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Original Research Article

A randomised study of outcome of acute pancreatitis in tertiary care hospital, Gujarat, India (retrospective study of 30 cases)

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ABSTRACT

Background: Acute pancreatitis is common and lethal condition, often associated with one or more complications in varying degree. Aim of this study is to identify etiological factors and high-risk factors in the patients that can significantly alter the disease process and various presentations of acute pancreatitis and correlate them clinically to assess the severity of disease, to observe the clinical course of the disease, to predict beforehand the possible outcome clinically and to study the different prognostic factors evaluated on the basis of clinical assessment, serial laboratory and radiological investigations; to predict the clinical outcome of the disease, either favourable or unfavourable.
Methods: In this retrospective study of randomly selected 30 patients admitted in G. G. Hospital Jamnagar, during the period of January 2015 to July 2016 with diagnosis of acute pancreatitis were studied. Their etiological, clinical, laboratory and radiological parameters were evaluated and their association with disease severity made. Impact of various parameters which can significantly alter the disease process was identified. Some of them required surgical intervention and rest of all were managed conservatively.
Results: Most of patient (74%) recover well by conservative management. Only 26% patients required surgical management and mortality rate is 6.6% only.
Conclusions: Study shows that not all patient of acute pancreatitis need surgical interventions, rather conservative approach is preferred over surgery now a day. Etiology of pancreatitis was most of the time idiopathic followed by cholelithiasis and alcoholism. Ascites and pleural effusion are two most common complications.

Keywords: Cholelithiasis, Complications, Lipase, Necrosis, Pancreatitis

INTRODUCTION

Most patients of acute pancreatitis develop a mild and self-limited course; however, 10% to 20% of patients have rapidly progressive inflammatory response associated with prolonged hospital stay and significant mortality and morbidity. In mild cases mortality rate is <1% but, in severe cases this increases up to 10% to 30%.[1] The purpose of this study is to compare the etiology, severity, various prognostic factors and possible clinical outcomes in various settings. Anything that injures the acinar cells and impairs secretion of zymogen granules or damage the duct epithelium can trigger acute pancreatitis. To prevent self-digestion the pancreatic enzymes are secreted in proenzyme form.[2]

The duration of pancreatitis can range from a transient attack to an irreversible loss of function.[3] Etiological factorscan be remembered as gall stone (Table 1).[2-7] Two factors, cholelithiasis and alcohol abuse are accounting for 80-90% of cases and variety of other causes responsible for 10-20% of case.[4]

Pancreatitis begins with intrapancreatic activation of enzymes. In severe form of haemorrhagic pancreatitis, probably there is activation of pancreatic elastase which dissolves elastic fibres of blood vessels. This blood percolates along muscles to flank causing reddish brown discoloration (Grey Turner sign) or to the umbilicus along falciform ligament (Cullen's sign). Erythematous skin nodules may be observed due to subcutaneous fat necrosis.[5,8]

Table 1: Etiological factors.

G	Gall stone
A	Alcohol
L	L- asparaginase and other drugs (corticosteroids, azathioprine, valproic acid, estrogens, thiazides)
S	Surgery – Hepatobiliary, upper G.I or cardiothoracic surgery Scorpion bite
T	Trauma- abdominal Tumour- ampullary and pancreatic
O	Others- Idiopathic Hereditary Autoimmune Pancreas divisum Viral (mumps, coxsackie B)
N	Nutritional- malnutrition
E	ERCP Endocrine- hyperparathyroidism and hypercalcemia

Exudate containing active pancreatic enzymes and toxins increasing the permeability of the blood vessels. This leads to "third spacing" protein rich fluid, leading to hypovolemia, hypotension and shock. Some enzymes like phospholipase A_2 may damage the tissues in body like alveolar membrane of lungs causing ARDS.[8]

Diagnosis, staging and severity

Diagnosis is based on combination of the clinical presentation and presence of marked elevation of pancreatic enzymes levels.[4,6-8] Levels of amylase and lipase peak within the first 24hr of symptoms. Minimum elevation of 3 times of normal for amylase and 2 times of normal for lipase is considered good indicator. Serum amylase tends to be higher in cholelithiasis associated pancreatitis, while Serum lipase level tends to be higher in alcoholic pancreatitis.[5,9] Specificity is being highest for lipase because it remains elevated for longer time and only secreted by pancreas.[4,9]

In scoring system (APACHE-2), 12 physiological variables are measured- Temprature, Mean arterial BP, Heart rate, Respiratory rate, PaO_2, Arterial pH, Hematocrit, Na^+, K^+, Creatinine, TLC, Glasgow coma scale.

