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Original Research Article

A study of surgical outcome of necrotizing pancreatitis

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ABSTRACT

Background: Increasing understanding and literature regarding the management of Necrotizing Pancreatitis has laid paths for surgical and conservative management. Although a conservative approach is increasingly used, this study depicts the importance of surgical management in today's era. The objective was to evaluate the surgical role in patients of documented Necrotizing Pancreatitis, with or without organ failure and debilitating symptoms by putting conservative management on a complementary part.
Methods: Sixteen consecutive patients were reviewed with Necrotizing Pancreatitis managed at DVVPF's Medical college and hospital, Ahmednagar between January 1, 2014, and July 1, 2017 documented by contrast-enhanced computed tomography (CECT).
Results: Out of sixteen patients of Necrotizing Pancreatitis recruited for the study, 13 (81%) patients were surgically managed; among which death rate was 7%. Of the other 3(19%) patients which were conservatively managed, there was 1 (33%) death. Patient who died while conservative management would have been candidate for earlier surgical intervention.
Conclusions: The results suggest that surgical approach can be applied successfully to manage most patients with Necrotizing Pancreatitis, still further evaluation being required for indication and timing of surgery.

Keywords: Infection, Necrotizing Pancreatitis (NP), Treatment

INTRODUCTION

Necrotizing pancreatitis (NP) is the severe type of acute pancreatitis. The management of Necrotizing pancreatitis has undergone tremendous changes depending on understanding of concepts and evidences from clinical studies.[1] Both medical and surgical treatment have role in management of NP. New advancement in the management of patient of NP have focused the role of surgical therapy in this condition.[2] Nowadays, most of them enter a phase of illness dominated by sepsis related complications after surviving the early systemic inflammatory response.[3,4] Diagnosis of NP can be made simply by contrast-enhanced computed tomography(CT), similarly sepsis or infection has been easy to diagnose because of Fine needle aspiration(FNA).[5-8]

In the course of disease of NP, 40% to 70% of patients undergo infection of pancreatic necrosis, which has become important risk factor of death.[9] Antibiotics are helpful in preventing infection in severe acute pancreatitis and reducing the death rate. However there is no firm evidence in the flavor of antibiotic prophylaxis due to which the discussion on antibiotic prophylaxis continues.[10] Number of meta-analysis did not show a significant beneficial effect of antibiotic prophylaxis on infection of pancreatic necrosis and mortality, due to which surgical approach in pancreatic necrosis, mostly in patients with complication as inflammatory enlargement of pancreas or ongoing multiple organ failure has been proposed by most of the goups.[11-13] Therefore at our institution, we evaluated the role of surgical treatment and nonsurgical treatment in the patients of NP.

METHODS

Between January 1, 2014, to July 1, 2017, sixteen consecutive patients with NP were recruited prospectively from department of surgery, DVVPF's Medical college and hospital, Ahmednagar, Maharashtra. Inclusion criteria were a typical clinical picture including abdominal pain and an elevation in serum amylase to more than three times the upper normal limit. NP was defined as the appearance of pancreatic/ extra pancreatic necrosis on contrast-enhanced computed tomography (CECT) and a serum C-reactive protein value of more than 150 mg/dl. Patient diagnosed as acute pancreatitis without necrosis were excluded from the study. CT was performed within 24 to 48 hours of admission. On admission, all patients were treated conservatively by withholding the oral intake providing pain relief and maintaining fluid and electrolyte balance by intravenous infusions. Nasogastric tube was inserted if vomiting had been a prominent part of clinical picture. To prevent stress ulcers, proton pump inhibitor was given. Intravenous opioid analgesics were used in treatment of pain. Pancrelipase was started orally in these patients. Clinical severity of acute pancreatitis was carried out using Ranson scoring system.[14] Two types of treatment strategies were used either conservative or surgical management depending on the severity of disease. Patients subjected to surgery were those with debilitating symptoms with organ failure and infective pancreatic necrosis diagnosed on CECT. Others were subjected to conservative management. Surgical approach was pancreatic necrosectomy with closure over drain. Follow-up was carried out after hospital discharge to find out late consequences of pancreatic necrosis. Data were analysed using the chi-square test where appropriate $P<0.05$ was considered significant.

