



## A PROSPECTIVE LONGITUDINAL OBSERVATIONAL STUDY ON ACUTE PANCREATITIS: FACTORS INFLUENCING MORBIDITY AND MORTALITY

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### ABSTRACT

**Background:** Acute pancreatitis presents a broad clinical spectrum ranging from cases so mild that symptoms abate before the diagnosis is actively pursued, to cases which progress rapidly to multisystem failure and eventual demise of patient despite current mode of therapy.

**Aims And Objectives:** To determine factors related to disease severity, mortality and morbidity in acute pancreatitis.

**Materials And Methods:** Study design: A prospective longitudinal observational study. Study area: Ramakrishna Mission Seva Pratishthan Hospital, Kolkata. Study period: April 2017 to March 2018 Sample size: 76 patients diagnosed with acute pancreatitis after admission. All patients were subjected to a thorough history taking, clinical examination, routine blood tests and imaging and monitoring of vitals. Patients with complications like sepsis, shock or organ failure was treated in ICU, with invasive and non-invasive monitoring. Thorough IV fluid resuscitation and appropriate analgesics were used with conservative management. Initially put in NPM, started with enteral feeding when ileus subsided or parenteral feeding at appropriate time if clinically unstable. ERCP was done followed by open/laparoscopic cholecystectomy in gallstone pancreatitis patients.

**Results:** The overall mortality for the study group was 11.8% and the morbidity rate was 31.5%. The mortality for male was greater than that for female. The mortality for patients over 50 years of age was greater than that of patients below 50 years of age. The mean duration of hospitalization for the total study group was 14 days and it was found to be higher in male (18 days) than for female (10 days). The mortality for this idiopathic group (n=4, 16.67%) was found to be higher than that for the alcoholic group (n=3, 13.6%) and those with biliary tract disease (n=2, 6.67%), whereas morbidity of the alcoholic group (n=12, 40%) was found higher than the idiopathic group (n=8, 33.3%) and biliary disease group (n=4, 18.1%). Mortality rate in patients with pseudocyst was 10%, 50% in pancreatic abscess, 42.8% in circulatory failure patients, 50% in renal failure patients and 75% in respiratory failure patients.

**Conclusion:** Despite earlier recognition and appropriate care the morbidity and mortality rates have remained quite high in cases of severe attack of acute pancreatitis.

**KEYWORDS :** Acute Pancreatitis, Etiology, Factors Influencing Morbidity And Mortality, Severe Pancreatitis, Complications.

### INTRODUCTION

Acute pancreatitis presents a broad clinical spectrum ranging from cases so mild that symptoms abate even before diagnosis is actively pursued, to cases which progress to multisystem failure and eventual demise of the patient in spite of the remarkable advances in critical care in recent times<sup>1</sup>. The incidence of acute pancreatitis varies in different parts of the world and depends upon the prevalence of the aetiological factors in the respective regions<sup>2</sup>. The aetiology of acute pancreatitis is a complex subject because many different factors have been implicated in the causation of the disease and sometimes there is no identifiable cause. Alcohol abuse and biliary tract disease, however, remain two of the most common aetiological factors<sup>3</sup>.

Clinically some patients experience a mild form of the disease which is self-limiting, while others suffer a more severe and sometimes a lethal attack<sup>4</sup>. The factors determining the severity of acute pancreatitis are usually multiple, and their identification is of considerable importance, since their manipulation may decrease the morbidity and mortality associated with the disease. New and more refined diagnostic approaches are used to select those likely to develop severe disease and complications, so that timely intervention can reduce the morbidity and mortality. No single parameter, blood test or clinical recording has been found to be consistently accurate in its prognostic value. However, analysis of carefully selected multiple factors has increased the prognostic accuracy. This study is undertaken to examine the clinical spectrum of acute pancreatitis and to look in particular at that group of patients who suffer life threatening complications. In this study a patient with possible diagnosis of acute pancreatitis will undergo a series of work-up like history taking, detailed clinical examination, pathological and biochemical investigations, and imaging modalities so that the important factors can be identified which determine the severity of the disease, in other words, morbidity and mortality from the disease.

