

## Research Article

# A study of the role of intervention in the final outcome of acute pancreatitis

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### ABSTRACT

**Background:** Acute pancreatitis is a common disease which varies in severity, from mild self-limiting pancreatic inflammation to severe pancreatic necrosis with life-threatening sequelae. As per the recent recommendations early intensive care with delayed intervention and step-up approach when indicated has definite survival advantages over the risks associated with early surgical procedures. The present study was aimed at evaluating the mortality and morbidity risk in patients undergoing procedural intervention in acute pancreatitis.

**Methods:** This was a prospective study done in Sri Ramachandra Medical College and Hospital from April 2012-September 2014. All patients with a diagnosis of acute pancreatitis were included in this study. A total of 110 patients were analysed. Routine lab parameters, serum amylase, lipase, lipid profile, calcium, CRP, LDH, CT abdomen, CXR and 2D Echo was done for all patients. Procedural intervention was planned as per the guidelines.

**Results:** Patients were given early intensive care as per the initial severity scores. 25 patients required intervention. Serum LDH, amylase, lipase and CT severity index were better predictors of requirement of intervention and death. Open necrosectomy was done in 15 patients (13.6%), laparoscopic necrosectomy in 3 patients (2.7%) and step up approach was tried in 7 patients (6.4%). Patients who were tried step up approach were monitored closely for any deterioration in their clinical condition to decide about surgery. 7 out of 8 patients who underwent surgery died. Alcoholic pancreatitis that underwent intervention had a high risk of mortality.

**Conclusions:** Intensive care monitoring with delayed intervention had a better survival benefit. Patients subjected to minimally invasive interventions had a better chance of survival.

**Keywords:** Acute pancreatitis, Pancreatitis necrosis, Step-up surgery, Necrosectomy

### INTRODUCTION

Acute pancreatitis is a common disease with wide clinical variation and the average mortality rate is predicted to be 2–10%.<sup>1</sup> In about 25% of patients, severe acute pancreatitis (SAP) develops. Severe acute pancreatitis is a two phase systemic disease. In the first phase, extensive pancreatic inflammation and/or necrosis is followed by a systemic inflammatory response syndrome (SIRS) that may lead to multiple organ dysfunction syndrome (MODS) within the first week. About 50% of deaths

occur within the first week of the attack, mostly from MODS.<sup>2,3</sup> The second phase ensues usually after the second week of onset, and includes the formation of infected pancreatic necrosis or fluid collection. The factors which cause death in most patients with acute pancreatitis seem to be related specifically to multiple organ dysfunction syndrome and these deaths account for 40-60% of in-hospital deaths in all age groups. The mortality figures associated with MODS vary between 30-100%.<sup>4</sup> Infections 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.<sup>5</sup>

Patients who suffer early organ dysfunction are at risk for developing a severe disease requiring early intensive care treatment. Antibiotic prophylaxis has not been shown to be an effective preventive treatment. Management of acute pancreatitis has changed significantly over the past years. Early management is supportive treatment with intensive care in specific patients. Today, more patients survive the early phase of severe pancreatitis due to improvements in intensive care medicine. Early enteral feeding is based on a high level of evidence, resulting in a reduction of local and systemic infection.<sup>6</sup>

Patients suffering infected necrosis causing clinical sepsis are candidates for intervention. Pancreatic debridement is indicated for patients with pancreatic necrosis and progressive clinical sepsis as a complication of severe acute pancreatitis. Infected pancreatic necrosis and symptomatic sterile necrosis are both accepted indications for debridement. The goal of pancreatic debridement is to excise all dead and devitalized pancreatic and peripancreatic tissue, while preserving viable functioning pancreas, controlling resultant pancreatic fistulas, and limiting extraneous organ damage. Minimally invasive techniques can be employed in selected patients. Percutaneous catheter drainage is primarily a bridging technique for patients who are too unstable to undergo surgical debridement, although one-third of patients can be managed with percutaneous drainage alone. Open surgical debridement is the gold standard for management of pancreatic necrosis. Laparoscopic debridement is primarily limited to patients with walled-off pancreatic necrosis.<sup>7,8</sup>

The present study was aimed at evaluating the mortality and morbidity risk in patients who are subjected to procedural intervention and their correlation with lab parameters.

## METHODS

This was a prospective study done in Sri Ramachandra Medical College and Hospital from April 2012-September 2014. All patients with a diagnosis of acute pancreatitis who required procedural intervention were included in this study (25 patients). Patients with chronic pancreatitis and pancreatic malignancy were excluded from the study. Patients were classified into mild, moderate and severe acute pancreatitis based on Ranson's score, Glasgow scoring and CT severity index (CTSI) along with time taken for reversal of organ dysfunction. Complete hemogram, liver function tests, renal function tests, serum amylase, serum lipase, random blood sugar, lipid profile, serum calcium and C - reactive protein were done. CECT abdomen was done and CT severity index was calculated. Intensive Care was given for patients with severe pancreatitis. Step up approach and surgery was done in patients who did not improve on medical management. Hospital ethics committee approval and informed and written consent by the patient were obtained before undertaking the study. The Statistical Package for Social Sciences version 17 was used for the statistical analysis. A p-value of less than 0.05 was taken as being statistically significant.

