# **Original Research Article**

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# A study of interventions and their outcome in the management of acute pancreatitis

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#### **ABSTRACT**

Background: Acute pancreatitis is the most terrible of all the calamities that occur in connection with the abdominal viscera. The suddenness of its onset, the illimitable agony which accompanies it, and the mortality attendant upon it, all render it the most formidable of catastrophes. Aim of the study is to evaluate the treatment outcome in acute

Methods: All the patients who underwent surgery for chronic pancreatitis were included in the study. initial APACHE II score at admission and CT severity index was evaluated.

Results: Edematous pancreatitis accounts for 80–90% of acute pancreatitis and remission can be achieved in most of the patients without receiving any special treatment. Necrotizing pancreatitis occupies 10-20% of acute pancreatitis and the mortality rate is reported to be 14-25%. Alcohol (45.8%) was the most common causes of acute severe pancreatitis in this study. Males were predominately affected (Male: Female = 29:5). Complication rate or morbidity is 50%. The initial APACHE II score at admission and CT severity index in the first scan were high in patients who underwent necrosectomy and the patients who died. The overall mortality in this study was 30.6%.

Conclusions: In conclusion, one reason attributed to high mortality was due to the subgroup of patients who underwent PCD alone and failed to show any change in the recovery nor deterioration and lead to gross nutritional depletion and death, secondly those patients who underwent step up approach and ultimately needed surgery have more aggressive disease evidenced by high APACHE II score, CT severity index and % of necrosis.

Keywords: Acute pancreatitis, Necrotizing pancreatitis, Mortality, Morbidity

### INTRODUCTION

Acute pancreatitis is the most terrible of all the calamities that occur in connection with the abdominal viscera. The suddenness of its onset, the illimitable agony which accompanies it, and the mortality attendant upon it, all render it the most formidable of catastrophes.<sup>1</sup>

Acute pancreatitis has been recognized since antiquity. An early description of AP was given by Ambrose pare in 1579. Acute pancreatitis may vary in severity, from mild self-limiting pancreatic inflammation to pancreatic necrosis with life-threatening sequelae. Severe acute pancreatitis (SAP) develops in about 25% of patients with acute pancreatitis.<sup>2</sup> Severity of acute pancreatitis is linked to the presence of systemic organ dysfunctions and/or necrotizing pancreatitis. Risk factors independently determining the outcome of SAP are early multiorgan failure (MOF), infection of necrosis, and extended necrosis (>50%). Morbidity of SAP is biphasic; the early phase occurs during the first week from the time of onset, and is related to organ failure, secondary to systemic inflammatory response (SIRS).<sup>3</sup>

Infection is not a feature of the early phase. Proinflammatory cytokines contribute to respiratory, renal, and hepatic failure. The second or late phase which starts 14 days after the onset of the disease, is marked by infection of the gland, necrosis and septic systemic complications causing a significant increase in mortality. Infection of the necrotic pancreas occurs in the 8%-12% of the patients with AP and in 30%-40% of patients with necrotizing pancreatitis, and it is considered the most important risk factor of necrotic pancreatitis. <sup>5</sup>

The extent of pancreatic necrosis is not fixed and may progress as the disease evolves during the first 2 weeks. Fluid collections are common and are termed as acute fluid collections before 4 weeks. Fluid collections after 4 weeks are termed as pancreatic pseudocyst.<sup>6</sup> Late phase of AP is characterized by local complications. Infection of pancreatic necrosis occurs in 25-70% of patients with necrotizing pancreatitis and is believed to occur as a result of bacterial translocation due to failure of intestinal barrier. Mortality occurs in two peaks. In the early phase, it is due to severe SIRS and in the late phase due to MOF, secondary to infective local complications or systemic sepsis.<sup>7</sup> Contrast-enhanced computed tomography provides the highest diagnostic accuracy for necrotizing pancreatitis when performed after the first week of disease. Patients who suffer early organ dysfunctions or are at risk for developing a severe disease require early intensive care treatment. Antibiotic prophylaxis has not been shown as an effective preventive treatment. Early enteral feeding is based on a high level of evidence, resulting in a reduction of local and systemic infection. Patients suffering infected necrosis causing clinical sepsis are candidates for intervention. Hospital mortality of SAP after interventional or surgical debridement has decreased to below 20% in high-volume centers. Although the overall mortality rate with acute pancreatitis is 2-10%, this is primarily related to patients with more severe disease.8

Management of acute necrotizing pancreatitis has changed significantly over the past years. Early management is nonsurgical and solely supportive. Today, more patients survive the early phase of severe pancreatitis due to improvements in intensive care medicine. It is clear that although the era of minimally invasive methods has arrived, there is a limited body of evidence. The selection of treatment must be guided by the need to ensure the availability of true multidisciplinary expertise in a specialist unit. Techniques should not be selected simply because of the expertise of an individual clinician. <sup>10</sup>

