



OUTCOMES IN SURGICALLY OPERATED PATIENTS OF ACUTE NECROTISING PANCREATITIS

Rameez Raja S Kacheri., Aparna Deshpande., Bhushan Thakur and Ashok Shelake

¹Department of Radio-diagnosis, Medical College and Hospital, Kolkata

²Department of Community Medicine, SJS Medical College and KEM Hospital, Mumbai

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INTRODUCTION

Acute pancreatitis is an inflammatory condition of pancreas associated with varying degree of edema, autodigestion and necrosis of pancreatic tissue, presenting with pain in epigastrium often radiating to back and usually accompanied with raised pancreatic enzymes in blood and urine.(1)

There are two types of acute pancreatitis acute edematous pancreatitis and acute necrotising pancreatitis based on CT findings. Most patients of acute edematous pancreatitis develop a self limiting course. There are 2 phases in acute pancreatitis early phase and late phase. Early phase is due to host response to cytokine cascade like SIRS (Systemic Inflammatory response syndrome) and CARS (Compensatory anti-inflammatory response syndrome) that can predispose to infection. Late phase of acute pancreatitis which lasts for weeks to months is characterized by systemic signs of inflammation, local and systemic complications and /or by transient or persistent organ failure.

Management of acute pancreatitis is aggressive medical management with analgesics for pain control, bowel rest, intravenous fluids to prevent dehydration. While patients with acute edematous pancreatitis can be managed in normal ward, necrotising pancreatitis should undergo intensive monitoring and maximum intensive care therapy.

Additionally necrotising pancreatitis patients should receive antibiotics that penetrate pancreas and pancreatic necrosis in bactericidal concentrations. Patients who develop infected pancreatic necrosis and sepsis are candidates for surgical intervention. Infected pancreatic necrosis is diagnosed both on Fnc of pancreatic parenchyma or/and CECT scan. Surgery should be performed as late as possible to ensure sufficient demarcation of necrosis. The goals of surgical management of necrotising pancreatitis are removal of necrotic peri and intrapancreatic tissue, removal of pancreatogenic exudate out of the lesser sac and the peritoneal cavity with the aim of preventing release of vasoactive and toxic substances.

A variety of surgical treatment modalities has been propagated including pancreatic resection, peritoneal dialysis, multi tube drainage, surgical debridement and suction drainage, necrosectomy supplemented with different postoperative treatment concepts, such as continuous local lavage of the necrotic cavities, planned, stagedrelaparotomy or the open packing modality and nonoperative drainage using percutaneous techniques. Our study is focussed on different types of surgical procedures done in acute necrotising pancreatitis and the complications and mortality associated with these surgical procedures.

AIM

To study the complications and mortality in operated patients of acute necrotising pancreatitis in a tertiary care centre.

Objectives

- To determine different types of surgical procedures followed for managing necrotising pancreatitis.
- To study the severity as per the scoring systems BISAP and RANSONS and CT Severity index in these patients and categorize them as per the ATLANTA 2012 classification.
- To document and analyse the timing between onset of illness and the surgery.
- To study postsurgical complications and to determine the mortality associated with severe acute pancreatitis.
- To determine whether any adjuvant procedure/s have been done.

MATERIALS AND METHODOLOGY

1. **Study design:** Retrospective study
2. **Sample size:** 28 as these are number of patients operated in 3yrs a tertiary hospital.(Seth G S Medical college)
3. **Inclusion criteria:** Surgically operated patients of acute necrotising pancreatitis above 12 years which includes the following surgeries:
 - a. Pancreatic necrosectomy

