



Comparison Study of Necrosectomy by Retroperitoneal Approach with Transperitoneal Approach - For Infected Pancreatic Necrosis

Arun K

Institute of Surgical Gastroenterology & Liver Transplantation,
Govt. Stanley Medical College Hospital, Chennai

Abstract

Background: Minimally invasive necrosectomy through a retroperitoneal approach has shown promising results for the treatment of infected pancreatic necrosis.

Aim: To perform comparison of patients with infected pancreatic necrosis who underwent necrosectomy by retroperitoneal approach with transperitoneal approach.

Methods: Retrospective analysis of prospectively maintained database of infected pancreatic necrosis patients treated between August 2013 and July 2016. Totally 77 patients were admitted with infected pancreatic necrosis. Conservatively managed -9 ; PCD alone- 22; PCD followed by TPN/RPN -11 ; Transperitoneal necrosectomy-26 (TPN alone -23; PCD followed by TPN -3) Retroperitoneal necrosectomy-20(left flank -18; right flank -01;Bilateral- 1) (RPN alone-11; PCD followed by RPN -9); Prophylactic ileostomy done in 2 cases in RPN & 2 cases in TPN (suspicion of bowel communication). 16 Patients from each group were matched for the age (10 years), status of infection, CT severity score (2 points), preoperative organ failure and timing for surgery (for 7 days).

Results: Reintervention was required in 4 patients (ileostomy -3 & redo necrosectomy -1) in the RP group ; 2 patients in the TP group (ileostomy -2); Ileostomy done for postoperative fecal fistula. Median post operative hospital

stay was 22 days in the RP group and 25days in the TP group . Mortality was observed in 5 cases in TP group (4 due to MODS; 1due to fecal fistula); 2 cases in RPN (1 due to MODS & 1 due to fecal fistula)

Conclusions: Comparing to TP approach , RP approach for pancreatic necrosectomy through a small flank incision was associated with more morbidity though insignificant P value(mainly because of bowel injury in RP group) comparable postop hospital stay but less mortality though insignificant P value.

Introduction

The spectrum of Acute Pancreatitis ranges from a mild transitory form to a severe necrotizing disease with high mortality. Severe pancreatitis is observed in 15 to 20% of all cases. Surgical management of patients with infected pancreatic necrosis has undergone remarkable evolution over the last few decades. Recognition that laparotomy may itself add to morbidity by increasing the post operative organ dysfunction¹ has lead to the recent development of minimally invasive techniques. Minimally invasive techniques² mostly involve debridement via retroperitoneal, laparoscopic or endoscopic approaches or combination of these. Minimally invasive necrosectomy through a retroperitoneal approach is gaining popularity for the treatment of necrotizing pancreatitis.

The aim of this study is to perform a case matched comparison of patients with infected pancreatic necrosis who underwent necrosectomy by the retroperitoneal approach with transperitoneal approach

Methods

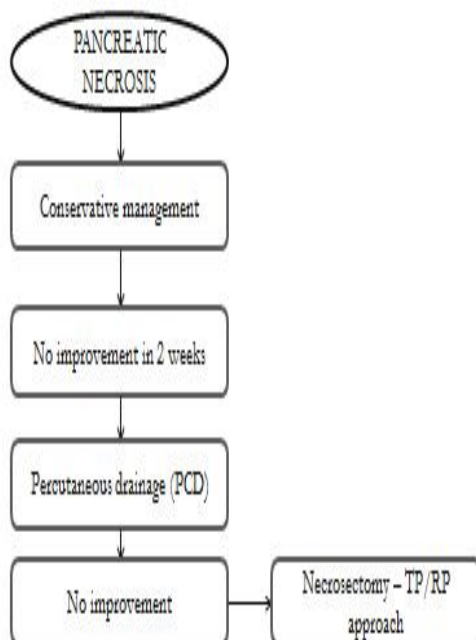
Retrospective analysis of prospectively maintained database of infected pancreatic necrosis patients treated between August 2013 and July 2016. Totally 77 patients were admitted with infected pancreatic necrosis. Conservatively managed -9 ; PCD alone- 22; PCD followed by TPN/RPN -11 ;Transperitoneal necrosectomy-26(TPN alone -24; PCD followed by TPN -2)Retroperitoneal necrosectomy-20(left flank -18; right flank -01;Bilateral- 1)(RPN alone-11; PCD followed by RPN -9); Prophylactic ileostomy done in 2 cases in RPN & 2 cases in TPN (suspicion of bowel communication)

Exclusion Criteria

Patients with extremes of age, Multiple comorbidities,late presentation with infected pancreatic necrosis (initially treated conservatively) are excluded

Step up Approach

Step up approach³ is followed in our Institution for infected pancreatic necrosis. This approach can avoid surgery in 1/3 of cases or timing of the operation is delayed thereby reducing intraoperative complications & mortality.