The clinical course of acute pancreatitis varies from mild to severe. Assessment of severity and etiology of acute pancreatitis is important to determine the strategy of management for acute pancreatitis. Acute pancreatitis is classified according to its morphology into edematous pancreatitis and necrotizing pancreatitis. Edematous pancreatitis accounts for 80–90% of acute pancreatitis

and remission can be achieved in most of the patients without receiving any special treatment. Necrotizing pancreatitis occupies 10–20% of acute pancreatitis and the mortality rate is reported to be 14–25%. The mortality rate is particularly high (34–40%) for infected pancreatic necrosis that is accompanied by bacterial infection in the necrotic tissue of the pancreas On the other hand, the mortality rate is reported to be 0–11% for sterile pancreatic necrosis which is not accompanied by bacterial infection.

In this study we describe the surgical and interventional therapy of acute pancreatitis and their outcome in the management of acute pancreatitis.

#### **METHODS**

Patients admitted in Narayana Medical College and Hospital, Nellore from August 2014 to December 2016 in the Department of Surgical gastroenterology with the diagnosis of acute necrotizing pancreatitis were included in the study group. Our study subjects included those admitted in Narayana Medical College and Hospital, Nellore having diagnosed of acute pancreatitis. Patients diagnosed of pseudo cyst of pancreas, Biliary Pancreatitis, necrosis of pancreas and ductal disruption of pancreas were included in the study.

Exclusion criteria were patients of age less than 15 years or more than 60 years, patients with pre-existing chronic liver, kidney, heart disease, and tuberculosis, patients with history of hematological disorders and all the patients who underwent surgery for chronic pancreatitis. Between September 2014 to December 2016 were included in the study, consent was obtained from all the patients in the study. APACHE II scoring was done for all the patients with severe acute pancreatitis at admission and was used as the major triaging tool. CECT was done for all the patients at variable points of time and CT severity index was calculated. Repeat imaging and CT guided FNAC was done for the patients who progressed to organ dysfunction (single or multiple) sepsis, infected necrosis. FNAC aspirate was sent for culture and sensitivity.

Biochemical investigations like C-reactive protein, complete hemogram, liver function tests, renal function tests, serum amylase, serum lipase, random blood sugar, lipid profile, serum calcium were done for all the patients. Number of organ systems involved in all the cases was documented. Blood and urine were also sent for culture and sensitivity.

Patients whose general condition improved without any worsening of organ failure were continued with conservative management. All the patients were aggressively rehydrated with normal saline till the hematocrit rises and improved urine output. Daily input and output charts, RFT are strictly monitored. All the patients were started with Ryle's tube feeds as they were

usually on ventilator support and reduced alimentation. With the help clinical nutrition specialist support feeds were specially prepared and administered as per the nutritional requirement. Those patients who had ileus, deficit in the required calorific requirement were given total parenteral nutrition.

Antibiotics were started in those patients who had persistent organ failure, fever and signs of infected pancreatic necrosis like retroperitoneal gas shadows and when more than two organ systems are involved. As a first line antibiotic Inj. Imipenem 500 mg intravenously every 8 hours was started and continued till the culture and sensitivity reports are available.

Percutaneous drainage (PCD) as a part of step up approach was done in patients who did not improve on medical management along with; (a) presence of predominant liquid necrosis and pus collection; (b) persisting fever; (c) leukocytosis; (d) worsening or new onset of organ failure and (e) culture and sensitivity positive.

Those patients who failed to improve on step up approach were subjected to surgery.

Surgery was done for those patients who had a) failed PCD or step up approach, b) persistent or worsening sepsis, c) worsening or new organ failure, d) presence of ongoing necrosis with other complications like bowel involvement, major bleeding etc. and e) inadequate drainage.

#### Intraoperative management

On table, decision is taken depending on the adequacy of necrosectomy. If necrosectomy is felt inadequate multiple soft drains (preferably Foley' catheters- 24 F) were placed in the lesser sac and exteriorized for continuous lavage during postoperative period.

In the intensive care unit under the unit supervision lavage was given to wash the debris out till the drainage fluid is clear. Proper influx and drainage chart was maintained to avoid collections. Drains were removed when the drainage is less than 10 ml, improved general condition, and improved nutrition and after USG or CT abdomen does not show any residual collections. In cases that had persistent drainage even after 3 months and the drain fluid amylase was more than three times the serum level they were treated as pancreatic fistulas. ERCP stenting was done for those patients. Patients with long standing drainage but clinically recovered were discharged and followed up on outpatient basis.

#### **RESULTS**

In total of 34 cases in study group. The majority i.e. 23 of cases were alcoholic and second common etiology is gallstones, followed by idiopathic 7 cases.

