

Clinical Study and Management of Complications of Acute Pancreatitis

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Abstract: *Acute pancreatitis is the most terrible of all the calamities that occur in relation to the abdominal viscera. It can range from mild interstitial pancreatitis to severe necrotizing pancreatitis. The clinical presentation may vary depending upon the degree of severity of the acute episode. Initial evaluation with blood investigations and imaging studies like CECT of the abdomen and pelvis helps in establishing the diagnosis and assessing the severity of disease. Management can be done in general wards but some patients may require ICU care with ventilator support. The current study is a prospective observational study conducted in a tertiary care centre in Central India. In the current study, 150 patients were evaluated out of which 122 were males and 28 were females with mean age of 37 years. Most common etiology was attributed to alcohol. Most common systemic complication was hypovolemia and local complication was pancreatic pseudocyst. Mortality seen in 4 cases of acute pancreatitis.*

Keywords: acute pancreatitis, pseudocyst, pleural effusion, necrosectomy.

1. Introduction

Acute pancreatitis has been recognized since antiquity^[1, 2] but the importance of pancreas and the severity of its inflammatory disorders were realized only in middle of 19th century³. The nature of disease was recognized way back in 1925 when Moynihan described acute pancreatitis as “The most terrible of all the calamities that occur in connection with abdominal viscera^[4]” but even today with technical advantage in medical and surgical field acute pancreatitis remains a major cause of morbidity and mortality^[5, 6].

Acute pancreatitis is related to alcohol or biliary tract stone disease in 80% of Cases. The remaining 10% is related to metabolic factor, drugs and other condition and 10% are idiopathic^[3, 6]. Acute pancreatitis is a pathological broad spectrum of disease ranging from parenchymal edema to severe necrotizing pancreatitis. Clinical presentations vary from mild abdominal discomfort to hypotension, metabolic derangement, sepsis, fluid sequestration, multiple organ failure and death. 9 of 10 experience mild to moderate course and self-limited, and 1 of 10 experience a severe life threatening form of acute pancreatitis. Based on the above it is presently classified into mild acute pancreatitis associated with minimal organ dysfunctions and uneventful recovery, and severe acute pancreatitis associated with organ failure and/or local complications such as necrosis, abscess or pseudo cyst^[7].

Diagnosis remain clinical and can be supported by 1.5 – 2 fold increase above the upper limit of normal of serum amylase^[8]. But an estimation of serum lipase, trypsinogen or isoamylase assay are confirmatory^[8] and will increase the diagnostic yield. Supportive radiological procedure are sonography, computed tomography and MRI. Currently CECT is the imaging modality of choice where areas of hypo perfusion correlate with necrosis⁹.

The treatment of acute pancreatitis is largely supportive. Patient with mild disease are treated by eliminating oral intakes, instituting intravenous hydration and providing frequent parenteral analgesia.

2. Aims and Objectives

- To evaluate the various complications associated with acute attack of pancreatitis through proper clinical, biochemical and radiological examination.
- To study the management of complications associated with acute attack of pancreatitis.

3. Materials and Methods

The present hospital based prospective observational study was planned to clinically study the complications of acute pancreatitis and their management.

3.1 Study Design

The study was a prospective observational study

3.2 Study Subjects

Patients presenting with clinical, biochemical and radiological diagnosis of acute pancreatitis associated with local/ systemic complications admitted in tertiary care centre in Central India in a period of 2 years.

3.3 Study setting

Tertiary Care Centre of Central India

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3.4 Study Duration

June 2017- Nov 2019

3.5 Inclusion Criteria

- Patients presenting with acute abdominal pain associated with raised serum lipase level in surgery Out Patient Department /casualty/ gastroenterology department in tertiary care centre in central India.
- Patient presenting with acute abdominal pain associated with swollen pancreatic parenchyma detected by USG/CT scan.

3.6 Exclusion Criteria

- Patient not willing for treatment after admission
- Patient opted for discharge against medical advice
- Patient with loss of follow up
- Patients with intestinal perforation, intestinal obstruction, chronic renal insufficiency,
- Patients who are known cases of chronic pancreatitis or those who came with acute exacerbations of chronic pancreatitis.

3.7 Sample Size

With reference to the study done by Satyanarayana Rao S V et al. the most common complication is pleural effusion with 21.6%

- Proportion (P) – 21.6%
- Absolute precision 7%
- Confidence interval 95%
- Sample size 133

Hence, considering attrition, total 150 cases were included in the present study.

