

Clinico-Epidemiological Profile of Acute Pancreatitis with Special Reference to Pancreatic Necrosis –Experience from a Teaching Hospital, Kolkata

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Abstract: Acute pancreatitis (AP) is a dreaded emergency in clinical practice. Though most of them undergo uneventful recovery in uncomplicated variety, various complications are encountered in the course of illness which may lead to prolonged hospital stay and mortality. Present study was undertaken to examine the clinical spectrum of acute pancreatitis and to look in particular for life threatening complications of this disease. A descriptive study with cross sectional design was planned in a tertiary care hospital of Kolkata city, in India. 50 consecutive patients of AP who were admitted to this hospital through one and half year period of time (January 2016-July 2017) were enrolled. The data was collected with the help of a pre designed, pre tested semi structure schedule. Secondary data was also obtained from the hospital treatment records. Parameters like correlation of acute pancreatitis with age, sex, Body Mass Index, alcohol and smoking were studied. Severity of the disease with its etiology and complications are noted. Study subjects presented at the hospitals with varieties of symptoms (Figure-1). Leucocytosis was common in severe disease and was an important prognostic parameter. The observed mortality rate for acute pancreatitis was 14% and morbidity rate was 38% during the study period. Majority of patients in the present study had addiction to alcohol (40%). The study found overall mortality rate as 14%. Early diagnosis and timely intervention was the key of management. Most patients required adequate hydration, maintenance of vitals and intensive monitoring. Present study was conducted with a limited number of patients but reemphasized the efficacy of conservative management in most patients.

Keywords: Acute pancreatitis, epidemiology, prognosis, complications.

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I. Introduction

Acute pancreatitis (AP) is the inflammation of pancreas with or without involvement of remote organ/systems. It is a commonly encountered condition in medical emergency. Fortunately most of the acute pancreatitis patients are uncomplicated and have an uneventful recovery. The observed incidence of AP in an European study¹ was 4.4 to 15.9 /100000 person-years and the annual mortality rate found 1.5 /10000 person-years which remain stable throughout the ten years duration of the study period. Incidence of mortality rate of AP in that study increased considerably with age. Case fatality proportion of first admission decreased from 14.3 to 10.7 % in that study. Other study² revealed a lower incidence of AP, 9.8/100000 person-years which is similar worsening trend with time. In that study age standardized case fatality rate within 30 days of admission improve with passage of time. AP patient with local complications, systemic involvement and co-morbidities may manifest organ failure and have a fatal outcome. With this idea in mind, we have studied 50 consecutive AP patients admitted to our hospital and analyzed various management issues and prognostic markers.

II. Material And Methods

A descriptive study with cross sectional design was planned in a tertiary care hospital of Kolkata city, in India. 50 consecutive patients of AP who were admitted as in patients through one and half year period of time (January 2016-July 2017) were enrolled. The data was collected with the help of a pre designed, pre tested semi structure schedule. Secondary data was also obtained from the hospital treatment records. All the study subjects who given consent were included and patients who were seriously ill or admitted in intensive care unit were excluded. The collected data was entered and analyzed in Microsoft Excel software (2007). The variables considered for analysis were epidemiological profile of study subjects, their presenting symptoms and various

complications, incidence of morbidity (developing either local and/or systemic complications or prolonged hospital stay more than 10 days) and mortality as well as different prognostic factors.

III. Result

Though majority of the study patients were in the 4th decade of age (38%), youngest patient was 22 years old and age of the oldest one was 68 years. Overall mortality was 14 % with a slightly higher recorded mortality of female patients and with increasing age. Mean duration of hospitalization was 14 days and was greater for males than females (21 Vs 12 days). Two third of all patients had mild disease and remainder had some complications. History of alcohol abuse was present in 40% patients. 28% patients had biliary tract disease and rest had suffered from neither biliary tract disease nor from alcoholism. Age, hypotension, tachycardia, abdominal lump, fever and abnormal lung finding correlated with increased morbidity and mortality. The observed mortality rate for acute pancreatitis was 14% and morbidity rate was 38% during the study period. (Table-1, 2)

Study subjects presented at the hospitals with varieties of symptoms (Figure-1). Leucocytosis was common in severe disease and was an important prognostic parameter. (Figure -2) Hypocalcemia noted in a small minority (4 patients). Most frequent biochemical abnormality was hypoalbuminemia (Figure -3) and was seen in severe disease. Albumin infusion was required in 7 patients, 2 of them died. Rise in AST and LDH were found to be useful marker in severe disease. Hyperbilirubinemia was noted mostly in biliary tract disease. Renal function parameter e.g. blood urea and serum creatinine found important prognostic marker and correlated with acute renal failure and mortality.