Table 1: Aetiology vs. sex distribution.

Aetiology	Sex		Total
	Male	Female	Total
Idiopathic	5 (17.2)	2 (40.0)	7 (20.6)
Alcoholic	18 (62.1)	0 (0.0)	18 (52.9)
Gall stones	0 (0.0)	3 (60.0)	3 (8.8)
Alco/gall stones	5 (17.2)	0 (0.0)	5 (14.7)
Trauma	1 (3.4)	0 (0.0)	1 (2.9)
Total	29 (100.0)	5 (100.0)	34 (100.0)

P≤0.000, significant.

Table 1 shows etiology wise sex distribution of 34 cases in study group with significant p value.

Intervention wise distribution of 34 cases in study group; the majority i.e. 12 cases had undergone opennecrosectomy followed by step up approach by 9 cases and 4 cases had embolization procedure (Figure 1).

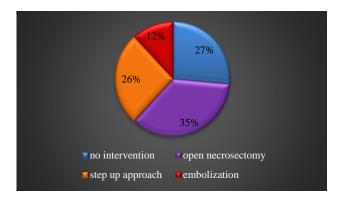


Figure 1: Intervention wise distribution of study participants.

Table 2: Outcome of the study.

Outcome	Frequency	Percentage (%)
Discharged	24	70.6
Died	10	29.4
Total	34	100.0

Table 3: Aetiology vs. outcome of the study.

Aetiology	Outcome		Total
	Discharged	Died	Total
Idiopathic	5 (20.8)	2 (20.0)	7 (20.6)
Alcoholic	11 (45.8)	7 (70.0)	18 (52.9)
Gall stones	3 (12.5)	0 (0.0)	3 (8.8)
Alco/gall	5 (20.8)	0 (0.0)	5 (14.7)
stones			
Trauma	0 (0.0)	1 (10.0)	1 (2.9)
Total	24 (100.0)	10 (100.0)	34 (100.0)

P≥0.05, NS.

Outcome of all the cases included in the study showing 70.6% of the patients were discharged and 29.4% were dead (Table 2).

Table 3 shows aetiology wise distribution of outcome of all the cases included in the study showing no significant p value.

Table 4: Intervention vs. outcome of the study.

Interventions	Outcome		Total
	Discharged	Died	Total
Nil	9 (37.5)	0(0.0)	9 (26.5)
Open necrosectomy	5 (20.8)	7 (70.0)	12 (35.3)
Step up approach	8 (33.3)	1 (10.0)	9 (26.5)
Embolization	2 (8.3)	2 (20.0)	4 (11.8)
Total	24 (100)	10 (100)	34 (100)

P=0.013, significant.

Table 4 shows procedure wise distribution of outcome of all the cases included in the study showing significant p value.

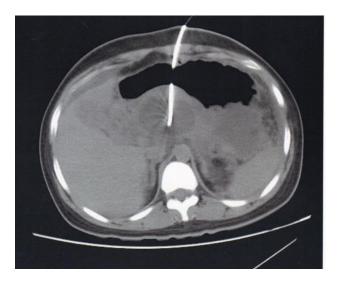


Figure 2: CT guided trans gastric pigtail drainage of liquid necrotic component.

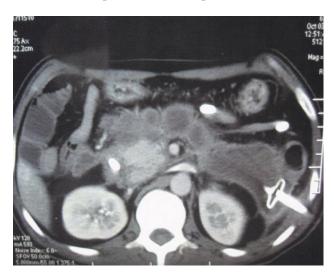


Figure 3: A CT picture of percutaneous drainage with multiple Malecot catheter seen.

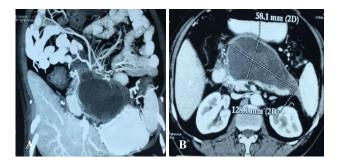


Figure 4 (A and B): CT picture showing collection and greater than 100% necrosed pancreas.

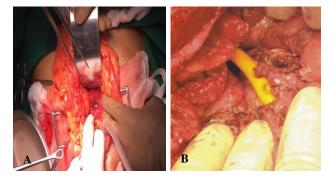


Figure 5 (A and B): Intra operative picture—anterior gastrostomy to approach the lesser sac and placement of soft drains in the cavity for postoperative care and lavage.

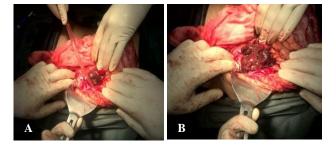


Figure 6 (A and B): Intraoperative picture- blood clot removed from the pseudocyst.

