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

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Abstract

AIM

The purpose of this research was to assess the factors linked with the severity of acute pancreatitis.

Methods: For one-year, prospective observational research was conducted at the Department of General Surgery at SCB Medical college and hospital, Cuttack. This research comprised 80 patients who were diagnosed with acute pancreatitis based on clinical indications, biochemical markers, and radiological findings. Various blood tests were performed on them, including 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. CT scans for individuals who are suggested. The two most often used scoring methods at our university, Ranson's score and modified Glasgow score, were also examined.

RESULTS

Most instances (37.5%) were observed in people aged 40 to 50. In our research, 56 patients (70% of the total) had mild acute pancreatitis, 15 had moderately severe acute pancreatitis (18.5%), and 9 had severe acute pancreatitis (11.25%). Most patients with acute pancreatitis in our research, 56 (70%), were caused by alcohol. 14 (17.5%) of the cases were due to gallstone pancreatitis. In our research, 50 patients (62.5%) had diabetes, 32 (40%) had hypertension, and 40 (50%) had dyslipidaemia. Diabetes mellitus was the most common co-morbidity in the study population. In our analysis, 38 instances (47.5%) had a BMI between 18.5 to 24.9, 8 (10%) had a BMI more than 30, and 34 (42.5%) had a BMI between 18.5 and 19.9. The majority of the 56 instances (70%) who presented had a drinking habit. In our

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research, 4 (5%) individuals died as a result of severe acute pancreatitis complications. The mean BMI for those with mild acute pancreatitis was 25.470.21 (standard error (SE)), 29.540.62 for those with moderately severe acute pancreatitis, and 29.871.67 for those with severe acute pancreatitis.

Conclusion: For successful therapy, one should not rely on a single grading system. Pancreatitis should be diagnosed clinically, laboratory, and radiologically, and vigorous crystalloid resuscitation with intensive care monitoring should begin as soon as possible.

Introduction

Acute pancreatitis (AP) has a wide range of clinical manifestations and severity. The majority of patients get a moderate course that resolves spontaneously, while around 20% of patients experience a severe necrotizing form with organ failure and fatality rates ranging from 10% to 50%. Because of the risk of worsening and death, stratification of the severity of AP is critical[1-4]. 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] have all been used to predict the severity of AP and its outcome.

Imaging approaches have made major contributions to the severity staging and prognostic evaluation of AP. CECT is the most often used imaging technique for AP staging. The abdominal CECT scan has been utilised to identify the severity of AP, the amount of necrosis, fluid collections, pseudo cysts, abscesses, and the prognosis of clinical outcome[8-10]. Except for modified Ranson's criteria, the other scoring methods use the same severity score parameters independent of AP aetiology. The factors used to quantify severity in the modified Ranson scoring system differ depending on etiology[11]. The conditions for nongallstone-induced AP are more strict than for gallstone-induced AP. In practise, the majority of gallstone-induced AP patients have a modest clinical course. Depending on the aetiology, several risk factors may contribute to the severity of AP. Obesity, for example, is thought to be an independent risk factor for SAP[12,13], while there has been a contradicting report[14]. Patients with low body mass index (BMI) have worse clinical outcomes, particularly in Asian populations[15,16]. Alcoholism (42%) was shown to be the top aetiology in Indian subcontinent research, followed by gall stones (24%) and trauma (17%). The research also found that men had a higher incidence (75%), as did those in their 30s. Alcoholic pancreatitis was reported to cause severe attacks[17].

One of the most critical aspects of acute pancreatitis care is the determination of severity. such scoring methods fail to identify people with severe illness, and the cost of generating such ratings is also considerable. As a result, the study focused on individual characteristics that might provide early warning signs of patients developing severe illness, and since the number of admissions due to acute pancreatitis is large in this location, this issue was chosen for research. The purpose of this research was to look at the factors that are linked to the severity of acute pancreatitis.

Methods and materials

After receiving clearance from the protocol review committee and the institutional ethics committee, this prospective observational research was conducted for one year at the Department of General Surgery, SCB Medical college and Hospital, Cuttack

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This research comprised 80 consecutive patients who arrived with symptoms of acute pancreatitis between the ages of 18 and 68 and were classified as having acute pancreatitis based on clinical signs, biochemical markers, and radiological signals.

Methodology

Patients with chronic pancreatitis and those who did not want to participate in the trial were excluded. After a thorough history was taken using the proforma, all patients were thoroughly examined. They were then tested for 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 who were indicated. Individual factors in distinct prognosis scores for acute pancreatitis were explored. The two most often used scoring methods in our institution, Ranson's score and modified Glasgow score [11,17], were also examined.

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 research period, 80 patients of acute pancreatitis were admitted to the general surgery department, including 58 (72.5%) men and 22 (27.5%) women. The patients in our research ranged in age from 18 to 68 years old, with the youngest being 19 and the oldest being 68. Most instances (37.5%) were observed in people aged 40 to 50. (Table1)

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

In our research, 56 patients (70% of the total) had mild acute pancreatitis, 15 had moderately severe acute pancreatitis (18.5%), and 9 had severe acute pancreatitis (11.25%). (Table 2)

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

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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

Most patients with acute pancreatitis in our research, 56 (70%), were caused by alcohol. 14 (17.5%) of the cases were due to gallstone pancreatitis. The remainder was accounted for by drugs, tumours, Post Endoscopic Retrograde Cholangiopancreatography (ERCP), and hypertriglyceridemia (Table 3). In our research, 50 patients (62.5%) had diabetes, 32 (40%) had hypertension, and 40 (50%) had dyslipidaemia. Diabetes mellitus was the most common co-morbidity in the study population. In our analysis, 38 instances (47.5%) had a BMI between 18.5 to 24.9, 8 (10%) had a BMI more than 30, and 34 (42.5%) had a BMI between 18.5 and 19.9. The majority of the 56 instances (70%) who presented had a drinking habit. In our research, 4 (5%) individuals died as a result of severe acute pancreatitis complications. One was caused by acute respiratory distress syndrome (ARDS), while the other was caused by multi-organ failure.