3.8 Methodology

All patients were evaluated at the time of admission with a history and clinical examination. Investigations like complete haemogram, blood urea, sr. creatinine, serum calcium, serum amylase, serum lipase was done. Ultrasound abdomen was performed and diagnosis confirmed. Any local complications were evaluated as well.

The patients showing deterioration in their clinical status were evaluated to find out associated local/systemic complications. CECT abdomen was done for all the patients except those who presented with acute kidney injury. Follow up CECT abdomen was done in patients whose condition did not improve. This included – continuous fever, persistent guarding and ileus, signs of retroperitoneal haemorrhage (Cullen’s sign and Grey Turner sign). CECT also done to rule out the etiological cause for pancreatitis. Following parameters were considered for complicated pancreatitis-

Systemic Complications

- Shock (systolic BP<90mm/hg)

- Pulmonary insufficiency PO₂<60 mm Hg or less, require ventilation or O₂ therapy.
- Renal failure (output <400 ml/24 hours), serum creatinine >2 mg %.
- Severe metabolic disturbance (serum calcium 7.5 mg/dl or less)

Local Complications

- Pancreatic pseudocyst
- Pancreatic necrosis
- Pancreatic abscess
- Pancreatic ascites, pleural effusion, fistula
- Superior mesenteric vein and portal vein thrombosis

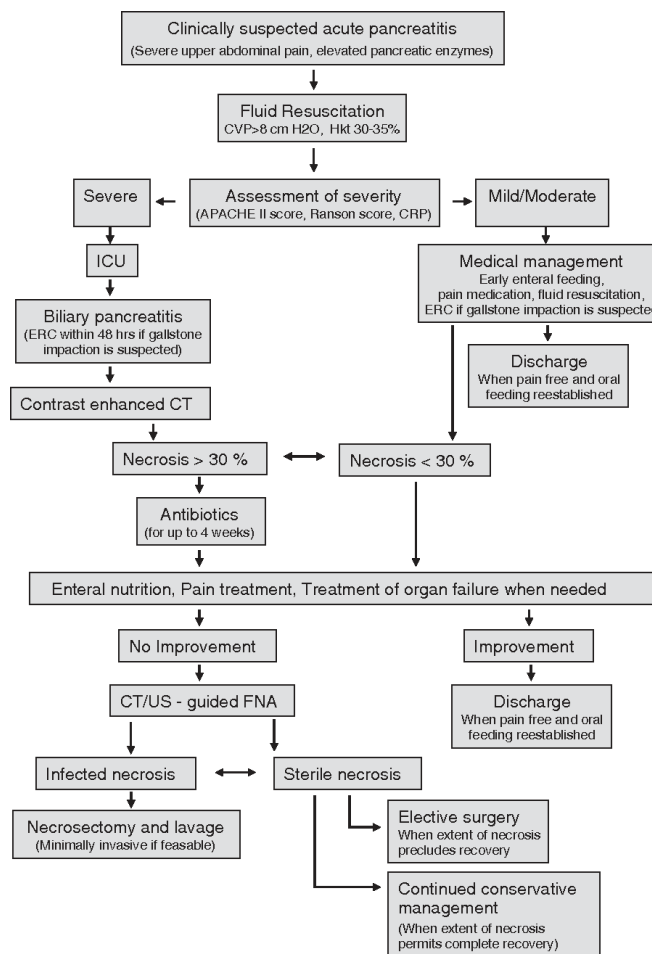


Figure 1: Showing the protocol for study

4. Observation and Results

4.1 Age Distribution

In the current study, we assessed the study subjects according to their age distribution and gender distribution. We observed that majority of the cases were males (81.33%), and 18.66% cases were females. The M:F ratio was 1:0.22. The mean age of study cases was 37.32 ± 11.61 years.

Table 1: Distribution of participants according to their age group

Age group (years)	Males		Females	
	No. of	%	No. of	%

	patients		patients	
≤ 20 years	4	3.27 %	0	0 %
21 – 30 years	33	27.04 %	10	37.03 %
31 – 40 years	47	38.52 %	5	18.51 %
41 – 50 years	14	11.47 %	10	37.03 %
51 – 60 years	15	12.29 %	3	11.11 %
≥ 61 years	9	7.37 %	0	0 %
Total	122	100 %	28	100 %

4.2 Aetiology of Acute Pancreatitis

In the present study, we assessed the aetiology of the acute pancreatitis cases. We observed that alcoholism was the aetiology among majority of the cases (74.67%), followed by Gall stone disease among 20% cases, idiopathic (1.33%), drug induced (2%), post-traumatic (1.33%), and rarely due to Pancreatic malformations (pancreatic divisum) among 0.66% cases.