## **DISCUSSION**

The management of acute severe pancreatitis continues to be a challenging entity. Surgery in severe acute pancreatitis is a morbid procedure associated with complications in 34% to 95% of patients and mortality in 11% to 39%. Surgery is also known to lead to long term pancreatic insufficiency. The high mortality encountered with surgery essentially reflects the hazard of operating on a critically ill, septic patients often in the setting of MOF (multi organ failure).

Faced with high morbidity and mortality of operative necrosectomy, minimally invasive strategies are increasingly explored by gastrointestinal surgeons, radiologists and gastroenterologists. PCD, endoscopic trans gastric procedures and minimally invasive

procedures have all been proposed as alternatives to open necrosectomy.

Despite the availability of several clinical (Ranson's criteria, APACHE II score, CTSI or Balthazar scoring system) and radiological scoring systems, accurate prediction of the best treatment strategies and outcome after acute necrotizing pancreatitis remains enigmatic. <sup>12</sup> These scoring systems could be used as triaging tools for appropriate management.

Various complications were encountered in the study group patients and were treated accordingly.

#### Early postoperative complications

One patient developed pelvic collection following a PCD and was treated by USG guided pigtail drainage of the collection. The patient recovered but later on went for necrosectomy. Four patients had bleeding with fall in hemoglobin during observation period with further investigations was found bleeding into the pseudocysts. One patent had radiological intervention in the form of gastro duodenal artery, one splenic artery embolization. Two patents had open surgery when failed embolization with control of bleeding by identification and ligation of the artery.

#### Late postoperative complications

Five patients had persistent drainage or pancreatic fistula of which two underwent ERCP and stenting. Three patients were discharged with drains in place and they eventually recovered. Four patients had Incisional hernia and were repaired. Three patients had delayed pseudocyst formation of which one went for a spontaneous regression and the rest of them were treated by cysto gastrostomy, as they were symptomatic. Unlike Panter study, Freeny's study, The Dutch Pancreatic study group who used randomization of patients between step up approach and laparotomy, this study employed step up approach only in those patients who had predominantly liquid necrotic component. 13,14

The incidence of intra-abdominal bleed was 16% in Panter group 12.56% in PGI group and 13.3% in our experience. Another important complication mentioned in Panter study group, Freeny's study is pancreatic fistula which were observed as 28% and 29% compared with 16.6% in our experience. The incidence of pancreatic fistulas has been variable in many studies and would depend on the depth of the necrotic tissue in the gland leading.

Optimal timing of laparoscopic cholecystectomy in patients with acute biliary pancreatitis (ABP) is still contentious. In mild ABP, laparoscopic cholecystectomy has been considered the definitive treatment. Early laparoscopic cholecystectomy can be performed as soon as the serum amylase decreases and symptoms improve.

Heinrich et al analyzed four prospective trials evaluating the optimal timing for surgery and concluded that early laparoscopic cholecystectomy should be preferred in patients with mild to moderate ABP, whereas in patients with severe ABP, who did not undergo surgery for necrotizing pancreatitis, cholecystectomy appears to be favorable after full recovery. In this study/hospital the decision for early laparoscopic or open cholecystectomy during the index admission itself was taken depending on the clinical condition of the patient, and was delayed until the acute episode subsides.

The benefit of ERCP with endoscopic sphincterotomy (ES) has been studied in 3 randomized trials and 2 metaanalyses. Patients with predicted mild ABP in the absence of cholangitis have not shown benefits from an early ERCP. The decision on management of patients with predicted severe ABP is still debatable. The United Kingdom guidelines recommend that urgent therapeutic ERCP should be performed within 72 hr of admission in all patients with predicted severe ABP, whether or not cholangitis is present. However, a recent meta-analysis by Petrov et al demonstrated that early ERCP with or without ES had no beneficial effects in patients with predicted mild or severe ABP without cholangitis. 15 The conclusion of this study was partially supported by the 2007 guidelines of the American Gastroenterology Association, which stated that early ERCP in patients with severe ABP without signs of acute cholangitis is still not uniformly accepted in the literature.

The overall mortality in this study was 30.6%, where as it was 20% in Panter study group and 40% in PGI group. One reason attributed to high mortality by PGI group was due to the subgroup of patients who underwent PCD alone and failed to show any change in the recovery nor deterioration and lead to gross nutritional depletion and death, secondly those patients who underwent step up approach and ultimately needed surgery have more aggressive disease evidenced by high APACHE II score, CT SI and% of necrosis.

#### **CONCLUSION**

The initial APACHE II score at admission and CT severity index in the first scan were high in patients who underwent necrosectomy and the patients who died. Multidisciplinary team approach and close cooperation between intensivists, gastroenterologists, interventional radiologists and nutritionists helped to ensure the best possible patient outcome. Complication rate /morbidity is 50%. In spite of proper triaging and aggressive treatment strategy death rate continues to be very high. Mortality rate was 30.

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Institutional Ethics Committee

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