Severe hypoxemia (PO₂ <60mm Hg in room air) correlated with higher mortality (66.67%). Pseudocyst was noted in 5 patients; 3 of them were alcoholic. Sepsis was the gravest complication as noted in the study .It denoted severe disease as evident by involvement of organ systems. Biochemical and hematological abnormalities, renal circulatory and respiratory failures were associated with sepsis. No single parameter, clinical finding, biochemical or hematological tests were found to be consistently accurate in predicting prognosis. Degree of elevation of serum amylase was not useful prognostically. Persistent high serum amylase above 600 IU/ L was associated with development of local complication. Serum lipase was also a useful marker for detection of AP. High amylase (>1000IU/L), lipase (>200IU) were associated with organ failure and positively correlated with increased morbidity and mortality.

IV. Discussion

The observed mortality rate for acute pancreatitis was 14% and morbidity rate was 38% during the study period. The annual mortality rate of acute pancreatitis remained fairly stable at 1.5/100,000 person-years in a European study². The incidence and mortality rate of acute pancreatitis increased considerably with age. In present study presence of complication and age along with co-morbidities played a role for mortality. In the said European study case-fatality proportion of first admissions for acute pancreatitis decreased from 14.3% to 10.7% and the case-fatality for relapses remained stable at 3.2%¹.

Majority of patients in the present study had addiction to alcohol 40% (Table-3). Biliary tract disease was present in 14% of cases. Eighteen percent had neither history of alcoholism nor biliary tract disease i.e. idiopathic group. Hypertriglyceridemia amounting to less than 1000 mg/dl was found in 6% patients of acute pancreatitis, 4% had a history of drug intake (Azathioprine) and 4% of pancreatitis was caused by infection (Dengue virus serology was positive). The mortality rate for alcoholic group (20%) was lower than that of biliary tract disease (21.42%). Etiologically the present study was comparable to Baig et al as far as alcohol consumption was concerned though drug intake and viral infection are the two new entrants in this category.

Failure to make an early diagnosis has an impact on mortality. Thus the fall in mortality rates from 17.8% in 1961 to 5.8% in 1985 in Scotland³ has to be taken in conjunction with the fact that no less than 42% of patients dying from acute pancreatitis in Glasgow Royal Infirmary within this period had their disease diagnosed for the first time at autopsy. Similarly, 35% of the fatal cases in Bristol were diagnosed for the first time at autopsy, case mortality remaining at around 20% throughout the study⁴. The crunch factor remained were early diagnosis and intervention to decrease the mortality rate.

Jacobs M. L., Daggett W.M., Civetta J. M. et al. reported a mortality rate of 12.9% for acute pancreatitis at Massachusetts General Hospital during period 1963 to 1969. The mortality for the alcoholic group (8%) was significantly higher than for those with biliary tract disease (6%)⁵. In present study alcoholic and gallstone disease patients had almost similar mortality but the cause of mortality depends on the time interval between symptoms and hospital attendance co-morbidities and complications

The elderly are at particular risk. Above 50 years of age the mortality rate (60%) is greater than that of below 50 years of age (13.18%), but the younger age group was more prone to develop complications i.e. had increased morbidity. In this study, incidence of acute pancreatitis was more in male than in female and also the mortality rate for male (13.88%) was less than that of female (14.28%). In Hong Kong study, mortality rose

from 6% in those under 50 years to 21% in those over 75 years, the increase being attributed primarily to a higher incidence of concomitant medical or surgical disease.⁶ In the study by Baig et al the main factor for mortality remained presence of complications like sepsis and not the age.

Circulatory failure was the most common cause of death in our study. Three patients died of hypovolemic shock. 10 patients who developed hypovolemic shock, two patients developed respiratory insufficiency. Renal failure developed in two patients. Foster and Ziffren reported a high mortality of 86.9% in a group of 23 patients with acute pancreatitis and shock.⁷ Facey et al, Elliot and Ranson, all reported that, in most instances, hypotension did not present in the face of vigorous intravenous replacement. Marshall L. J. and Daggett reported greater than 39% mortality among the 33 patients who presented with a systolic blood pressure less than 90 mmHg. In this present series, there was 30% mortality among the 10 patients who presented with a systolic blood pressure of less than 90 mmHg, though the usual measures were taken to correct hypovolemia.