### AIM

To evaluate and identify the factors influencing the morbidity and mortality from acute pancreatitis.

### OBJECTIVES

1) To identify those suffering from acute pancreatitis among the

patients admitted in this hospital with acute abdomen.

- 2) To subject every patient of acute pancreatitis to detail history taking, thorough clinical examination, routine and specific pathological and biochemical investigations and relevant imaging modalities.
- 3) To make out the possible etiology for every case of acute pancreatitis.
- 4) To monitor the patients closely so as to identify the severe cases.
- 5) To follow up the patients for development of complications.
- 6) To assess the factors (clinical, pathological, biochemical and imaging tests) retrospectively which determine the severity of the disease, in other words, morbidity and mortality from acute pancreatitis.

### MATERIALS AND METHODS

**Study Design:** A prospective longitudinal observational study.

**Study Area:** Ramakrishna Mission Seva Pratishthan Hospital, Kolkata.

**Study Period:** April 2017 to March 2018

**Sample Size:** 76 patients diagnosed with acute pancreatitis after admission.

### Methodology:

#### Statistical Analysis:

- 1) Categorical variables are expressed as Number of patients and percentage of patients and compared across the groups using Pearson's Chi Square test for Independence of Attributes/ Fisher's Exact Test as appropriate.
- 2) The statistical software SPSS version 20 has been used for the analysis.
- 3) An alpha level of 5% has been taken, i.e., if any p value is less than 0.05 it has been considered as significant.

### Treatment Protocol:

All the patients diagnosed with acute pancreatitis, included in the study, were thoroughly examined with history taking, clinical

examination, routine blood tests(Complete blood count, coagulation profile, viral serology, blood sugar profile, kidney function test, electrolytes, liver function test, amylase, lipase, CRP) and necessary imaging were done(Chest X ray, CECT abdomen), continuous and close monitoring of the haemodynamic parameters was ensured, intake-output chart was maintained. The initial and most important part of the treatment was prompt and adequate IV fluid resuscitation and moist oxygen supplementation to prevent tissue hypoxia. Vital signs and hourly urine output were monitored initially as essential part of the treatment; an important guide to the fluid therapy.

Central venous catheterization was done and CVP monitored in patients with shock. In severely hypotensive patients, inotropic support like dopamine was used and colloids were used later on at least after 48 hours if needed.

For pain relief injection pethidine (100mg) was administered intramuscularly according to the severity of the pain, if needed, repeated 3 to 4 times a day. Injection tramadol and buprenorphine were also used.

Initially all the patients were put on a nothing per mouth. However, enteral feeding was started with clear fluids as soon as the vomiting stopped and the nausea subsided. Nasogastric suction with Ryle's tube was given to patients who had intractable vomiting or paralytic ileus. TPN was given in patients with severe disease or with persistent paralytic ileus.

Antibiotics were given to patients with severe acute pancreatitis, necrotizing pancreatitis, abscess formation, patients developing sepsis, patients on mechanical ventilation and patients with multi-organ dysfunction. Patients with acute lung injury or respiratory failure were intubated and put on mechanical ventilation.

ERCP followed by Laparoscopic/Open cholecystectomy was done in gallstone pancreatitis patients.

Morbidity has been defined as patients requiring more than ten days of hospital admission and patients developing complications.

## RESULTS

Our study comprised of 49(64.5%) males and 27(35.5%) females, age ranging from 17-64 years. 52(68.4%) patients had mild attack and responded well to the treatment and were discharged without any complications. The remaining 24(31.6%) patients had severe form of the disease; many of them developed complications, had prolonged hospital stay, some required intensive care and 9(11.84%) patients died of the disease.

16(21.05%) patients were treated in intensive care unit and 25(32.9%) patients with gall stone pancreatitis received intervention in the form of ERCP and surgery (laparoscopic or open cholecystectomy).