RESULTS

Table 1: Characteristics of patients.

Characteristics	Percentage
Male	13(81%)
Female	3(19%)
Mean age in years (range)	48(26-60)
Alcoholic cause	10(63%)
Biliary cause	4(25%)
Other/ unidentified cause	2(12%)
Mean ranson score (range)	4(0-8)
Mean hospital stay in days	48(26-74)

There were 16 patients in the study, 13 (81%) men and 3 (19%) women. Mean age was 48 years (range 26-60). The cause was alcohol overindulge change it to 'abuse' in 10 (63%), biliary in 4 (25%) and other or undefined in 2 (12%) patients. According to CT scan, there were 16 (100%) patients with NP, Mean Ranson Score was 4 (range0-8). Mean hospital stay in days was 48 (range26-74). Hospital deaths were 2 (12.5%). Patients characteristics are summarized in Table 1.

Necrotizing pancreatitis

There were 16 patients with evidence of pancreatic necrosis on contrast-enhanced CT, single and multiple organ failure occurred in 2 and 4 patients, respectively. In 7 patients, contrast- enhanced CT demonstrated air in necrotic areas, indicating infection. While rest of the 3 patients showed no signs to intervene.

Table 2: Organ failure in patients with necrotizing pancreatitis.

Organ failure etiologies	Percentage
No. of patients with organ failure	6(37.5%)
No. of patients with single organ failure	2(12.5%)
No. of patients with multiple organ failure	4(25%)
Pulmonary insufficiency	6(37.5%)
Renal insufficiency	2(12.5%)
Cardiocirculatory insufficiency	3(18.75%)
Metabolic disorders	4(25%)
Sepsis	2(12.5%)

Necrotizing pancreatitis (n=16)

CT scans determined the extent of necrosis that revealed that there were 8 patients with less than 30%, 5 patients with 30% to 50% and 3 patients with more than 50%.

Table 3: Extent of necrosis according to Computed Tomography findings.

Extent of necrosis	NP
<30% of the pancreas	8(50%)
30-50% of the pancreas	5(31.25%)
>50% of pancreas	3(18.75%)

Management and outcomes

Out of the 16 patients, 13 (81%) patients were considered potential candidates for surgery for NP and underwent pancreatic necrosectomy. Among them, 6 patients had debilitating symptoms with organ failure, while 7 patients had infective pancreatic necrosis documented on contrast enhanced computed tomography (CECT). The rest 3(19%) patients were managed conservatively. They received prophylactic antibiotics, combination of ceftriaxone and metronidazole. The overall death rate was 12.5% (2 out of 16). 13 patients who underwent surgery for NP, there was 1 death; cause of death was non-responding multi-organ failure.

In the group managed without surgery, 1 out of 3 (33%) patients died. One patient out of 13 which were operated developed bleeding. Table 4 summarizes the overall management and outcome in the 16 patients. Table 5 shows patients subjected to surgery.

Table 4: Summary of management and outcome.

Intervention	Outcome
Pancreatic necrosectomy	13(81%)
Conservative management	3(19%)
Deaths	2 out of 16 (12.5%)
Surgical death	1 out of 13 (7%)
Non-surgical death	1 out of 3 (33%)
Complications	1(6%)
Mean post op length of stay in days (range)	28(10-142)

Values are mean and range or number of patients percentage

Table 5: Patients subjected to surgery.

Number of patients	13 out of 16(81%)
Debilitating symptoms with organ failure	6 out of 13(46%)
Infective pancreatic necrosis	7 out of 13(54%)

Follow up

During the study period, follow up was carried out (mean follow-up time 24 months) after hospital discharge. There were no complications of surgical management nor readmission.