*Corresponding author: **Rameez Raja S Kacheri**

Department of Radio-diagnosis, Medical College and Hospital, Kolkata

- b. Minimally invasive pancreatic necrosectomy
 - c. Exploratory laparotomy for abdominal compartment syndrome in acute necrotising pancreatitis
 - d. Drain placement for acute necrotising pancreatitis
 - e. Retroperitoneal necrosectomy
4. **Exclusion criteria:**
- a. Non operated patients of severe acute pancreatitis
 - b. Acute mild pancreatitis
 - c. Chronic pancreatitis
 - d. Acute pancreatitis in children less than 12 years of age
5. **Duration:** 3 years
6. **Study population:** All operated patients of acute necrotising pancreatitis admitted in tertiary hospital.
7. **Study protocol:** Medical record department data of all operated patients of acute necrotising pancreatitis taken for study. Each patient sub grouped on basis of their Ranson score and CT severity index. Basic epidemiological information was collected from record in every patient. Investigation like haemogram, arterial blood gas analysis, renal function test, liver function test, serum lipase levels, chest x-ray, ultrasonography abdomen, computed tomography abdomen noted. Any variation in the course of disease, repeat radiological investigation done to check for any local complication is noted. Treatment given was recorded and categorised as conservative with or without an interventional procedure. A detailed note of their hospital stay, various interventions they underwent, their complications and outcomes including mortality was done. All the data collected was analysed using Microsoft Excel Sheets. Comparison of various prognostic indices Ranson, CTSI and BISAP scores with organ failure, interventions (surgeries), morbidity and mortality was carried out using Pearson's Chi Square test.

DISCUSSION

In our study on outcomes in surgically operated patients of acute necrotising pancreatitis, we studied in detail the complications, interventions and their outcome.

Age

All operated patients above the age of 12 were considered in the study. The youngest and the oldest member were 21 and 65 year old respectively. Peak incidence was seen between 31-40 years. Mean age at presentation being 37.68 years. The peak incidence of acute necrotising pancreatitis is in the third and fourth decade(94). Most patients in our study are alcoholics which might be possible reason for higher incidence in younger age group

Sex

In our study, among 28 patients 23(82.14%) were male and 5(17.86%) were female. Thus the general observation is that acute pancreatitis is more common in males than females. Also again we have more alcoholics hence the sex distribution is skewed.

Etiology

The various etiological factors responsible for acute necrotising pancreatitis in our study were alcohol-23 patients(82.14%), gall stone-4 patients(14.29%) and

idiopathic-1 patient(3.57%). So in our study we found alcohol as a leading cause of acute pancreatitis.

Ranson Score, Ctsi And Bisap

All patients were subjected to Ranson score and sub grouped accordingly into those with score 0-2 and ≥ 3 . Among 28 patients, 27(96.43%) had Ranson score 0-2 while 1(3.57%) had score ≥ 3 .

Similarly all patients were subjected to CT scan, scoring done according to CT severity index (CTSI), later sub grouped into those with CTSI 0-6 and CTSI 7-10. Among study group, CTSI 0-6 had 11 patients (39.29%) and CTSI 7-10 had 17 patients (60.71%).

Similarly all patients were categorised on the basis of BISAP score with BISAP score of < 3 in 23 patients (82.14%) and score of ≥ 3 in 5 patients (17.86%).

Organ Failure

Presence and duration of organ failure is the primary determinant of severity of acute pancreatitis in its early phase. This is as a result of Persistent SIRS. Mortality in severe acute pancreatitis is strongly related to organ failure. The incidence of organ failure in severe acute pancreatitis varied from 28% to 76%, and its related mortality ranged from 28% to 69%(107,108). In our study 8 patients (28.6%) had persistent organ failure, of which respiratory system involvement in 7 patients (25%), cardiovascular system – 7 (25%), renal – 1(3.6%) and central nervous system – 0 (0%). Transient or temporary organ failure is not taken into account in our study.

Management of Organ Failure

Early diagnosis of organ failure in SAP patients and timely treatment may reduce the mortality. In our study, single organ failure was present in 1 patient (3.57%), 2 organ failure were present in 7 patients (25%) and no organ failure was present in 20 patients(71.43%). In patients with respiratory system involvement 5 patients had pleural effusion, 1 patient had ARDS and 1 patient had pneumonitis. Pleural tapping was done in 3 patients.