CVP was monitored in 18(23.7%) patients who presented in severe shock. 16(21.05%) patients who were severely hypotensive, colloids and inotropic support(dopamine) was used.

Continuous nasogastric suction was given to 24(31.57%) patients with intractable vomiting and the patients who developed paralytic ileus.

Total parenteral nutrition was administered to 6(7.9%) patients who had severe form of the disease and with complications like persistent paralytic ileus.

Antibiotics were used in 56(73.7%) patients.

Moist oxygen was administered through nasal prongs to 60(78.9%) patients initially on admission. 4(5.3%) patients had to be intubated and put on mechanical ventilation because of acute lung injury or respiratory failure.

Out of the 30 patients with gall stone pancreatitis definitive interventions like ERCP and laparoscopic or open cholecystectomy were performed in 25(83.33%) patients on the same admission. However, this sort of intervention could not be done in the remaining 5 patients because of the very poor general condition.

Management of pseudocyst of the pancreas was as follows: among the 10 patients who developed pseudocyst, 2(20%) underwent

spontaneous resolution in six weeks' time. The rest were however operated upon within six to eight weeks. 4(40%) patients developed pancreatic abscess which was managed by ultrasound-guided percutaneous drainage by placement of pigtail catheters. 1(25%) of these 4 patients, however, had to undergo open surgery-debridement and pancreatic necrosectomy.

## Clinical Features:

**Pain:** was present in all the 76(100%) patients on admission, severity varied from mild to severe. Pain was mostly dull, continuous and mid-epigastric. It was poorly localized in almost all cases and radiated to the back in 48(63.2%) patients and to the flank in 24(31.6%) patients.

**Vomiting:** was present in 68(89.5%) patients, frequency varying from 4 to 6 times a day. Vomitus mostly had stomach contents while bile-stained fluid obtained in 12(15.8%) patients.

**Anorexia:** 54(71%) patients had anorexia at the time of admission.

**Nausea:** was found to be present in 70(92.1%) patients.

All these symptoms, however, could not predict the severity of the disease.

## Physical Examination:

**Pulse Rate:** above 120/min was present in 24(31.6%) patients on admission, including those in severe shock(n=14, 18.4%).

**Temperature:** above 101°F was present in 18(23.7%) patients.

**Respiratory rate:** above 40/min was present in 9(11.8%) patients on admission.

**Blood Pressure:** Low Systolic-BP(<90 mm Hg) was present in 14(18.4%) patients with hypovolaemic shock at the time of admission. Cyanosis: 4(5.3%) patients had cyanosis during admission, with severe respiratory distress.

**Jaundice:** 15(19.7%) patients had jaundice on admission.

Among the vital signs, tachycardia, high fever, low systolic-BP and cyanosis had positive relation with the severity of acute pancreatitis. Tachypnoea did not correlate with mortality, although an abnormal lung finding e.g., basal rales, pleural effusion, or pulmonary oedema as evident from chest X-ray were all associated with higher morbidity and mortality. Abnormal lung finding was present in 9(11.84%) patients on clinical examination.

**Abdominal Tenderness:** Abdominal tenderness was present in 62(81.6%) patients at the time of admission. On the 2<sup>nd</sup> day of hospital stay following conservative management and analgesics, pain persisted in 36(50%) patients. Persistent abdominal pain (>5 days) in the epigastric region was present in 24(31.6%) patients.

**Epigastric Lump:** was found palpable in 15(19.7%) patients after 48 hours of admission.

Persistent abdominal pain and palpable epigastric lump, both were associated with the severity of the disease. These findings were present more frequently in patients below 50 years of age(n=12).

**Signs:** Grey-turner's sign, present in 1(1.31%) patient and Cullen's sign, present in 2(2.63%) were associated with increased mortality, but neither was statistically significant because of the small sample size.