Conservative Management

It was well accepted that patients with infected pancreatic necrosis which was earlier considered to be a definite indication for surgical necrosectomy, can be successfully treated with an initial conservative approach⁴ with improved outcome.

Surgical Intervention

Intervention was deemed necessary in cases of proven (FNA) or suspected infection of pancreatic necrosis and/or Peripancreatic necrosis. Infected pancreatic necrosis was suspected when the acute phase of the disease (1-2 weeks) had subsided and there was a sudden onset of spiking fever and an increase in leukocytes in the presence of heterogeneous fluid collections on CT (with or without gas bubbles).

Regardless of infection, an intervention was postponed till the third or fourth week after onset of disease. It is known that during the acute phase the systemic inflammatory response syndrome (SIRS) with MOF is due to sterile inflammation rather than to infection associated with pancreatic and/or peripancreatic necrosis⁵. Moreover, by postponing intervention, the infected collections demarcate and become encapsulated, thereby theoretically optimizing the conditions for surgical intervention⁶.

FNA was not commonly used in our institution because during the acute phase it had no therapeutic consequences (and we still tried to postpone intervention in cases of a positive bacterial culture) and during the late phase a patient with signs of infection but a negative FNA would still undergo intervention. Moreover, FNA is known to yield false-negative results⁷.

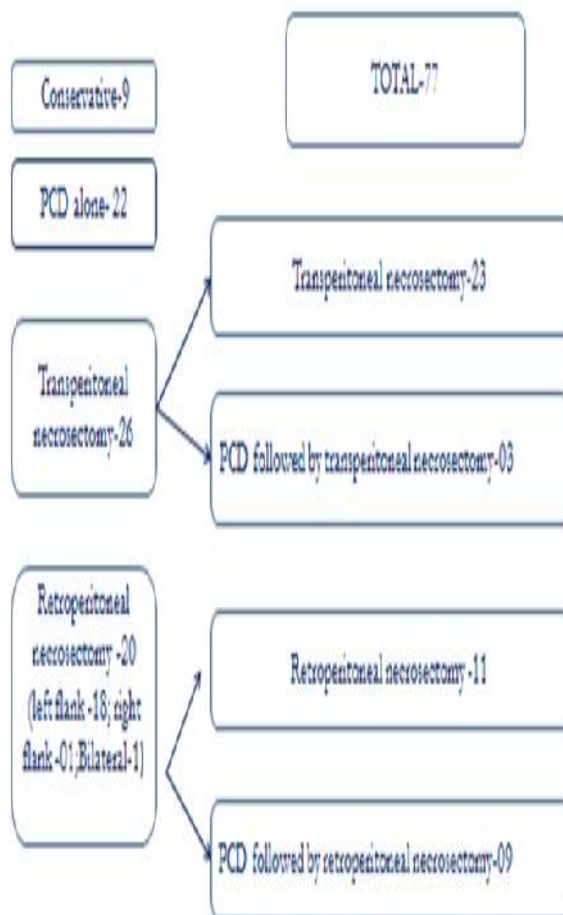
Retroperitoneal Approach

Retroperitoneal drainage is performed under general anesthesia in supine position. The flank is slightly elevated by placing a pillow under the back. A 5-8 cm incision is made in the left flank. This incision is bluntly and cautiously deepened into the retroperitoneal necrotic space with finger dissection and first the visible necrotic tissue is removed with a forceps under vision. Care should be made not to enter the peritoneum or injure the colon. Then through a blunt dissection using the left kidney as an anatomical landmark along with CT images, the abscess cavity deep in the retroperitoneal space can be drained and the necrotic material removed. Necrotic material is taken for bacterial culture and smear. Finally the retroperitoneal space is inspected with a 0 degree video scope, introduced through a trocar placed in the edge of the incision. Additional necrosectomy and lavage is performed with a laproscopic forceps and a suction device.

Two large bore single lumen drains are positioned in the cavity and exteriorized through the two edges of the incision. The first drain is placed at the deepest possible point and the second more superficially. Catheters are removed if collapse of the cavity is shown on CT and daily production of drainage fluid has decreased to less than 50 ml/ 24 h. Reintervention is performed only in case of further clinical deterioration

Transperitonealnecrosectomy

Transperitonealnecrosectomy was first described by Begeret al⁸.Aftera bilateral subcostal or median incision, the lesser sac is entered through the gastro colicomentum/ transmesocolon. Blunt debridement of all necrotic tissue is performed. Two double lumencatheters are inserted through separate incisions and positioned in there troperitoneal space. Opened ligaments are sutured in an attempt to create a closed compartment for local irrigation& drainage.