It is now regarded as an optimal scoring system to access disease severity in pancreatitis.[10] CT severity index of >5 on CECT scan is s/o severe acute pancreatitis which can be correlated with Ranson's score of > 3 and APACHE-2 score of >8, all indicating severe acute pancreatitis. Complications of acute pancreatitis are local and systemic complications (Table 2). [1,2,4]

Table 2: Complications.

Systemic complications		Local complications
Pulmonary complication	Pneumonia, atelectasis ARDS Pleural effusion	Acute fluid collections
Cardiovascular complication	Hypotension Hypovolemia Sudden death Nonspecific ST wave changes Pericardial effusion	Sterile pancreatic necrosis
Haematological complication	Hemoconcentration DIC	Infected pancreatic necrosis
GI hemorrhage complication	Peptic ulcer Erosive gastritis Portal or splenic vein thrombosis with varices	Pancreatic abscess
Renal complication	Oliguria Azotemia Renal artery/vein thrombosis	Pancreatic ascites
Metabolic complication	Hyperglycemia Hypercalcemia Hypertriglyceridemia Encephalopathy Sudden blindness	Pseudocyst
CNS complication	Psychosis Fat emboli Alcohol withdrawal syndrome	Pseudoaneurysm
Fat necrosis	Intra-abdominal saponification Subcutaneous fat necrosis	Portal/splenic vein thrombosis

Management

Non-operative management has become increasingly standardized.[2,4] Studies have shown that conservative strategies can be applied in necrotizing pancreatitis with mortality rate of 10%.[4]

Aggressive fluid resuscitation at rate of greater than 200 ml/hr with supplemented oxygen are often necessary to restore and maintain intravascular volume, to avoid organ dysfunction such as hypovolemia, hypoperfusion, hypoxemia. Colloids should be preferred over crystalloids.[4]

The routine use of nasogastric tubes to should probably abandoned. In paralytic ileus to prevent aspiration, pneumonia, emesis nasogastric tube is required. Studies have shown beneficial effect of enteral feeding in preventing distant organ dysfunction.[2]

Adequate pain management using opioids or epidural blockade is widely advocated. Broad spectrum antibiotics capable of penetrating pancreatic parenchyma such as imipenem and meropenem are advocated for prophylactic purpose in case of CT proven severe acute pancreatitis with necrosis to prevent superinfection. ERCP may help in biliary obstructive pathology.

Indications for surgical interventions are

- Infected pancreatic necrosis
- Severe pancreatic necrosis (selected case)
- Symptomatic organized pancreatic necrosis
- Intra-abdominal catastrophic complications related to acute pancreatitis i.e. bowel or viscera perforation, abdominal compartment syndrome.
- Diagnostic uncertainty.[1,2,11]

METHODS

Retrospective randomized study of 30 patients of acute pancreatitis has been carried out in a tertiary care hospital (G.G Hospital, MPSMC Jamnagar, Gujarat, India) between January - 2015 and July - 2016.

Inclusion criteria

- Patients of all age group
- Patients of both sexes
- He/she must be admitted in G.G. hospital Jamnagar
- All patients having first episode of acute pancreatitis
- All patients without any psychiatric condition

Exclsion criteria

- Patient known or previously admitted patients of acute pancreatitis coming with relapse or recurrence were excluded from the study.
- Patient once a diagnosed case of chronic pancreatitis was excluded.
- All patients with major psychiatric illness who are not able to give proper history.

Patient clinically seeming to be affected with acute pancreatitis have been admitted to surgery ward. Diagnosis of acute pancreatitis was confirmed with the specific clinical and laboratory measures. Epidemiological data, clinical exam records, investigations, procedure records, preoperative and postoperative notes and management data of all 30 patients are recorded. In this study, favourable outcome is ascribed to survivors without ICU admission or need of surgery and unfavourable outcome is ascribed to non-survivors, patient undergoing surgery for local complications and ICU admission.