Table 2: Distribution of participants according to the aetiology of pancreatitis

Personal History	No. of patients	%
Alcoholism	112	74.67 %
Gall stone disease	30	20 %
Drug induced	3	2 %
Idiopathic	2	1.33 %
Post-traumatic	2	1.33 %
Pancreatic malformations	1	0.66 %
Total	150	100 %

4.3 Clinical Features

The following table shows the distribution of number of patients according to their symptoms and signs

Table 3: Distribution of participants according to their clinical presentation

Clinical features		No. of patients	%
General symptoms	Fever	31	20.66 %
	Nausea / Vomiting	72	48 %
Systemic symptoms	Pain in abdomen	150	100 %
	Lump in abdomen	27	18 %
	Distension of abdomen	40	26.67 %
General signs	Febrile	13	8.66 %
	Tachypnea	9	6 %
	Pallor	15	10 %
	Icterus	12	8 %
	Hypotension	27	18 %
P/A signs	Tenderness	67	44.66 %
	Guarding	34	22.66 %
	Paralytic ileus (absent bowel sound)	28	18.67 %

4.4 Haematological Investigations

The following table depicts the haematological profile of the evaluated patients in this study.

Table 4: Blood investigations observations

Blood investigations	Parameter	No. of patients	%
Hemoglobin	<10 gm %	18	12 %
	>10 gm %	132	88 %

Total leucocyte counts	<16000/mm ³	113	75.33 %
	>16000/mm ³	37	24.66 %
BSR	<200mg/dl	140	93.33 %
	>200 mg/dl	10	6.66 %
Serum Bilirubin	< 1.5 mg/dl	139	92.66 %
	>1.5 mg/dl	11	7.33 %
Serum Lipase	0-80IU/lt	48	32 %
	81-240 IU/lt	76	50.66 %
	>240 IU/lt	26	17.33 %
Renal function test (blood urea and serum creatinine)	Normal	131	87.33 %
	Deranged	19	66%
Serum Calcium	>9 meq/lt	124	82.67 %
	< 9 meq/lt	26	17.33%

4.5 CECT Abdomen Findings

All the patients in the study underwent a CECT of the abdomen and were categorized as acute interstitial pancreatitis and acute necrotizing pancreatitis. The following table shows the distribution of each category:

Table 5: Diagnosis of acute pancreatitis based on CECT abdomen

Diagnosis on CT	No. of patients	%
Acute interstitial pancreatitis	101	67.33
Acute necrotizing pancreatitis	49	32.66
Total	150	100%

4.6 Complications of Acute Pancreatitis

In the given study, systemic and local complications developed were studied. It was observed that among systemic complications, the commonest was hypovolemia among 30% cases, followed by hypocalcemia among 17.33% cases, Hypovolemia with ARF among 12.66% cases, sepsis among 10.66% cases and Septicemia with ARDS among 8% cases. 6+2 cases of portal vein with Superior mesenteric vein thrombosis (5.33%) were presented in the present study.



Figure 2: Showing retroperitoneal approach to pancreas



Figure 3: Showing intra peritoneal findings of saponification



Figure 3: Showing slough from lesser sac

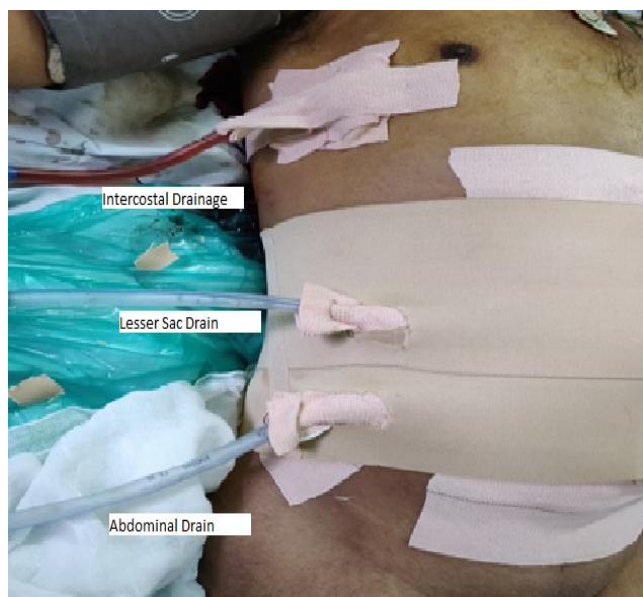


Figure 4: Showing post operative drain placement in a case of necrosectomy

Table 6: Systemic Complications of Acute Pancreatitis

Systemic complications	No of patients	%
Hypovolemia	45	30%
Hypovolemia with ARF	19	12.66 %
Septicemia	16	10.66 %
Septicemia with ARDS	12	8 %
Hypocalcemia	26	17.33 %
Portal vein with Superior mesentric vein Thrombosis	6+2	5.33 %

Among the local complications, it was observed that pancreatic pseudocyst was seen among 18% cases, pleural effusion was noted among 15.33% cases, pancreatic necrosis among 11.33% cases, Ascites among 10% cases, pancreatic abscess among 7.33% cases, and Ascites with Pleural effusion among 3.33% cases.