Case Matching

16 Patients from each group were matched for the age⁹(10 years), status of infection¹⁰, CT severity score¹¹ (2 points), preoperative organ failure¹² and timing for surgery¹³ (for 7 days)

	RP approach(16)	TP approach(16)	P value
Sex	Male -16	Male-15 Female -1	0.317
Age	Median -38.5 (Range- 25-60)	Median -36 (range 18 -58)	0.317
Etiology	Alcohol -15 Biliary -1	Alcohol-15 Biliary -1	0.697
CT severity index a) 8-10	16	16	0.936
Preop organ failure a)MODS	4	4	0.787
b)Organ failure	7	8	0.56
Time to operation	30(21-40)	31.5(17-42)	0.936

Prophylactic Ileostomy

Prophylactic ileostomy (done for the suspicion of bowel communication)

RETROPERITONEAL APPROACH	TRANSPERITONEAL APPROACH
2	2

Results

1.1 Postoperative Outcomes

		RP approach(16)	TP approach(16)	P values
1.	Fecal fistula	3	1	0.069
2.	Biliary fistula	1	1	0.696
3.	Bleeding	1	-	0.59
4.	Pancreatic fistula	1	1	0.69
5.	Deep vein thrombosis	-	1	0.59
6.	Postop new onset organ failure	1	3	0.838
7.	Postoperative stay	22 (9-51)	25(16-60)	0.893
8.	Reintervention for necrosectomy	1	1	0.69
9.	In hospital mortality	2	5	0.064

Complications

Complications in the retroperitoneal approach group were managed as follows:

- (1) Fecal fistula (n =3): Laparotomy and ileostomy.
- (2) Pancreatic fistula (n =1): managed conservatively
- (3) Bleeding (n = 1) managed conservatively
- (4) Biliary fistula (n = 1) managed conservatively

The complications in the transperitoneal approach group were managed as follows:

- (1) Fecal fistula (n=1): Laparotomy and ileostomy.
- (2) Pancreatic fistula (n=1): managed conservatively.
- (3) Biliary fistula (n = 1) managed conservatively.
- (4) Deep vein thrombosis (n = 1) managed conservatively

Ileostomy (done in postoperative period for fecal fistula)

	RP APPROACH (16)	TP approach (16)	P values
FECAL FISTULA	3	1	0.069

Statistical Analysis

All statistical analyses were performed using Software - SPSS Version - 23. Patients who underwent necrosectomy by the retroperitoneal approach were compared with matched patients treated with transperitoneal approach, with mortality as the primary outcome measure. Tests used- Chi - Square Test (Etiology, Redonecrosotomy , Complications, No of deaths across each type of surgery) & Mann-Whitney U Test (Mean Ctsi score and Mean age of the study subjects & Postoperative stay) . P value <0.050 was considered statistically significant.

Discussion

Postoperative new-onset organ failure occurred in 3 patients in the transperitoneal approach group and 1 in the retroperitoneal approach group (p=0.838). Of the 32 patients, 5 died in transperitoneal approach group & 2 in retroperitoneal approach group.

The cause of death in Transperitoneal group was MOF. Among 5 patients in transperitoneal approach group 3 patients had preoperative MODS (which could not be recovered) 2 patients had postoperative new onset organ failure.

- Among 12 patients of preoperative organ failure in retroperitoneal approach group, 9 patients could recover after surgery & supportive measures ; 3 patients could not be recovered & died
- Among 3 patients postoperative new onset organ failure 2 patients could be recovered & one patient could not be recovered & died
- we could infer that increased postoperative new onset failure & mortality following transperitoneal necrosectomy may be due to peritoneal contamination, increased surgical stress^{12,13}

The cause of death in retroperitoneal group was MOF. Among these 2 patients, one had preoperative MODS (which could not be recovered after surgery) and another had postoperative new onset organ failure because of fecal fistula.

- Among 11 patients of preoperative organ failure in retroperitoneal approach group, 10 patients could recover after surgery & supportive measures ; 1 patient died .
- Among retroperitoneal approach group , 3 patients develop fecal fistula due to iatrogenic bowel injury / disease process. Of these 3 patients, one patient died because of MODS . Fecal fistula was the reason for increased morbidity in this group.

The median post operative hospital stay was 22 days in the retroperitoneal group and 25 days in the transperitoneal group (p=0.893) and it was comparable between two groups.

In the current study, the risk of selection bias was minimized by matching patients for essentially all criteria known to affect outcome as organ failure, infection of necrosis, timing of intervention, age and CTSI score.