Local Complication

Necrosis and related local complications are one of the principal determinants for development of sepsis. The other local complications are pseudocyst, haemorrhage due to pseudoaneurysm, splenic, portal or superior mesenteric vein thrombosis. In our study, frequency of various complications are as follows: necrosis- 19 necrosis with pseudocyst -9, splenic or portal vein thrombosis with necrosis -6 and splenic artery pseudoaneurysm with necrosis -4.

Interventions

Patients with severe pancreatitis, however, may require surgical therapy as an integral part of their management. An increasingly conservative approach has been adopted in recent years towards the management of patients with sterile pancreatic necrosis. Pancreatic debridement is the accepted standard of care for patients with infected pancreatic necrosis. Initially conservative (non interventional) management was provided to all patients in our study like adequate hydration, oxygenation, nutrition and antibiotics. All patients which needed surgery are included.

Various interventions and their frequencies are:

Surgery: Surgery was performed in all patients

- Open Necrosectomy (Debridement and continuous post operative lavage): 14
- Open Necrosectomy with Loop ileostomy: 3
- Minimally invasive pancreatic necrosectomy(MIPN) : 2
- Exploratory laparotomy for haemorrhage(bleeding pseudoaneurysm): 3
- Open Cystogastrostomy: 3
- OTHERS
- Exploratory laparotomy for bowel complications(gastric outlet obstruction): 2
- Distal pancreatectomy and splenectomy with evacuation of pancreatic tail necrosis: 1

Open Necrosectomy (Debridement and continuous postoperative lavage of lesser sac) is the surgical procedure most commonly performed at my institute.

Timing of Surgery

Years ago, early surgical intervention was favoured when systemic organ complications were present. Mortality rates of upto 65% have been described with early surgery in necrotising pancreatitis.

Today, there is general recommendation according to international association of surgeons that surgery in necrotising pancreatitis should be performed as late as possible. Third to fourth week after the onset of disease is agreed as providing optimal operative conditions with well demarcated necrotic tissue present, thus limiting the extent of surgery to pure debridement and to only one single intervention. This approach decreases the risk of bleeding, minimises the surgery related loss of vital tissue and thus reduces exocrine and endocrine pancreatic insufficiency. In our study, out of 28 operated patients, 6 patients(21.43%) were operated in first two weeks with 17 patients(60.71%) were operated in 3rd to 4th week and 5 patients(17.86%) were operated after 4 weeks. Thus majority of patients (60.71%) were operated in 3rd to 4th week.

Morbidity

Morbidity associated with severe acute pancreatitis are most commonly due to complications that develop during the course of disease which includes local, regional and systemic and their management. In our study, among 28 patients, 16 patients (57.14%) had only necrosis, 4 patients (14.29%) had necrosis with haemorrhage (pseudoaneurysm), 3 patients(10.71%) had necrosis with sepsis, 2 patients(10.71%) had necrosis with cutaneous fistula and among others; 1 patient had necrosis with duodenal obstruction, 1 patient had necrosis with Acute respiratory distress syndrome and 1 patient had necrosis with acute myocardial infarction. In our study, the different morbidities in association with necrosis are haemorrhage in 4 patients (50%), bowel obstruction in 1 patient (12.5%) and bowel fistulisation in 2 patients (37.5%).

Re-Exploration

Out of all 28 patients, 5 patients were re-explored and 2 patients required second exploration. Re-necrosectomy was done for 2 patients and 1 re-exploration was done for haemorrhage(bleeding post cystogastrostomy) while 3 explorations were for bowel complication (1 surgery for colocolocutaneous fistula, 2 for bile leaks in which 1 bile leak was

following gastrojejunostomy done for duodenal obstruction and the other bile leak was following necrosectomy) and second re-explorations were 1 done for bile leak following primary closure of perforation in a case of gastrojejunostomy done for duodenal obstruction and other done for feeding jejunostomy with incision and drainage of flank abscess. Total of 34 explorations were performed on 27 patients indicating each person getting operated had 25% risk of re-exploration in the course of disease.