DISCUSSION

Pancreatic infection is regarded as major risk factor for mortality in patients with acute pancreatitis and preventing this risk factor represents a main step in treatment of NP.[15] This statement is supported by data from various randomized studies that have been subjected to meta-analysis, showing an improvement in outcome associated with antibiotic treatment.[16-18] Consequently most of clinicians use antibiotic prophylaxis as the initial treatment in most patients with predicted severe disease.[19] Data from other groups argue for surgical treatment in pancreatic necrosis, most in patients with ongoing multiple organ failure or local complications such as an inflammatory enlargement of pancreas causing obstruction of gastrointestinal tract or common bile duct.[20]

In our study, mean age in years was 48 years. In other studies, one including Ashley et al and Buchler et al, mean age was 52 and 56.6 years, respectively. Male: Female patients in our trial was 13:3, as compared to 56:43 and 55:31 in Ashley et al and Buchler et al, respectively. 63% of patients with NP were alcoholic in our study and found to be most common cause for NP. But in Ashley et al and Buchler et al biliary cause was common accounting for 40% and 44%, respectively.[21,22]

In the literature of NP, there is ongoing debate as to the significance and proper management of pancreatic necrosis.[23,24] Our clinical experience has shown that removal of necrotic tissue can be turning point both in patients who are receiving intensive care with organ failure and in those who are not critically ill but have persistent symptom such as pain or inability to eat after an episode of acute pancreatitis. Eighty one percent of the patients in this series underwent surgery-pancreatic necrosectomy with closure over drains within 6 weeks (mean 21 days) while remaining nineteen percent of the patients with NP were conservatively managed with antibiotics which resulted in improvement in this illness and helped them returning to their normal diet and activities. Our case series demonstrates that out of 13 patients, 7 diagnosed with infective necrosis and 6 others with organ failure accompanying NP out of 16 patients with NP responded well to surgical management. Single surgical procedure was sufficient in 85% of our patients. Fernandez-del Castillo et al described 64 patients treated surgically and found a single surgical procedure to be sufficient in 69%.[25] Surgical approach was successful in 92% of patients to whom it was applied, as compared to 67% success rate in Buchler et al study. Clearly, resolution of symptoms and reabsorption of necrotic tissue does not occur in all patients with pancreatic necrosis and the costs of delaying surgical intervention may be substantial.[26]

Although we have treated some patients without surgery with NP these patients do not constitute an appropriate control group because they did not even have indications to intervene (either organ failure or debilitating symptoms later). Debridement of necrotizing pancreatitis is associated with significant post-surgical complication as bleeding, pancreatic fistula, pseudocyst. But in our series, one of the postoperative patient developed bleeding, who was re-explored and managed successfully.

This series of Necrotizing pancreatitis demonstrates that debridement of pancreatic and peripancreatic necrosis can be done with a relatively low mortality rate of 7%. The technique used was pancreatic necrosectomy and closure over drains. Drain that was removed sequentially made single procedure sufficient in almost all the patients treated surgically. None of the patients treated surgically required second surgical procedure. Out of 16 patients of NP, 3 of them were conservatively managed among which there was 1 (33%) mortality. However, in our series one patient with early multiple organ failure not responding to intensive care died after surgical necrosectomy for NP. The present results also represent an improvement over previously reported institutional series of 64 consecutive patients. In that study, the mortality rate of 6.2%, while in our case series it was 7%. 17% of patients underwent a second procedure in the institutional series, while only 1 (7%) patient underwent second surgical procedure due to bleeding who was re-explored and managed successfully.[25] Historically, the literature would suggest a death rate for NP in the range of 20% to 40%. Although surgical series have improved significantly on these results. In fact, the two studies one including only surgical patients and the other from Bern

studying conservative management in a prospective trial reported death rates of 6.2% and 10% respectively.[22] In our series, mortality rate was 7% for the patients treated surgically.

Characteristic of NP are prolonged hospital stay after surgery and a long convalescence. The mean average hospital stay after surgery was 28 days in our study as compared to 27 days in Ashley et al.[21]

The data from our study support the concept of using surgical approach for infective NP and NP with organ failure, that could improve success rate in NP. Our experience shows that debridement for NP can be carried out safely. Our technique of necrosectomy with closed drain has produced low complications, no need for second surgical procedure and lower reported mortality rate. Still the indications and timing for surgery deserve further study.

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