Table 7: Local complications of acute pancreatitis

Local Complication	No. of patients	%
Pseudocyst	27	18 %
Pleural effusion	23	15.33 %
Ascites	15	10 %
Necrosis	17	11.33 %
Abscess	11	7.33 %
Ascites + Pleural effusion	5	3.33 %

4.7 Management of Complications of Acute Pancreatitis

Following table shows the management of patients according to the severity of the cases:

Table 8: Management of complications of acute pancreatitis

Requirement of intensive management	No. of patients	Percentage %
General ward	122	81.33 %
ICU without ventilator	16	10.66 %
ICU with ventilator	12	8 %
Total	150	100 %

Individual complications were managed according to the condition of the patients. Most common complication reported was pancreatic pseudocyst in 27 cases (18 %). The following table gives the details of management of such cases in whom complications occurred.

Table 9: Management of pancreatic pseudocyst

Location	Conservative	Cysto - Gastrostomy		Percutaneous approach
		Lap	Open	
Head	14.81 %	3.7 %	3.7 %	3.7 %
Body	29.62 %	7.4 %	7.4 %	7.4 %
Tail	7.4 %	3.7 %	3.7 %	7.4 %

Pancreatic necrosis was seen in 17 patients (11.33 %). Out of which we managed 7.3 % cases conservatively, while 3.3 % cases with necrosectomy and 0.6 % cases with Necrosectomy + Pancreatectomy. Mortality seen in 2 cases managed with necrosectomy (1.3 %).

Table 10: Line of management for necrosis

Line of management for necrosis	No. of cases	%	Mortality
Conservative	11	64.70 %	0
Necrosectomy	5	29.41 %	2
Necrosectomy + Pancreatectomy	1	5.88 %	0

Total	17	100 %	2
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In the current study, 11 cases were encountered with pancreatic abscess (7.3 %), out of which 27.27% cases were managed with conservative approach, 18.18% cases managed with Conservative + Percutaneous approach, 36.36% cases with Percutaneous approach, 9.09% cases with Open drainage and 9.09% cases were managed with Open drainage + Percutaneous approach. 25% mortality was observed among the cases managed with Percutaneous approach, and 100% mortality was observed in one case managed with open drainage.

Table 11: Line of management for abscess in acute pancreatitis

Line of management for abscess	No. of cases	%	Mortality	Percentage mortality
Conservative	3	27.27 %	0	0 %
Conservative + Percutaneous approach	2	18.18 %	0	0 %
Percutaneous approach	4	36.36 %	1	25 %
Open drainage	1	9.09 %	1	100 %
Open drainage+ Percutaneous approach	1	9.09 %	0	0 %
Total	11	100 %	2	18.18 %

5. Discussion

The early identification of potentially severe acute pancreatitis enables the selection of patients who may require more intensive and invasive method of management than are appropriate in mild pancreatitis. Most of the patients with associated with systemic complication were managed in general ward expect few patients who are associated with septicemia and ARDS.

5.1 Age and Gender wise distribution

In the current study, we assessed the study subjects according to their age distribution and gender distribution. We observed that majority of the cases were males (81.33%), and 18.66% cases were females. The M:F ratio was 1:0.22. The mean age of study cases was 37.32 ± 11.61 years.

Table 12: Comparison of age distribution in acute pancreatitis in various studies with present study

Studies	Mean age	M:F ratio
Current study	37.32 ± 11.61 years	1:0.22
Irshad Ahmad Bandy et al ^[10]	42.32 years	2:1
Paolo Soliani et al ^[11]	55.1 ± 9.5 years	2.1:1
Jha PK et al ^[12]	40.9 ± 1.3 years	1:1.8

From the table it can be seen that pancreatitis is more common in male population.

5.2 Aetiology of Acute pancreatitis

In the present study, we assessed the etiology in all the cases of acute pancreatitis. We observed that alcohol was the etiology among majority of the cases (74.67%), followed by Gall stone disease (among 20% cases), idiopathic (1.33%),

drug induced (2%), post-traumatic (1.33%), and rarely due to Pancreatic malformations (pancreatic divisum) among 0.66% cases.