Classification of disease severity was made on the basis of revised Atlanta Classification.

All these patients were studied, and findings were recorded according to the proforma.

RESULTS

From the present study it is evident that sex distribution was almost equal in number with male comprising 53% (n=16) and females 47% (n=14) and mean age of presentation was 41 years (Table 3). Patients below 40 year of age has mild disease and favourable outcome, while patients with more than 45 years had an adverse disease outcome. Similarly, patients aged more than 60 years had a high ratio (50%) of mortality.

Table 3: Sex wise age distributions.

Study	Mean age (years)	Sex wise age distribution	
		Male	Female
Present study (n=30)	41	53% (n=16)	47% (n=14)
Albalushi A et al (n=174)	44	55% (n=95)	45% (n=79)
Khanna AK et al (n=72)	40.5	51% (n=37)	49% (n=35)

Pain in abdomen is chief complain of all patients. Fever was present in 4 (14%) patients. Nausea-vomiting was present in 22 (73%) patients. Abdominal distension was present in 15 patients. 4 (14%) patients presented with constipation, anorexia was present in 18 (60%) patients. Significant breathlessness was present in 5 (17%) patients (Table 4).

Table 4: Clinical presentations.

Clinical features	No. of patients	%
Abdominal pain	30	100
Fever	4	14
Vomiting	22	73
Abdominal distention	15	50
Constipation	4	14
Anorexia	18	60
Breathlessness	5	17

Table 5: Personal history.

Habit	Number of patients
Alcohol	7 (23%)
Smoking	3 (10%)
Tobacco chewer	4 (13%)

Alcohol (23%), Bidi smoking (10%) and Tobacco (13%) are all associated risk factors for acute pancreatitis (Table 5).

Table 6: Haematocrit and disease severity.

Hematocrit value	Mild disease	Moderate disease	Severe disease
≥48% (7)	2 (29%)	1 (14%)	4 (57%)
31-48% (20)	11 (52%)	7 (33%)	3 (15%)
<30% (3)	1 (33.33%)	0	2 (66.67%)

Leukocytosis (TLC >11000/mm^3) was present in 17 (57%) patients, in one (3%) patient it was below 4000/mm^3 and in 12 (40%) patients it was within normal range; between 4000-11000/mm^3. Total 7 patients had hemoconcentration with hematocrit value >48%. Out of 7 patients, 4 (57%) had severe disease one (14%) had moderate and 2 (29%) had mild disease. 3 patients had less than 30% hematocrit; of them each one had severe, moderate and mild disease. Among 20 patients with normal hematocrit; 11 had mild disease, 7 had moderate disease and 3 had severe disease (Table 6).

Table 7: CRP level and other parameters.

Study		Number of patients	Mild acute pancreatitis	ICU admission	Mortality
Present study (n=30)	CRP≥15 mg/dl	16 (80%)	3 (18%)	8 (50%)	3 (18%)
CRP done 66% (n=20)	CRP<15 mg/dl	4 (20%)	3 (75%)	0	0
Khanna AK et al (n=72)	CRP≥15 mg/dl	25 (42%)	0	6 (24%)	6 (24%)
CRP done 83% (n=60)	CRP<15 mg/dl	35 (58%)	31 (88%)	2 (5%)	3 (8%)

Serum calcium measurement was done in 22 (73%) patients, out of which hypocalcemia (S. Ca++ <8.2mg/dl) was found in 10 (45%) patients and 12 (55%) patients had normal calcium level.

Table 8: CRP level and hospital stay.

Study		Hospital stay (in days)
Present study (n=30) CRP done 66% (n=20)	CRP≥15 mg/dl	17.68
	CRP<15 mg/dl	7.75
Khanna AK et al (n=72) CRP done 83% (n=60)	CRP≥15 mg/dl	13.28
	CRP<15 mg/dl	8.51

Among 20 patients who had undergone CRP level assessment, 16 patients had CRP≥15 mg/dl. Out of them only 3 (18%) had mild disease. Out of 4 patients having CRP level <15mg/dl, 3 (75%) had having mild disease (Table 7, 8).