Other Interventions

In our study, pigtailing was done in 4 patients for pancreatic necrosis whereas 1 patient undergone CBD stenting for CBD stricture. Out of the four patients in whom pigtailing was done, 3 were followed with necrosectomy while 1 underwent conservative management.

Mortality

The rate of mortality in severe acute pancreatitis, which is about 20% of all cases of acute pancreatitis (AP), may be as high as 25%, as in infected pancreatic necrosis(124). In our study mortality rate is 32.1% (9/28). All patients expired after second week. Most common cause of mortality was septicemia in patients having infected pancreatic necrosis. Cause of mortality is septicemia in 6 patients(21.43%), multiorgan dysfunction due to DIC in 1 patient(3.57%), among others; acute myocardial infarction in 1 patient(3.57%) and acute respiratory distress syndrome in 1 patient(3.57%).

Co-Relation of Organ Failure with Ranson Score

Ranson score is an objective clinical and laboratory measurement done within 48 hours of admission. Chance of severe pancreatitis is more likely if Ranson score is 3 or more. In our study, all 8 patients with organ failure had Ranson score 0-2. The co-relation between Ranson score and organ failure is not significant after applying Chi square test.

Co-Relation of Organ Failure with CTSI

Only 1 patient had single organ failure which belonged to CTSI 0-6 Group. Whereas 7 patients had multi-organ failure, out of which 4 patients(57.1%) belonged to CTSI group 0-6 and 3 patients(42.9%) belonged to CTSI group 7-10. No organ failure was seen in 6 patients (30%) with CTSI 0-6 and 14 patients (70%) with CTSI 7-10. It is seen that there is no statistically significant co-relation between CTSI and organ failure after applying Chi square test.

Co-Relation of Organ Failure with Mortality

In our study, 9 patients died out of which 1 patient had single organ failure, 7 patients had 2 organ failures and 1 patient had no organ failure. Out of 19 patients who survived, none had organ failure. There is a statistically significant co-relation between organ failure and mortality after applying Chi square test.

Co-Relation between Ranson CTSI and Bisap with Mortality

Total deaths in sub group Ranson 0-2 were 9 (11.1%) while it was 0 in patients with Ranson ≥ 3 . With the above data it was found that there was no statistically significant relation between Ranson score and mortality after applying Chi square test and Fischer Exact test.

Among 9 deaths in the study group, 6 patients (21.43%) had CTSI 0-6 while 3 patients (10.71%) had CTSI 7-10. With the

above data it was found that there was a statistically significant relation between CTSI score and mortality after applying Chi square test. Among 9 deaths in the study group, 8 patients (34.8%) had BISAP less than 3 while 1 patient (20%) had BISAP 3 and above. Statistically test applied, found to have no significant co-relation between BISAP and mortality.

Co-Relation between Ranson Ctsi and Bisap with Morbidity

Out of 28 patients, only 1 patient had Ranson score of ≥ 3 who had colo-cutaneous fistula. Rest 27 patients had Ranson score of < 3 , of which 15 patients only had necrosis, 3 patients had necrosis with sepsis, 1 patient had necrosis with cutaneous fistula (enterocutaneous), 4 patients had necrosis with haemorrhage(pseudoaneurysm), 2 patients had respiratory complications (ARDS and pneumonitis), 1 patient had myocardial infarction and 1 patient had burst abdomen. There is a statistically significant co-relation between Ranson and morbidity after applying Chi square test.

Out of 28 patients, 11 patients had CTSI score 0-6, of which 4 patients(36.4%) only had necrosis, 1 patient(9.1%) had necrosis with sepsis, 1 patient(9.1%) had necrosis with cutaneous fistula (enterocutaneous), 2 patients(18.2%) had necrosis with haemorrhage (pseudoaneurysm), 1 patients(9.1%) had respiratory complications (pneumonitis), 1 patient(9.1%) had myocardial infarction and 1 patient(9.1%) had renal failure. Rest 17 patients had CTSI score of < 3 , of which 10 patients only had necrosis, 2 patients had necrosis with sepsis, 1 patient had necrosis with cutaneous fistula (enterocutaneous), 2 patients had necrosis with haemorrhage (pseudoaneurysm), 1 patients had respiratory complications (ARDS) and 1 patient had burst abdomen. There is no statistically significant co-relation between CTSI and morbidity after applying Chi square test.