**Table 1: Prognosis Of Acute Pancreatitis With Clinical Features**

Symptoms & Signs	No. of Patients(%)	Mortality (%)
Pain abdomen	76, (100%)	9 (11.8%)
Back pain	48, (63.2%)	9 (18.1%)
Vomiting	68, (89.5%)	6 (8.8%)
Anorexia	54, (71%)	3 (5.5%)
Pulse >120/min	24, (31.6%)	8 (33.3%)
Resp. rate>40/min	35, (46%)	3 (8.3%)
Temp>101 F	18, (23.7%)	6(33.3%)
BP < 90 mm Hg	14, (18.4%)	6 (42.8%)
Cyanosis	4, (5.3%)	2 (50%)

Jaundice	15, (19.7%)	2 (13.3%)
Abdominal tenderness	62, (81.6%)	9 (14.5%)
Epigastric lump	15, (19.7%)	4 (26.6%)
Abnormal lung finding	9, (11.8%)	3 (33.3%)

**Imaging Studies:**

Straight X-ray abdomen: was done in all patients. Majority were inconclusive due to intraluminal gas. 18(23.7%) patients showed obscure psoas shadow, 5(6.6%) showed sentinel loop, 3(3.9%) had colon cut-off sign, and 10(13.2%) patients who had generalized ileus showed few air-fluid levels. Neither of these findings was related with the morbidity or mortality from acute pancreatitis.

**Chest X-ray:** was done on all patients on admission and during the course of treatment when needed. 9(11.8%) patients had pleural effusion, 3(3.9%) had basal atelectasis during their hospital stay. Abnormal chest x-ray finding was found to be strongly related with the mortality and morbidity.

**USG Abdomen:** was done in all patients. 40(52.6%) patients showed oedematous pancreas, pseudocyst of pancreas was recognized in 10(13.2%) patients, 3(3.9%) had developed pancreatic abscess. 30(39.5%) patients had gall stone disease. Though the more important role of USG was detection of gall stones and thereby guiding the further treatment it was found to be useful for assessment of clinical course of the disease and selection of patients who required timely intervention, thus, played an important role in determining the morbidity and mortality.

**CECT Abdomen:** It could not be done in 6 patients because of financial constrain. Abnormalities detected were pancreatic necrosis, peripancreatic fluid collections, pancreatic pseudocyst and pancreatic abscess. It was definitely more informative than USG in defining the extent and severity of the disease process. CT score of 3 and 4 were found in 17 patients, and of them 9 patients (52.9%) died. Thus, abnormal findings on CT scan were related with the severity of the disease and higher CT score was associated with increased morbidity and mortality.

**ANALYSIS**

The overall mortality for the study group was 11.8% and the morbidity rate was 31.5%. The mortality for male was greater than that for female. The mortality for patients over 50 years of age was greater than that of patients below 50 years of age. The mean duration of hospitalization for the total study group was 14 days and it was found to be higher in male (18 days) than for female (10 days).

**Table 2: Prognosis Of Acute Pancreatitis In Relation To Age And Sex.**

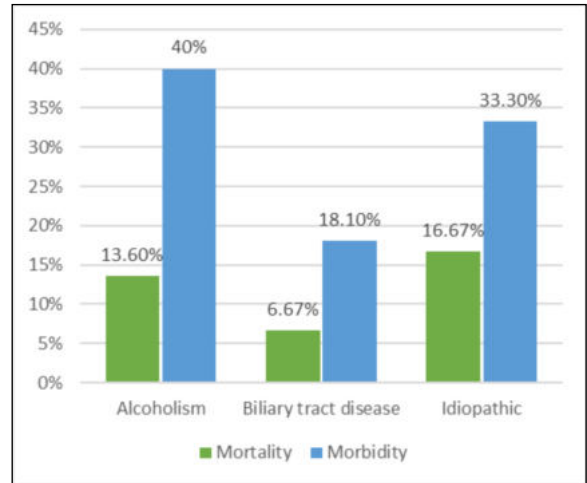
Age (in years)	Sex		Mortality		Morbidity	
	M	F	M	F	M	F
0-10	0	0	0	0	0	0
11-20	1	0	0	0	0	0
21-30	10	2	1	0	4	0
31-40	13	8	2	1	5	2
41-50	22	16	4	2	6	4
51-60	2	1	1	1	2	1
61-70	1	0	1	0	0	0
Total	49	27	9	4	17	7