Etiology was idiopathic in 50% (n=15) while cholelithiasis26.67% (n=8) and alcoholism 23.34% (n=7) stood next in order (Table 9). There is significant association of BMI and disease prognosis. Both underweight and obese patients had protracted disease course; with 100% (n=4) unfavourable outcome in underweight and obese class-II/III patients (Table 10, 11).

Table 9: Etiological factors.

Study	Alcohol	Cholelithiasis	Others	Idiopathic
Present study (n=30)	7 (23%)	8 (27%)	-	15 (50%)
Khanna AK et al (n=72)	13 (18%)	44 (61%)	6 (9%)	9 (12%)

Table 10: BMI and disease severity.

Study	Mild disease severity and mean BMI (in kg/m^2)	Severe disease severity and mean BMI (in kg/m^2)
Present study (n=30)	24.3	30.15
Funnel IC et al (n=99)	23.3	31.2
Shin KY et al (n=280)	23.3±0.18	24.39±0.34

Table 11: BMI and mean hospital stay.

Study		Mean duration of hospital stay (in days)
Present study (n=30)	Normal BMI	10.4
	Pre-Obese	12.5
	Obese	11.94 (including 1 death within 24 hours of admission)
Shin KY et al (n=280)	Normal BMI	10.65
	Pre-obese	12.2
	Obese	9.7

On routine blood investigation, no significant association between leukocytosis (TLC>11000/mm3), hemoconcentration (hematocrit >48%), hypocalcemia (S. Calcium<8.2 mg/dl) and disease severity could be made. Patients having CTSI≥5 (57% n=12) were associated with moderate to severe disease (83%, n=10). They had much incidence of unfavourable outcome (58% n=7) and numbers of local complications. It was also associated with long duration of hospital stay (12.08 days).

Table 12: Management of patients.

Mode of management	No. of patients (%)
Conservative	22 (74%)
Surgical	8 (26%)

Most of the patients 13 (43%) had mild disease, 8 (27%) had moderate disease and 9(30%) had severe disease. Out of the 30 patients, 22 patients (74%) were managed conservatively (12 mild, 8 moderate and 2 severe) and 8 patients (26%) were managed surgically (1 mild and 7 severe, Table 12). The mean duration of hospital stay was 17.68 days (Table 13).

Table 13: Duration of hospital stay.

Duration of hospital stay	No. of patients
<7 days	11
7-14 days	12
>14 days	7

Pleural effusion was most common systemic complication and its aggravated pathological complications, lung consolidation and ARDS were significantly associated with disease severity and unfavourable outcome and thus mortality.

Table 14: Outcome.

Outcome	Number of patients	
Death	1 (within 24 hours of admission)	4 (13%)
	3 (after 24 hours of admission)	
Discharge	26 (87%)	

There were 4 patients who died, of which 2 died within 24 hours of admission. One died postoperatively while the other died after conservative treatment within 15 days of admission. Others were discharged from the ward. In our study 20 (67%) patients had favourable and 10 (33%) had unfavourable outcome. Mortality rate was low (13%) with adequate management (Table 14).

DISCUSSION

In this study; out of 30 patients, 10 (33%) patients were of 1-30 year age group, 10 (33%) patients were of 31-50 year age group, 9 (30%) patients were of 51-70 year age group, and one (4%) patient was of more than 70 year. Out of these 30 patients 14 (46%) were females and 15 (50%) were adult male while one (4%) was male child. In Albalushi A et al study, there is 55% male and 45% females, mean age was 44 years (Table 3).[12]

There is significant association between increase CRP level and acute pancreatitis. Out of total 16(80%) patients with CRP≥15mg/dl, 10 (63%) had unfavourable outcome while 6 (37%) had favourable outcome. Among these 16 patients 8 (50%) had SICU admission for further management. In Khanna AK et al, study, there is 42% of the patients were having CRP>15 mg/dl and 24% was the ICU admission rate (Table 5). Patients with CRP ≥15 mg/dl had mean duration of hospital stay was 17.68 days in this study but it is 13.28 days in Khanna AK et al study (Table 8).[13]