Pancreatic phlegmon was developed in 2 patients. 5 patients developed pseudocyst and one patients developed pancreatic abscess in the present study.

Pain in epigastrium was the commonest presentation of acute pancreatitis. Severity of pain correlated negatively with severity of disease. Severe pain was found to be significantly more in patients with alcoholic pancreatitis when compared to rest. Ammann RW et al, in a comparative study of the differences in natural history of alcoholic and idiopathic acute pancreatitis, had reported higher incidence of pain in patients with alcoholic pancreatitis⁸, corroborating our findings. Vomiting, nausea and anorexia all insignificantly correlated with morbidity and mortality of the disease. Marshall L. Jacobs, Daggett. W.M. et al reported a negative correlation between mortality rate and presence of abdominal pain, vomiting, nausea or anorexia.⁵

Tachycardia, hypotension, fever, dyspnoea and cyanosis at the time of presentation were all associated with increased morbidity and mortality hence importance of general physical examination cannot be over-emphasized. Fever as a presenting feature along with pain abdomen was noted in many patients with acute pancreatitis. Jacobs et al reported that 142 patients (27%) had an initial temperature greater than 100°F and 20% of these patients died.⁵ In the present series 12 patients (24%) had an initial temperature greater than 100°F and 41.66% of these patients died but possibly underlying severe disease was the culprit not the fever per se. Of the remainder physical examination, the presence of abdominal mass and abnormal findings over lung fields correlated with increased mortality. The present study suggested that in acute pancreatitis the initial physical finding of abdominal mass and abnormal lung changes to detect the severity and complication were important. Ranson and colleagues reported a positive correlation between leucocytosis and severity of disease¹⁰. Among 50 patients in this series 12 patients had a white blood cell count greater than 15000/mm³ during the first 48 hours. Morbidity for this group was 41.67% which was significantly greater than that for total population.

A hematocrit of more than 44% at any time during the initial 48 hours correlated with increased mortality. Failure to lowering the hematocrit below 44% during the same period was associated with a mortality rate of 20%. The presence of high hematocrit value was a useful prognostic sign and the importance of early treatment by transfusion with whole blood or packed red blood cells was also demonstrated. Present data do not confirm the report by Gray and Rosenman that hemoconcentration on admission is significant as a poor prognostic sign.

Abnormal examination of the lung fields, both physical (Tachypnea, abnormal breath sound) and radiological methods correlated with increased mortality in patients in this series. The importance of diagnosis of respiratory insufficiency early, however, required a high index of suspicion and confirmation by determination of arterial blood gases. Only 5 patients underwent arterial blood gas analysis. Ranson¹¹ reported a high incidence of mild to moderate respiratory insufficiency based on arterial blood gas determination in a group of patients among whom very few had clinically or radiologically apparent signs of respiratory problems. Many authors noted earlier the relation between respiratory complications and poor prognosis in acute pancreatitis. Warshaw and colleagues¹² recently reported a series of 7 patients with severe pancreatitis and a distinct form of pulmonary injury characterized by disruption of the alveolar- capillary membrane; leading to pulmonary oedema (Acute respiratory distress syndrome). It should be emphasized that this particular type of pulmonary injury (Acute respiratory distress syndrome) was not shared by all or even most patients with acute pancreatitis complicated by respiratory insufficiency. Twelve patients in the present series had respiratory complication like left sided pleural effusion. Three of these patients showed arterial oxygen tension less than < 60 mmHg within 48 hours and required mechanical ventilatory support. Two patients subsequently died (mortality rate-66.67%).

Many authors have reported the incidence of altered renal function in the presence of acute pancreatitis. In this series, elevations of both blood urea (greater than > 100 mg/dl) and serum creatinine (greater than >3 mg/dl) were associated with significant increase in the mortality rate, even after adequate hydration. Some authors found very high mortality rate in patients with acute pancreatitis complicated with acute renal failure. In our study among 50 patients 2 patients had a serum creatinine greater than 3 mg/dl and 2 patients had blood urea level greater than >100 mg/dl. Only one patient developed frank renal failure and died in spite of adequate

hydration and a level of serum creatinine and blood urea was persistently high. As noted above in the patients under discussion, oliguria during the initial 48 hours was not found as reliable indicator for renal failure.