The mean BMI for those with mild acute pancreatitis was 25.470.21 (standard error (SE)), 29.540.62 for those with moderately severe acute pancreatitis, and 29.871.67 for those with severe acute pancreatitis. The ANOVA test revealed a significant variation in mean BMI values across mild, moderate, and severe acute pancreatitis, with F value of 17.79 and p value of 0.001 (significant) among individuals with hypertension. Hypertension was shown to be statistically significant after analysis, with a Pearson Chi-square test value of 9.87, a 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 research, individuals with diabetes mellitus got more severe illness. With a Pearson Chi-square test score of 9.06, a degree of freedom (df) of 2, and a p value of 0.015, it was determined to be statistically significant. In our research, mild pancreatitis had a mean pulse rate of 85.311.11 (SE), moderately severe pancreatitis had a mean pulse rate of 94.163.34, and severe acute pancreatitis had a mean pulse rate of 106.844.12. The ANOVA test revealed a significant difference in mean pulse rate values for mild, moderate, and severe pancreatitis, with a F value of 14.59 and a p value of 0.001 (significant).(table 4)

With a Pearson Chi-square value of 24.87, df of 4, and a p value of 0.001 (significant), there was statistical relevance between systolic blood pressure (BP) score and severity in our research. In

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our research, there was statistical significance between respiratory rate and severity, with a Pearson Chi-square value of 21.78, df of 4, and a p value of 0.001 (significant).

In our research, the mean total count for mild acute pancreatitis was 12875384.21 (SE), 168711096.07 for moderately severe pancreatitis, and 173622874.21 for severe pancreatitis. With a F value of 10.01 and a p value of 0.001, the ANOVA test revealed a significant difference in mean total count values in mild, moderate, and severe pancreatitis. With a Pearson Chi-square value of 38.12, df of 2, and a p value of 0.001 (significant), there was statistical significance between BUN and severity. Our research found statistical significance between base deficiency and pancreatitis severity, with a Pearson Chi-square value of 57.03, df of 4, and p value of 0.001 (significant).

Discussion

During the research period, 80 patients of acute pancreatitis were admitted to the general surgery department, including 58 (72.5%) males and 22 (27.5%) females. The patients in our research ranged in age from 18 to 68 years old, with the youngest being 19 and the oldest being 68.

The majority of instances (37.5%) were observed in people aged 40 to 50. In our research, 56 patients (70% of the total) had mild acute pancreatitis, 15 had moderately severe acute pancreatitis (18.5%), and 9 had severe acute pancreatitis (11.25%). The majority of patients with acute pancreatitis in our research, 56 (70%), were caused by alcohol. Gall stone pancreatitis accounted for 14 (17.5%) of the cases, which is consistent with Rithin et al's research, in which the mean age was 40.9 years and alcohol was a prevalent aetiology in 72% of the patients[18]. Similar findings were reported by Baig et al, in which drunkenness accounted for 41.14% of cases, followed by gall stones, in contrast to research performed outside India, which revealed 51.7% of cases attributable to gall stones and 48.3% due to alcohol in a study conducted by Maher et al.[19,20] According to Bota et al, 41.6% of cases were caused by gallstones, while 37.1% were caused by alcohol consumption[21].

In our research, 56 patients (70% of the total) had mild acute pancreatitis, 15 had moderately severe acute pancreatitis (18.5%), and 9 had severe acute pancreatitis (11.25%). Both were caused by pancreatitis complications, including ARDS and multi-organ failure. The mortality rate in Bota et al's research was 4.6%, but it was 5.7% in Simoes et al's study. [17,21] The most prevalent aetiology identified in our investigation was alcohol (70%) followed by gall stones (17.5%).

In our investigation, systolic blood pressure and creatinine levels were associated with illness severity as defined by the updated Atlanta classification [22]. Total count was also significant, which agreed with a research by Maher et al. [20]

Serum amylase, serum lipase, LDH, CRP, creatinine, total count, arterial pH, serum calcium, and drop in hematocrit correlated well with the severity of pancreatitis, whereas liver function tests other than Aspartate aminotransferase (AST), serum sodium, serum potassium, RBS, platelet count, and haemoglobin had no significant correlation. This was consistent with the findings of the Maher et al. investigation.[20] A substantial relationship with CRP was also found in a research by Campos et al. [23]

A CT scan is not performed on all pancreatitis patients. However, CTSI is regarded as the gold standard for imaging in acute pancreatitis [24]. In our investigation, CT scan indicated a substantial connection with illness severity. The use of CECT is limited by radiation exposure and repeated scans to monitor progress and problems. It raises the possibility of allergic responses to IV contrast. Furthermore, contrast cannot be employed in individuals with renal failure. In our

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investigation, CT scans were performed on 12 patients, two of whom had peripancreatic inflammation with necrosis less than 30% and one had peripancreatic inflammation with solitary fluid collection. None of them had infected necrosis. In our research cases, no surgical intervention was performed. CTSI was associated with severity, which is consistent with the findings of Simoes et al.[17]

The presence of pleural effusion on a chest x-ray was shown to have a strong connection with severity. In our research, pleural effusion was seen in 6 of 9 instances of severe acute pancreatitis and 9 of 15 cases of moderately severe pancreatitis. This correlates the occurrence of pleural effusion with severity, which is consistent with the findings 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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