Table 13: Comparison of etiology for acute pancreatitis in various studies with present study

Studies	Etiology	Percentage
Current study	Alcohol	74.67 %
	GSD	20 %
	Drug induced	2 %
	Idiopathic	1.33 %
	Post traumatic	1.33 %
Jha P K et al ^[12]	GSD	63 %
	Alcohol	27 %
	Idiopathic	6 %
	Post traumatic	3 %
	Infection (mumps)	1 %
Soliani P et al ^[11]	Alcohol	33.33 %
	GSD	9.6 %
	Others	25 %

From the comparison with various studies, it is seen that alcohol and gall stone disease (GSD) are the main etiological agents implicated for acute pancreatitis.

5.3 CECT findings in acute pancreatitis

In the given study, according to the CT findings we observed that majority of the cases (67.33%) presented with Acute interstitial pancreatitis, while 32.66% cases presented with Acute necrotizing pancreatitis.

Table 14: Comparison of CT findings in acute pancreatitis in various studies with present study

Studies	Findings
Present study	Acute interstitial pancreatitis: 67.33%
	Acute necrotising pancreatitis: 32.66%
Sameer Raghuvanshi et al ^[13]	Interstitial Pancreatitis : 50 %
	Pancreatic necrosis: 50%

From the table, in the study conducted by Raghuvanshi et al an high incidence of necrotizing pancreatitis is demonstrated which is high when compared to the present study

5.4 Complications of Acute Pancreatitis

In the given study, we assessed the study subjects according to the systemic and local complications developed. We observed that among systemic complications, the commonest was hypovolemia among 30% cases, followed by hypocalcemia among 17.33% cases, Hypovolemia with ARF among 12.66% cases, sepsis among 10.66% cases and Septicemia with ARDS among 8% cases. 6+2 cases of portal vein with Superior mesentric vein Thrombosis (5.33%) were presented in the present study.

Among the local complications, we observed that pancreatic pseudocyst was observed among 18% cases, pleural effusion was noted among 15.33% cases, pancreatic necrosis among 11.33% cases, Ascites among 10% cases, pancreatic abscess

among 7.33% cases, and Ascites with Pleural effusion among 3.33% cases.

Table 15: Comparison of Complications in Acute pancreatitis in various studies with present study

Study	Complication (most common)	%
Current study	Pancreatic Pseudocyst	18 %
Mohd Altaf et al ^[14]	Pleural effusion	12 %
Sameer Raghuvanshi et al ^[13]	Pleural effusion	46 %
Balthazar et al ^[15]	Pleural effusion	43 %

The most common complication noted in various studies seen was pleural effusion as against pancreatic pseudocyst seen in the present series.

5.5 Management of Complications

In the current study, we observed that majority of the pseudocysts were located in the body of pancreas (51.85%), followed by head (25.92%), and tail (22.22%). We managed the cases with Conservative approach among 13 (48.14%), Lap CG among 5 (18.51%) cases, Open CG among 4 (14.81%) cases and Percutaneous approach among 5 (18.51%) cases. In study conducted by Bradley et al^[16], 55% resolved by conservative management.

In the current study, we managed the 64.70% cases with pancreatic necrosis conservatively, while 29.41% cases with necrosectomy and 5.88% cases with Necrosectomy + Pancreatectomy. Mortality was observed among the cases managed with necrosectomy (18.18%). All cause mortality seen in 4 cases (2.66 %). Fernandez et al^[17], reported 7% mortality among necrosis cases, whereas Ashley et al^[18], reported 11% mortality among cases presented with pancreatic necrosis.

6. Conclusion

The present study was conducted to diagnose and evaluate the various complications associated with acute attack of pancreatitis through proper clinical biochemical and radiological examination, and hence to assess severity of disease and detect the complications and surgical intervention if required.

The M:F ratio was 1:0.22. The mean age of study cases was 37.32 ± 11.61 years. Alcoholism was the aetiology among majority of the cases (74.67%), followed by Gall stone disease among 20% cases, idiopathic (1.33%), drug induced (2%), post-traumatic (1.33%), and rarely due to Pancreatic malformations (pancreatic divisum) among 0.66% cases.

In the given study, according to the CT findings we observed that majority of the cases (67.33%) presented with Acute interstitial pancreatitis, while 32.66% cases presented with Acute necrotizing pancreatitis

Among systemic complications, the commonest was hypovolemia and among the local complications, we observed that pancreatic pseudocyst was observed among 18% cases.

25% mortality was observed among they cases managed with Percutaneous approach, and 100% mortality was observed in one case managed with open drainage.

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