Contrast enhanced CT was done in 16 patients, out of these 12 patients had developed pancreatic necrosis. Two patients died with a necrosis score of 4 and 6. Approximately 33% of patients with necrotizing pancreatitis developed infected necrosis mostly after 10 days of illness¹³⁻¹⁶. Most patients with infected necrosis had systemic toxicity (including fever and leucocytosis) which was either documented from the time of admission or developed at some time after admission. As many as 48% of patients with infected necrosis had persistent organ failure, either documented initially at admission or sometime after admission¹⁷. Because the elevations in white blood count and temperature may be identical in sterile and infected necrosis¹⁸, and because organ failure may occur in a substantial percentage of patients with both sterile and infected necrosis (45% vs. 62%) in one series^{18, 19}, it was impossible to distinguish these conditions clinically unless CT scan showed evidence of air bubbles in the retro-peritoneum. The distinction between sterile and infected necrosis was an important concern throughout the course of necrotizing pancreatitis, but particularly during the second and third weeks, when at least one-half of cases of infected necrosis were documented^{15,17}. The technique of percutaneous aspiration (usually by CT guidance) has proven to be safe and accurate in distinguishing sterile from infected necrosis²⁰⁻²² except possibly during the first week of illness²². For this reason, when infected necrosis was suspected on the basis of systemic toxicity and/or organ failure, CT-guided percutaneous aspiration for Gram's stain and culture was recommended¹⁶. The initial aspiration was usually performed during the second or third week of illness. If this aspiration was negative for bacteria or fungi, it was generally recommended that patients with persistence of systemic toxicity undergo CT-guided percutaneous aspiration every 5–7 days to identify instances of infected necrosis that develop at a later time or conceivably may have already developed but were not diagnosed at the time of a prior aspiration

Jordon²³ Pollack²⁴ and Trapnell²⁵ all had pointed out that exploratory laparotomy did not necessarily increase the mortality of acute pancreatitis. In this series 2 patients underwent exploratory laparotomy for diagnostic suspicion and all of them survived. They had a mortality rate same as that for other patients but had a prolong hospital stay (more than 2 weeks). But nowadays endoscopic approach and limited surgical interference remained the main modality of treatment and the preferred one.

In present study mortality rate was noted to be around 14%. Baig et al observed the mortality rate of acute severe pancreatitis was around 5%. The cause of death was multiorgan failure. In that study the mild pancreatitis group did not have any mortality.²⁶

The aforementioned studies did not selectively address the question of surgical treatment of those severely ill patients with acute pancreatitis who continue to deteriorate despite maximal medical treatment. These patients might benefit from any of several therapeutic modalities currently under evaluation. These included peritoneal lavage, subtotal pancreatectomy and the use of anti-enzyme preparation. Kivilaakso et al reported their experience of early surgery in 30 severely ill patients (mean age 37.4 years). Most of the operations were distal pancreatic resections and the overall mortality was 37%. This was comparable to the results in reports of conservatively managed patients. They subsequently compared early surgery (distal pancreatic resection) to peritoneal lavage performed through catheters placed around the pancreas at laparotomy²⁷. The mortality was less in the resected group (4 from 18, compared to 8 from 17 in the lavage group) although the number were small. The authors analysed the patients according to the extent of pancreatic damage. In general, the more extensive the damage the higher is the mortality. This early direct surgical intervention was seldom advocated in older patients but in younger severely ill patients, not responding to conservative management, it still had a place in selected patients. No such trial was given in the present series. Only a small portion of all patients with pancreatitis had such severe disease and the experience quoted above was difficult to repeat.

V. Conclusion

AP was a common illness in medical practice. Early diagnosis and timely intervention were the key of management. Most patients required adequate hydration, maintenance of vitals and intensive monitoring. Present study was conducted with a limited number of patients but reemphasized the efficacy of conservative management in most patients.

VI. Figures and Tables

Figure 1. Simple bar diagram representing different presenting symptoms of study Patients (n=50)

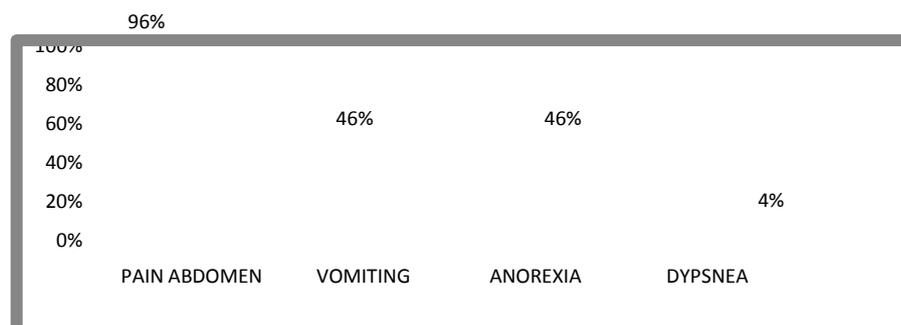


Figure 2. Simple bar diagram representing different clinical findings of Acute Pancreatitis Patients at the time of diagnosis (n=50)

