

A Hospital-Based Retrospective Assessment of the Indications and Outcome of Surgical Management of Local Complications of Acute Pancreatitis

Ashok Kumar¹, Khurshid Alam², Mukesh Kumar³

¹Assistant Professor, Department of General Surgery, Government Medical College, Bettiah, Bihar, India

²Assistant Professor and HOD, General Surgery, Government Medical College, Bettiah, Bihar, India

³Senior Resident, Department of General Surgery, Government Medical College, Bettiah, Bihar, India

Received: 04-01-2023 / Revised: 27-01-2023 / Accepted: 21-02-2023

Corresponding author: Dr. Ashok Kumar

Conflict of interest: Nil

Abstract

Aim: This study aims to evaluate the indication and outcome of different surgical management modalities in local complications of acute pancreatitis.

Methods: A hospital-based retrospective study was conducted in the department of surgery at Government Medical College, Bettiah, Bihar, India for 12 months. A purposive sampling method was utilized to recruit the patients.

Results: 450 patients were admitted to the surgery department with the diagnosis of acute pancreatitis or with complications of acute pancreatitis. Among them, 60 patients had local complications due to acute pancreatitis. All patients were managed using the step-up approach, starting with conservative management and minimally invasive intervention when warranted. Twenty-five patients required surgical intervention due to failure of endoscopic or radiological intervention or positions of lesions being inaccessible to these techniques. Out of 25 patients, 56% were females. 52% had ethanol etiology and 36% had pseudocyst pancreatic fluid collection. According to the location, 68% were at body or tail. According to Clavien-Dindo classification, 32% were in grade 4 followed by grade 1 (24%) and grade 4 (20%).

Conclusion: Although various endoscopic techniques are now available to manage the pancreatic fluid collection and pancreatic necrosis, surgery remains essential in managing the disease.

Keywords: Acute Pancreatitis, Local Complications, Surgical Management.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

Introduction

Acute pancreatitis (defined as the acute nonbacterial inflammatory condition of the pancreas) is derived from early activation of digestive enzymes inside acinar cells, with varying compromising of the gland itself, nearby tissues, and other organs. It is well known that several situations

develop into acute pancreatitis, but the mechanisms and how those mechanisms develop the disease remain unclear. If the early events that generate the inflammatory process are understood and if pro and anti-inflammatory factors that modulate the severity of the disease are

known - treatment can be implemented so the process will not happen or possible associated complications will be minimized. [1]

Acute pancreatitis is one of the most common gastrointestinal disorders requiring acute hospitalization worldwide, with a reported annual incidence of 13 to 45 cases per 100000 persons. [2] It is rare in childhood but may occur at any age (according to recent publications [3,4] median age, 55-58 yr). Acute biliary pancreatitis is more common in women, and alcoholic pancreatitis is more common in middle aged men. [5] Although most patients with acute pancreatitis recover without sequelae, between 10% to 20% will have a more complicated clinical course with higher risks of morbidity and mortality. [6] Severe acute pancreatitis (SAP) requires prolonged hospitalization, frequently including a stay in the intensive care unit (ICU) because of organ dysfunction. [7]

Most of the fluid collection noted during acute pancreatitis are sterile and resolve spontaneously. If the fluid collection is infected within four weeks or remains symptomatic beyond four weeks of onset, intervention is indicated. [8] Timing and modality of intervention for these local complications strongly impact the morbidity and mortality of acute pancreatitis. [9] Less invasive options such as percutaneous drainage or endoscopic drainage techniques will be adequate for managing most cases of local complications. However, minimally invasive (video-assisted or laparoscopic) or open surgical drainage is indicated when these modalities are unavailable or fail to drain the collection adequately. [8-10]

This study aims to evaluate the indication and outcome of different surgical management modalities in local complications of acute pancreatitis.

Materials and Methods

Kumar *et al.*

A hospital-based retrospective study was conducted in the department of surgery at Government Medical College, Bettiah, Bihar, India for 12 months. A purposive sampling method was utilized to recruit the patients. 450 patients were admitted to the surgery department with the diagnosis of acute pancreatitis or with complications of acute pancreatitis. Among them, 60 patients had local complications due to acute pancreatitis. All patients were managed using the step-up approach, starting with conservative management and minimally invasive intervention when warranted. Twenty-five patients required surgical intervention due to failure of endoscopic or radiological intervention or positions of lesions being inaccessible to these techniques.

Inclusion and exclusion criteria

The inclusion criteria for the study were patients who underwent laparoscopic, retroperitoneal or open surgical procedures for the management of local complications of acute pancreatitis for the period of one year. Exclusion criteria for the study were patients who had associated vascular and bowel-related complications.

Procedure

Clinical, laboratory and imaging findings including, contrast-enhanced CT scan findings of all the cases, were recorded as per the proforma. In addition, the indication of each procedure, perioperative outcome and associated complications were evaluated in all the studied cases. All minimally invasive procedures were performed under general anesthesia using Karl Storz© laparoscopic set by the surgical team experienced in pancreatic surgery. The local complications of acute pancreatitis were based on the revised Atlanta classification 2012.1 All complications were graded according to the Clavien-Dindo classification.7 Data were analyzed using the statistical package for the social sciences (SPSS) version 20.