	TRANSPERITONEAL NECROSECTOMY	RETROPERITONEAL NECROSECTOMY
Advantages	<ul style="list-style-type: none"> ▪ Extensive or inaccessible necrosis ▪ Can deal with GB stone – cholecystectomy can be combined ▪ Feeding jejunostomy can be done 	<ul style="list-style-type: none"> ▪ No risk of peritoneal contamination ▪ Surgical stress –less¹⁴ ▪ Less postoperative new-onset organ failure and the morbidity and mortality^{13,16} ▪ early enteric feeding can be initiated-improved nutritional status
Disadvantages	<ul style="list-style-type: none"> ▪ Risk of peritoneal contamination ▪ Surgical stress –more 	<ul style="list-style-type: none"> ▪ Risk of colonic perforation ▪ ineffective if collections located in the transverse mesocolon or the mesentery root¹⁷ & also in extensive collections ▪ Cannot deal GB stone

Limitations

Transperitoneal necrosectomy was still performed in more extensive necrosis, less accessible collections and that selection bias was thereby introduced. However, as this was a case-matched design, a control patient was selected from a larger group of patients undergoing laparotomy only if his or her criteria matched those of a patient undergoing the retroperitoneal approach.

Small sample size might have led to a type II statistical error for certain endpoints (e.g., total complications).

Moreover, the results still requires to be confirmed by further randomized studies.

Conclusion

Comparing to TP approach, RP approach was associated with less mortality though insignificant P values comparable postoperative hospital stay more morbidity though insignificant P values

References

1. Beattie GC, Mason J, Swan D, Madhavan KK, Sriwardena AK. Outcome of necrosectomy in acute pancreatitis: the case for continued vigilance. *Scand J Gastroenterol* 2002;37:1449e53
2. Windsor JA. Minimally invasive pancreatic necrosectomy. *Br J Surg* 2007;94:132e3
3. A step-up approach or open necrosectomy for necrotizing pancreatitis. van Santvoort HC, Besselink MG, Bakker OJ, Hofker HS- PANTER TRIAL
4. Garg PK, Sharma M, Madan K, Sahni P, Banerjee D, Goyal R. Primary conservative treatment results in mortality comparable to surgery in patients with infected pancreatic necrosis. *Clin Gastroenterol Hepatol* 2010;8:1089-94.e2
5. Werner J, Feuerbach S, Uhl W, Buchler MW. Management of acute pancreatitis: from surgery to interventional intensive care. *Gut* 2005;54:426e36
6. Connor S, Raraty MG, Neoptolemos JP, Luyer P, Runzi M, Steinberg WM. Does infected pancreatic necrosis require immediate or emergency debridement? *Pancreas* 2006;33:128e34
7. Rau B, Pralle U, Mayer JM, Beger HG. Role of ultrasonographically guided fine needle aspiration cytology in the diagnosis of infected pancreatic necrosis. *Br J Surg* 1998;85:179e84.
8. Beger HG, Buchler M, Bittner R, Oettinger W, Block S, Nevalainen T. Necrosectomy and postoperative local lavage in patients with necrotizing pancreatitis: results of a prospective clinical trial. *World J Surg* 1988;12:255e62
9. Connor S, Ghaneh P, Raraty M, Rosso E, Hartley MN, Garvey C, et al. Increasing age and APACHE II scores are the main determinants of outcome from pancreatic necrosectomy. *Br J Surg* 2003;90:1542e8
10. Anonymous. UK guidelines for the management of acute pancreatitis. *Gut* 2005;54(Suppl. 3):iii1e9

11. Simchuk EJ, Traverso LW, Nukui Y, Kozarek RA. Computed tomography severity index is a predictor of outcomes for severe pancreatitis. *Am J Surg* 2000
12. Tenner S. Initial management of acute pancreatitis: critical issues during the first 72 hours. *Am J Gastroenterol* 2004;99:2489e94
13. Mier J, Luque-de León E, Castillo A, Robledo F, Blanco R. Early versus late necrosectomy in severe necrotizing pancreatitis. *Am J Surg* 1997;173:71e5
14. Connor S, Alexakis N, Raraty MG, Ghaneh P, Evans J, Hughes M, et al. Early and late complications after pancreatic necrosectomy. *Surgery* 2005;37:499e505
15. Van santvoort HC, Besselink MG, Bollen TL, Buskens E, van Ramshorst B, Gooszen HG. Case e matched comparison of the retroperitoneal approach with laparotomy for necrotising pancreatitis. *World J Surg* 2007;31:1635e42
16. Case matched comparison study of the necrosectomy by retroperitoneal approach with transperitoneal approach for necrotizing pancreatitis in patients with CT severity score of 7 and above- 2012 Perumal SenthilKumar, P.Ravichandran, S.Jeswanth
17. Berne TV, Donovan AJ. Synchronous anterior celiotomy and posterior drainage of pancreatic abscess. *Arch Surg* 1981;116:527e33