22(28.9%) patients gave history of alcoholism whereas 30(39.5%) patients had biliary tract disease. 24(31.5%) patients were neither alcoholic nor had any biliary tract disease or any known cause of pancreatitis - the idiopathic group. The mortality for this idiopathic group(n=4, 16.67%) was found to be higher than that for the alcoholic group(n=3, 13.6%) and those with biliary tract disease(n=2, 6.67%), whereas morbidity of the alcoholic group(n=12, 40%) was found higher than the idiopathic group(n=8, 33.3%) and biliary disease group(n=4, 18.1%).

2 had drug addiction (e.g., Heroin) in addition to alcoholism, 3 (3.9%) had pre-existing diabetes, 3 (3.9%) had a history of previous peptic ulcer disease, and 1 (1.31%) had history of hematemesis. None of these, seemed to influence the outcome of the disease process of acute pancreatitis.

In the first 24 hours of hospital admission, five laboratory parameters – maximum WBC count >15,000/cu.mm, maximum blood sugar level >200 mg/dl, minimum serum calcium <8 mg/dl, maximum serum lactate dehydrogenase level >350 U/L, and maximum serum

aminotransferase level >200 U/L, were found to be related with the severity of the disease and increased morbidity i.e. likelihood of developing complications.



**Fig 1: Mortality And Morbidity Vs Etiology**

**Table 3: Prognostic Value Of Laboratory Parameters Vs Morbidity**

Laboratory parameters	Significant value	On admission & 1 <sup>st</sup> hospital day	Admission & 1 <sup>st</sup> 2 hospital days	Entire hospital course	Morbidity (%) (after 48hours)
WBC max.	>15000/cumm	14	16	10	42.8 %
Ser. Amylase max.	> 1000 U/L	38	46	12	21.0 %
Ser. lipase max.	>150 U/L	22	26	10	18.1 %
Ser. Bilirubin max.	>4 mg/dL	15	12	4	20 %
Ser. LDH max.	>350 U/L	12	12	8	41.6 %
Ser. AST max.	>200 U/L	20	26	22	45.0 %
Ser. Calcium min.	<8 mg/dl	8	6	4	50 %
Blood sugar max.	>200 mg/dl	8	10	4	37.5 %

Six additional laboratory parameters - minimum haematocrit ≤30%, maximum WBC count >15,000/cu.mm, minimum serum albumin <3 gm/dl, maximum serum creatinine >3 mg/dl, maximum blood urea >100 mg/dl, and minimum arterial oxygen tension (PaO2) <60 mm Hg, were also found to be related with the mortality from the disease when considered over the second time period i.e., first 48 hours of hospitalization.

**Table 4: Prognostic Value Of Laboratory Parameters Vs Morbidity**

Laboratory parameters	Significant value	On admission & 1 <sup>st</sup> hospital day	Admission & 1 <sup>st</sup> 2 hospital days	Entire hospital course	Mortality (%) (after 48hours)
Haematocrit min.	≤30%	14	14	6	42.8%
WBC max.	>15000/cumm.	14	16	10	37.5%
Ser. Amylase max.	>1000 U/L	38	46	11	17.4%
Ser. Albumin min.	<3 gm/dl	12	14	9	42.8%
Ser. Creatinine max.	> 3 mg/dl	6	4	2	25%
Blood Urea max.	>100 mg/dl	8	4	2	25%
Art. Oxygen tension min.	< 60 mm Hg	4	4	3	75%

The laboratory parameters which were analyzed and found not to be related with morbidity and mortality were maximum level of serum

amylase, maximum serum lipase and maximum serum bilirubin.

#### Local Complications:

**Pancreatic Phlegmon:** 4(5.3%) patients developed pancreatic phlegmon. 2(50%) of these underwent spontaneous resolution, 1 developed pseudocyst and the remaining 1(25%) developed pancreatic abscess.

