p value of 0.001 (significant).

There was statistical significance observed between creatinine score and severity of pancreatitis in our study with Pearson Chi-square value of 90.77, df of 4 and a p value of 0.001 (significant). There was statistical significance observed between C-reactive protein (CRP) and severity of pancreatitis in our study with Pearson Chi- square value of 9.33, df of 2 and p value of 0.011(significant).

In our study the mean value of serum amylase for mild acute pancreatitis was 1913.8±241.70 (S.E), moderately severe pancreatitis was 2893.65±67.22 and severe pancreatitis was 2655±522.86. Kruskal Wallis test was used to compare the value of serum amylase with mild, moderate and severe pancreatitis and was found to be significant with a p value of 0.041 (significant).

In our study the mean value of serum lipase for mild acute pancreatitis was 5612±511.30 (SE), moderately severe pancreatitis was 8598±826.233 and severe pancreatitis was 8977.62±795.233. Kruskal Wallis test was used to compare the value of serum lipase with mild, moderate and severe pancreatitis and was found to be significant with a p value of 0.006 (significant).

In our study the mean value of LDH for mild acute pancreatitis was 532.61±22.32 (SE), moderately severe pancreatitis was 674.71±53.97 and severe pancreatitis was 888.67±85.20. Kruskal Wallis test was used to compare the value of LDH with mild, moderate and severe pancreatitis and was found to be significant with a p value of 0.001 (significant).

In our study the mean value of pH in mild acute pancreatitis was 7.41±0.003 (SE), moderately severe pancreatitis was 7.39±0.008 and severe pancreatitis was 7.41±0.003. ANOVA test showed significant difference in the mean value of pH with mild, moderate and severe pancreatitis with an F value of 6.71 and a p value of 0.002 (significant).

In our study the mean value of calcium in mild acute pancreatitis was 8.49±0.062 (SE), moderately severe pancreatitis was 8.12±0.152 and severe pancreatitis was 7.88±0.274.

ANOVA test showed significant difference in the mean value of calcium with mild, moderate and severe pancreatitis with an F value of 5.22 and a p value of 0.008 (significant).

In our study there was statistical significance observed between fall in >10% hematocrit with severity of pancreatitis with a Pearson Chi-square value of 39.331, 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 58.23, df of 4 and a p value of 0.001 (significant).

In our study two patients had peripancreatic inflammation with necrosis less than 35% and one had peripancreatic inflammation with single fluid collection. None had infected necrosis.

In our study there was statistical significance observed between CTSI with severity of pancreatitis with a Pearson Chi-square value of 81.11, df of 8 and a p value of 0.001 .

In our study there was statistical significance observed between Ranson's score and severity of pancreatitis with a Pearson Chi-square value of 47.22, df of 2 and a p value of 0.001 .

In our study it was observed that the IP duration of the patients with severe disease was more. 16 out of 18 cases of moderately severe acute pancreatitis and 6 out of 12 cases of severe acute pancreatitis had prolonged hospital stay. In our study there was statistical significance observed between IP duration and severity with a Pearson Chi square test value of 50.32, df of 2 and a p value of 0.001 .

Discussion

In this study period 100 cases of acute pancreatitis were admitted in general surgery department, out of which 76(76%) were males and 24 (24%) were females. Age of the patient in our study varied from 18 to 75 years, the youngest being 22 years and oldest being 75 years. Majority cases were seen in between 40 to 50 years 35 (35%). In our study the majority of cases who presented with acute pancreatitis were of alcohol induced type, 67 (67%). Gall stone pancreatitis accounted for 19 (19%) 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 70 cases were mild acute pancreatitis (70%), 18 cases were moderately severe acute pancreatitis (18%) and 12 cases severe acute pancreatitis (12%). We had mortality of 4 patients who developed severe pancreatitis. 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 (67%) followed by gall stones (19%).

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 20 cases and 3 patients had peripancreatic inflammation with necrosis less than 36% and 2 had peripancreatic 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 9 out of 12 cases of severe acute pancreatitis and 12 out of 18 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]

USG abdomen showed significant correlation with severity. It is better than CT scan in detection of gall stones.[25] Ultrasonogram is the most sensitive modality in evaluating the biliary tree and gall bladder.[26]

The mean IP duration of patients with mild acute pancreatitis was 4.68±0.25, moderately severe acute pancreatitis was 12.04±0.94 and severe acute pancreatitis was 12.42±2.52, maximum stay was 18 days and minimum were 3 days. The morbidity increased with severity of the disease.

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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