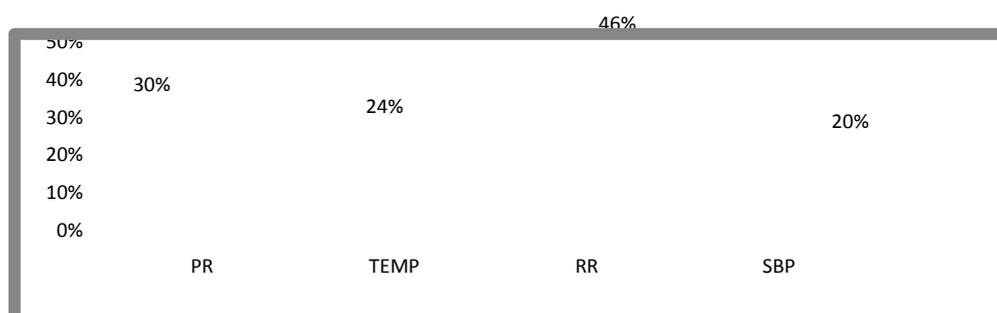


Figure 3. Simple bar diagram showing deranged hematological and biochemical parameters among study patients (n=50)

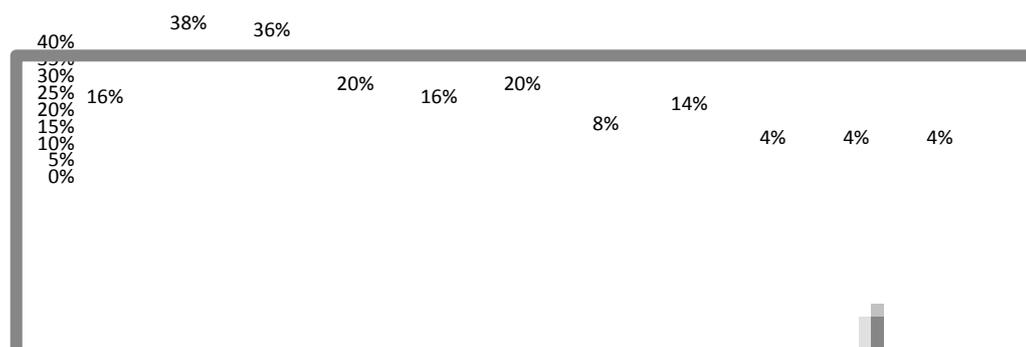


Table 1: Mortality and morbidity status of Acute Pancreatitis in relation to etiological factors (n=50)

Etiological Factors	No. of Patients	Mortality	Morbidity
Alcoholism	20 (40.0%)	4 (20.0%)	9(45.0%)
Biliary tract disease	14(28.0%)	3 (21.42%)	4 (28.57%)
Idiopathic	11(22.0%)	-	3(27.3%)
Hypertriglyceridemia	3 (6.0%)	-	2 (66.7%)
Drug	2 (4.0%)	-	1 (50.0%)
Total	50(100%)	7(14.0%)	19(38.0%)

Table 2: Proportion of mortality of Acute Pancreatitis in relation to clinical features. (n=50)**

Symptom / Sign	Number of Patients	Percentage	Mortality No. (%)
Pulse >120/min	15	30.00	5(10%)
Respiratory Rate > 30/min	23	46.00	4 (17.39%)
Temperature > 100 °F.	12	24.00	5 (41.66%)
(SBP) Blood Pressure < 90 mm Hg	10	20.00	3 (30%)
Jaundice	10	20.00	2 (20%)
Abdominal Tenderness	38	76	7 (18.42%)

Abdominal Lump	10	20.00	5(50%)
Abnormal Lung Findings	8	16.00	2(25%)

** Multiple responses

Table 3 : Association between acute pancreatic necrosis and alcoholism. (n=50)

Necrosis	Alcohol		Total	P value
	Drinker	Non drinker		
Yes	7(14%)	5(10%)	12(24%)	0.135
No	13(26%)	25(50%)	38(76%)	
Total	20(40%)	30(60%)	50(100%)	

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