#### Pseudocyst:

10(13.2%) patients developed pseudocyst. 2 of these underwent spontaneous resolution, 4 developed pancreatic abscess which were managed initially by percutaneous drainage with placement of pigtail catheter. 1(10%) of them, however, subsequently died. The remaining patients were subjected to formal surgery after six weeks. Of these 4 patients, 1 developed severe haematemesis and malaena in the post operative period requiring massive blood transfusion and the patient finally survived.

#### Pancreatic Abscess:

4(5.3%) patients developed pancreatic abscess, which were drained percutaneously initially but one of these patients required open drainage and debridement. 2(50%) of these patients died of septicemia and multi-organ failure.

Thus, local complications played important role in determining the morbidity and mortality from acute pancreatitis.

#### Systemic Complications:

**Circulatory failure:** 14(18.4%) patients developed shock and had systolic-BP <90 mm Hg. All these patients were infused with adequate crystalloids, colloids and patients with anaemia were transfused with blood. 6(42.8%) of them subsequently died. So, it may be said that circulatory failure at admission is an adverse prognostic factor for acute pancreatitis.

#### Respiratory insufficiency:

4(5.3%) patients required endotracheal intubation and mechanical ventilation. 3(75%) patients subsequently died. Respiratory insufficiency had a high mortality rate of 75%.

#### Renal failure:

2(2.6%) patients suffered from acute renal failure. 1(50%) of these died and was >55 years age. While elevation of both blood urea and serum creatinine levels were related with mortality, there was no relation between reduced urine output (maximum urine 500 ml in 24 hours) and the death rate in the first 48 hours of hospitalization. This observation suggests that the urine output early in the course of the disease may better reflect the status of hydration and/or cardiac output than the status of renal function in patients of acute pancreatitis.

#### Calcium requirement:

4(5.26%) patients developed hypocalcaemia but none of them had tetany. They all required intravenous calcium gluconate administration. Though the serum calcium level was well associated with the morbidity (50%), the mortality rate in this group did not differ from that of the total population and was not important because of the small size of the sample.

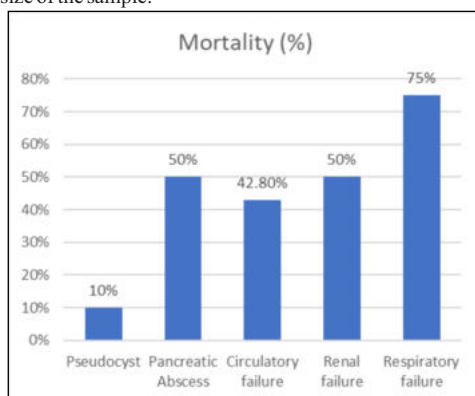


Fig 2: Mortality From Complications Of Acute Pancreatitis

#### DISCUSSION

In our study, the overall mortality rate of acute pancreatitis was 11.8% and the morbidity rate was 31.5%. Morbidity meant development of

either local or systemic complications and prolonged hospital stay of more than 10 days. In de Beaux et al<sup>5</sup> study, mortality rate was 1.9% in patients without complications and 18.8% mortality rate among patients admitted with severe disease or complicated disease. Jacobs ML<sup>6</sup> also found the overall mortality rate of 12.9%, thus comparable to our study.

Majority of the patients (39.5%) in our study had biliary tract disease while history of alcoholism was present in 28.9% patients. The remaining 31.5% patients belonged to the idiopathic group. The mortality rate for the idiopathic group (16.67%) was quite higher than that of the alcoholic group(13.6%) or biliary tract disease group(6.67%). De Beaux<sup>7</sup> also found a lower mortality rate(3%) in gall-stone pancreatitis and a higher mortality rate(15%) in patients with pancreatitis of unknown aetiology.

In our study, the mortality rate was found to be higher in patients >50 years of age(75%) than in patients <50 years(13.8%), but the younger age group was more prone to develop complications i.e. had increased morbidity. Incidence of acute pancreatitis was higher in males than females, and the mortality rate was also higher in males(18.3%) than in females(14.8%). Jacobs ML<sup>6</sup> also noted that mortality was significantly higher in patients >60 years age.