## RESULTS

25 patients out of 110 patients (22.7%) with acute pancreatitis required intervention. The mean age of patients who required intervention was 44.28. 11 patients were alcoholic (7 with CAGE score 4 and 4 patients had score 3), 8 had cholelithiasis and others had no specific aetiology. 6 patients had comorbid illness (3 with hypertension and 3 had diabetes mellitus). 13 patients had multiorgan dysfunction (MODS) and 1 patient developed pseudocyst. Various lab parameters were analysed and summarized in the following tables.

**Table 1: Intervention and outcome.**

Intervention	Discharge	Death	Total	P value
Open Necrosectomy	14	1	15	0.00
Step-up surgery	1	6	7	0.00
Laparoscopy	3	0	3	0.00

**Table 2: Correlation of lab markers with outcome.**

Parameter (N)	Intervention (Mean value)	Favourable outcome (Mean value)	Death (Mean value)	P value
LDH	543.76	528.83	582.14	0.005
Leucocyte count	13695.24	15838	8184.28	0.97
CRP	2.452	2.29	2.86	0.002
Amylase	613.96	541.89	799.29	0.009
Lipase	640.72	531.61	921.29	0.003
Ranson score	6.6	6.38	7.14	0.001
Glasgow score	6	5.83	6.43	0.001
CT severity index	7.88	7.56	8.73	0.003

There was a significant difference in the CT Severity Index of alcoholic pancreatitis in comparison to gall bladder pancreatitis where the score was higher for alcohol induced pancreatitis. In patients who died, 5 were alcoholic and 1 had cholelithiasis. All patients who died had MODS.

## DISCUSSION

Necrotizing pancreatitis carries a high risk of morbidity and mortality. Infected necrosis has a poor outcome. Early assessment of severity and intensive care management improves outcome.

Several clinical scoring systems<sup>9,10</sup> are available for predicting severity. In the present study death was high in alcohol related pancreatitis with increased risk of pancreatitis with reasons unexplained. Comorbid illness had no correlation with risk of death. Presence of MODS had the highest predictor of mortality. Serum LDH, amylase, lipase and CT severity index were better predictors of requirement of intervention. Leucocyte count had no predictive value but other lab markers were high in patients who required intervention. All the patients who required intervention had high score of Ranson, Glasgow and CT severity index (CTSI) and CTSI had a greater predictive value in comparison to the other two scores.

The risk of procedural intervention can worsen the prognosis in a critically ill patient. Surgery also carries a risk of long term pancreatic insufficiency. The high mortality encountered with surgery essentially reflects the hazard of operating on critically ill, septic patients with MODS. It is preferable to delay surgical intervention especially when patients show clinical improvement with intensive care and the necrosis is sterile.<sup>11,12,13,14</sup> Operative necrosectomy carries high morbidity and mortality. Hence gastrointestinal surgeons, radiologists and gastroenterologists have adopted minimally invasive strategies. Percutaneous drainage (PCD), endoscopic transgastric procedures and minimally invasive procedures are other alternatives to open necrosectomy. Step up approach using PCD alone or along with high volume lavage and multiple drainage insertion has been reported to improve organ failure by about 26%.<sup>15-19</sup>

The reported mortality rate in patients undergoing debridement for pancreatic necrosis ranges from 4 to 25 percent.<sup>20</sup> The mortality rate is related to the extent of necrosis, underlying organ failure, and infection of the necrotic tissue. In the present study 3 patients (2.7%) underwent laparoscopic necrosectomy, 15 patients (13.6%) underwent open necrosectomy surgery, and 7 patients (6.4%) were tried step up approach but could not avoid surgery. Close monitoring was done for clinical deterioration in patients who were tried step-up approach. 7 out of 8 patients who underwent surgery died. There is

a significant advantage with minimally invasive procedures. Though it carries a higher risk in an already critical patient surgical intervention should never be delayed in patients who definitely require intervention (infected necrosis with worsening sepsis). All patients who underwent laparoscopic procedure had a favourable outcome. This reiterates the point that minimally invasive strategies offer a better chance of survival.

## Limitations of the study

The strength of the study is that it analyzed various parameters and inferred that specific lab markers especially CTSI had predictive value for patients who will require intervention. The number of patients was minimal and a larger group study is needed to ascertain the findings of the present study. Also it was done in a resource limited setting and we could not reassess all lab markers during various periods of hospital stay and follow up CT abdomen could not be done for all patients.

## CONCLUSION

Alcoholic pancreatitis who underwent intervention had a high risk of mortality. Serum LDH, amylase, lipase and CT severity index were better predictors of requirement of intervention and death. Patients subjected to minimally invasive interventions had a better chance of survival.

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