Out of 28 patients, 5 patients had BISAP score of ≥ 3 , of which 3 patients had only necrosis, 1 patient had necrosis with haemorrhage (pseudoaneurysm) and 1 patient had necrosis with cutaneous fistula (enterocutaneous). Rest 23 patients had BISAP score of < 3 , of which 12 patients had only necrosis, 3 patients had necrosis with sepsis, 1 patient had necrosis with cutaneous fistula (enterocutaneous), 3 patients had necrosis with haemorrhage (pseudoaneurysm), 2 patients had respiratory complications (ARDS and pneumonitis), 1 patient had myocardial infarction and 1 patient had burst abdomen. There is no statistically significant co-relation between BISAP and morbidity after applying Chi square test.

Co-Relation between Re-Exploration and Mortality

Out of 6 re-explorations in patients, 3 survived and 3 expired. 2 re-explorations were done for necrosectomy of which one expired whereas 3 re-explorations were done for bowel complications of which two expired whereas 1 re-exploration for in which patient survived. After applying Chi square test, co-relation between re-exploration and mortality is not significant.

Co-Relation between Timing of Surgery and Mortality

In our study, 9 patients expired of which 7 patients (77.80%) were operated in 3-4 weeks and 2 patients (22.20%) were operated after 4 weeks. Out of 19 survivors, 6 patients were operated in the first two weeks, 10 patients were operated in the 3rd-4th week and 3 patients were operated after 4 weeks. After applying Chi square test, the co-relation between timing

of surgery and mortality is not significant. After applying Chi square test, the co-relation between Ranson score and total ward stay and total hospital stay is significant in all patients whereas the co-relation between Ranson score and total ICU stay, total ward stay and total hospital stay is significant in discharged patients. Statistically Mann Whitney test applied, found to have a significant co-relation between ICU stay and mortality.

SUMMARY AND CONCLUSION

1. All cases of acute necrotising pancreatitis are managed initially conservatively and in late stages would require either an intervention or surgical management.
2. Etiology of most cases (82.14%) of acute necrotising pancreatitis is alcohol and most (82.14%) patients are males.
3. RANSON, CTSI and BISAP scores are used to determine the severity of acute necrotising pancreatitis.
4. Local complications are common in acute necrotising pancreatitis with pseudocysts (32.14%) and bowel complication (3.57%)
5. Organ failure (28.57%) is present in acute necrotising pancreatitis. Single organ failure was present in 3.57% of patients while multiorgan failure was seen in 25% patients. Pulmonary and cardiovascular dysfunction (25%) were common. Patients with organ failure have high mortality, hence prevention and active management of organ failure can improve the outcome of acute necrotising pancreatitis.
6. Different surgical procedures are used to manage acute necrotising pancreatitis. Of these procedures, the most common procedure performed is Open necrosectomy with post operative lavage of lesser sac.
7. Other interventions done for managing acute necrotising pancreatitis or walled off necrosis are pigtailing of necrotic cavity (4) and CBD stenting (1) for CBD stricture or calculi.
8. In many patients, a single surgery or exploration is not adequate to control complications of acute necrotising pancreatitis for eg haemorrhage, bile leak due to bowel perforation, etc, for these patients re-explorations are done.
9. Increasing number of surgical procedures lead to increase in mortality. Hence no of re-explorations (6) increases the risk of mortality (50%).
10. The most common cause of mortality (32.14%) in acute necrotising pancreatitis is septicaemia (67%) followed by multi organ failure (11%).
11. Morbidity associated with acute necrotising pancreatitis (necrosis) in this series are entero-cutaneous fistulas (28.57%), bowel obstruction (14.29%) and haemorrhage (57.14%).
12. Significant co-relations are present between Ranson score and morbidity; between CTSI score and mortality; Organ failure and mortality; Ranson score and total ICU, ward and hospital stay.

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