Circulatory failure and Shock were the most common cause of death in the initial period. 6 patients had died of hypovolaemic shock. Among the 14 patients who had hypovolaemic shock, 1 patient went into renal failure, 4 patients developed respiratory insufficiency subsequently.

Pancreatic phlegmon occurred in 4 patients. 10 patients developed pseudocyst and 4 patients developed pancreatic abscess.

Pain in the upper abdomen was the commonest presentation. Vomiting, anorexia and nausea were present in majority of the patients though none of the presentations were statistically significant in determining disease severity, similar to what Jacobs ML<sup>6</sup> found.

Tachycardia, hypotension, fever and cyanosis on presentation were all associated with increased morbidity and mortality. Foster PD<sup>7</sup> reported a high mortality of 86.9% in 23 patients with acute pancreatitis and shock. Jacobs ML<sup>6</sup> also reported >39% mortality in 33 patients who presented with systolic blood pressure less than 90 mmHg. In our study, there was 42.8% mortality among 14 patients who presented with a systolic-BP <90 mmHg.

In our study, Grey-Turner's sign (in one patient) and Cullen's sign (in two patients) were associated with increased mortality, but neither was statistically significant. In Daggett et al<sup>8</sup> study, Cullen's sign (present in 4 patients) and Grey-Turner's sign (present in 5 patients) were associated with a mortality rate of 50% and 60% respectively.

Ranson JH<sup>8</sup> reported a positive correlation between leukocytosis and severity of acute pancreatitis. Among the 76 patients in our study 16(21%) patients had a leukocyte count >15,000/cumm during the first 48 hours. Morbidity for this group was 42.8% which is quite greater than that for the total population. Mortality for this group(37.5%) was also clearly higher than that of the entire group(11.8%).

A haematocrit of <30% during the initial 48 hours was associated with increased mortality. Failure to elevate the haematocrit >30% during first 48hrs was associated with a mortality of 42.8%. Low haematocrit value was a useful prognostic sign and the importance of early treatment by transfusion with whole blood or packed red blood cells is also demonstrated. Present data, however, do not confirm the report by Gray and Rosenman<sup>9</sup> that haemoconcentration on admission is significant as a poor prognostic sign.

Abnormalities of the respiratory system, both physical(e.g., Cyanosis, tachypnoea, abnormal breath sounds etc) and x-ray findings were associated with increased mortality in our study. Diagnosing respiratory insufficiency early required a high index of clinical suspicion and confirmation by chest x-ray and ABG analysis. Fishbein<sup>10</sup> also noted a relation between respiratory complications and poor prognosis in acute pancreatitis.

In our study, elevation of blood urea >100 mg/dl and serum creatinine >3 mg/dl were associated with increased mortality even after ensuring adequate hydration. Frey<sup>11</sup> reported 80% mortality in patients with



acute pancreatitis suffering from acute renal failure. Among the 76 patients, 4(5.3%) had a serum creatinine >3 mg/dl and 4(5.3%) had a blood urea level >100 mg/dl. The mortality rate was 25% in the first 48 hours. 2 patients subsequently had normal blood urea and serum creatinine levels after proper hydration. Only 2 patients developed frank renal failure. 1 of them died who was >55yrs old and had persistently elevated blood urea and serum creatinine. As may be noted that oliguria in the initial 48 hours is not a reliable indication of renal failure.

In our study, 1 patient underwent laparotomy for debridement and pancreatic necrosectomy and survived although had a prolonged hospital stay. Trapnell<sup>12</sup> also pointed out that exploratory laparotomy does not necessarily increase the mortality from acute pancreatitis.

## CONCLUSION

Despite earlier recognition by reliable and sophisticated diagnostic techniques, appropriate care and supportive measures the morbidity and mortality rates have remained quite high in cases of severe attack of acute pancreatitis. To reduce this high mortality the major aim of management should be to anticipate and treat the complications and organ-system failures, which may develop during the course of the disease.

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