On etiological factor evaluation, alcohol induced pancreatitis was present in exclusively male patients and in our study biliary disease were present in female patients. Out of 30 patients; 23% (n=7) had alcoholism and among females 27% (n=8) had cholelithiasis as an etiological factor. In our study most common etiology is idiopathic comprising 50% (n=15) of the patients. (Table 9)

Most common etiology in Khanna AK et al, study was cholelithiasis (61%), followed by alcohol (18%) and then idiopathic etiology in (12%) of patients.[13]

Measurement of BMI suggested that among normal BMI patients, 80% (n=8) had mild and 20% had (n=2) moderate disease severity. In pre-obese BMI group, 30% (n=3) had mild, 40% (n=4) had moderate and 30% (n=3) had severe disease. Among obese class-I group, 33% (n=2) patients had mild disease, 33% (n=2) had moderate disease, while 33% (n=2) had severe disease. Among obese class II/III, all three 100% had severe disease and all had died off. One underweight patient had severe disease (Table 10).

Both underweight and obese class-II/III patients 100% (n=4) had unfavourable outcome. Amongst obese class-I group, 33% (n=2) had unfavourable and that of pre-obese group, 40% (n=4) had unfavourable outcome. The mean duration of hospital stay was longest in pre-obese group 1 (2.5 day), and for obese group it was 11.94 day (Table 11).

The Funnel IC et al, shows that patients with mild severity of disease are having 23.3kg/m^2 mean BMI, and with severe acute pancreatitis it is 31.2kg/m^2.[14] In another study (Shin KY et al), mean BMI was 23.3kg/m^2 for mild severity of disease and 24.39kg/m^2 for severe severity of acute pancreatitis. The mean duration of hospital stay was more in pre-obese group (12.2 days) then that in obese group (9.7 days).[15]

On systemic examination, 16 (53%) patients had some positive respiratory finding i.e. hypoxemia, respiratory

rate >20/min; indicating underlying systemic complication of the disease, 9 (56%) had developed severe disease, 6 (38%) had developed moderate disease, and one (6%) had mild disease. Among four deaths including one in postoperative patient, all were suffering from significant respiratory distress for which appropriate measures were ensued. Out of these 16 patients, 13 (81%) had underwent CECT scan and it was found that 4 (30%) had oedematous pancreatitis, 9 (70%) had necrotizing pancreatitis (Table 15).

Table 15: Respiratory distress and CECT.

Study	Respiratory distress	Oedematous pancreatitis	Necrotizing pancreatitis	Mortality within two weeks
Present study	53%	30%	70%	25%
Browne et al	65%	10%	74%	35%
Jacobs et al	50%	-	-	64%

Browne et al, find significant relationship between acute pancreatitis and development of respiratory distress. In his study, 65% of the patients had developed respiratory distress with 35% mortality rate in first 2 weeks of admission.[16]

In Jacobs et al, there is 50% of patients having respiratory distress and mortality rate within 2 weeks is 64%.[17]

Table 16: Complications.

Local complications	No. of patients	Systemic complications	No. of patients
Ascites	15	Pleural effusion	13
Ileus	9	Lung consolidation	3
Pseudocyst	5	ARDS	4
Walled off necrosis	2	Overt diabetes	5
Vascular complications	3	Impaired glucose tolerance	8
Necrosis	9	Septicemia	4
Infection	1	Acute renal failure	3
No local complications	11	No complications	8

One had undergone ERCP and stenting. Remaining seven patients underwent CT guided percutaneous drain placement after 1 week of conservative management. 3 patients were put retroperitoneal drain and 4 patients peritoneal drain (reason being central necrosis in 2 patients and no accessible window in 2 patients). 3 patients out of 7 recovered completely. 1 patient died. Remaining 3 patients did not show improvement in 3 weeks and were operated for open necrosectomy (with nasojejunal tube in 2 patients and without nasojejunal tube in 1 patient). Two patients survived, and 1 patient died. Total 10 patients were shifted to SICU and remaining managed in ward itself.

Out of thirty patients, 11 patients did not develop any local complications and 9 patients did not develop any systemic complications. The ascites as a most common local complication and pleural effusion as a most common systemic complication (Table 16).

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