Results

International Journal of Pharmaceutical and Clinical Research

Table 1: The demographic and clinical characteristics of patients

Variables	N	%
Gender		
Male	14	56
Female	11	44
Clinical characteristics		
Etiology		
Biliary	10	40
Ethanol	13	52
Others	2	8
Category of pancreatic fluid collection (PFC)/complications		
PPC	4	16
ANC	8	32
WON	4	16
Pseudocyst	9	36
Location of the cavity		
Head	8	32
Body or tail	17	68

Out of 25 patients, 56% were females. 52% had ethanol etiology and 36% had pseudocyst pancreatic fluid collection. According to the location, 68% were at body or tail.

Table 2: Clavien-Dindo classification of the complication following surgical intervention

Clavien-Dindo classification	N	%
Grade 0	4	16
Grade 1	6	24
Grade 2	8	32
Grade 3	2	4
Grade 4	5	20

According to Clavien-Dindo classification, 32% were in grade 4 followed by grade 1 (24%) and grade 4 (20%).

Discussion

The primary goal of treatment for acute necrotic collection is to drain the content and remove all infected pancreatic tissues. [11] The available treatment options include open and laparoscopic transperitoneal drainage, image-guided retroperitoneal drainage, and endoscopic transgastric approaches. [12] The current recommendation for the treatment of acute necrotic collection is the “step-up” approach. The term „step-up“ was coined by the Dutch PANTER trial and is used commonly across disciplines when referring to minimally invasive procedures that have the potential to be re-employed

with escalation towards more invasive procedures for the drainage of infected pancreatic necrosis. In 2010 the results of the trial demonstrated several benefits from the step-up approach over laparotomy. [13] In our series, the “step-up” approach was the primary modality of treatment in ANC.

Management strategy of walled-off necrosis has evolved over the years. Some WON resolve with time and can be conservatively managed if there are no symptoms or secondary complications like infection of the walled-off necrotic collection. [14] However, if the WON is infected, intervention is warranted in the form of endoscopic drainage or open necrosectomy. [15] In our series, all patients with WON underwent open

transperitoneal necrosectomy due to the positions of WON being unamenable to endoscopic approaches. Several endoscopic drainage modalities exist for managing symptomatic pancreatic pseudocysts. [16] These include transpapillary pancreatic duct stenting, transmural drainage, or a combination of both. [17,18] Transpapillary stent placement and endoscopic ultrasound (EUS)-guided transmural drainage (EUS-TM) for PPC drainage report a wide range of clinical success. [19-21] However, when these modalities are not suitable for the patient surgical management is an acceptable modality for managing pancreatic pseudocyst. [22]

There is no single surgical procedure that is appropriate for all pseudocysts. The most important factor dictating the mode of treatment is local expertise. [23] Despite the various endoscopic and minimally invasive options, the most effective and reliable method of draining a pseudocyst is internal drainage by an open surgical approach. [24] For the management of pancreatic pseudocyst in our series, cystogastrostomy was the commonest internal drainage procedure performed, followed by Roux-en-Y cystojejunostomy. This technique consists of an anterior gastrostomy followed by a posterior gastrostomy centred on the cyst, which avoids dissection through inflamed tissues. [25,26,27]

Conclusion

Management of patients with local complications of pancreatitis is most effective at a specialized tertiary care centre with pancreatic surgeons who have expertise in managing these cases. Although various endoscopic techniques are now available to manage the pancreatic fluid collection and pancreatic necrosis, surgery remains an essential modality in managing the disease.

References

1. Cruz-Santamaría DM, Taxonera C, Giner M. Update on pathogenesis and clinical management of acute pancreatitis. *World journal of gastrointestinal pathophysiology*. 2012 Jun 6;3(3):60.
2. Yadav D, Lowenfels AB. The epidemiology of pancreatitis and pancreatic cancer. *Gastroenterology*. 2013 May 1;144(6):1252-61.
3. Gooszen HG, Besselink MG, van Santvoort HC, Bollen TL. Surgical treatment of acute pancreatitis. *Langenbeck's archives of surgery*. 2013 Aug; 398:799-806.
4. Shen HN, Lu CL, Li CY. Epidemiology of first-attack acute pancreatitis in Taiwan from 2000 through 2009: a nationwide population-based study. *Pancreas*. 2012 Jul 1;41(5):696-702.
5. Yadav D, O'Connell M, Papachristou GI. Natural history following the first attack of acute pancreatitis. *Official journal of the American College of Gastroenterology | ACG*. 2012 Jul 1;107(7):1096-103.
6. Wu BU, Johannes RS, Sun X, Tabak Y, Conwell DL, Banks PA. The early prediction of mortality in acute pancreatitis: a large population-based study. *Gut*. 2008 Dec 1;57(12):1698-703.
7. Beger HG, Rau BM. Severe acute pancreatitis: clinical course and management. *World journal of gastroenterology: WJG*. 2007 Oct 10; 13(38):5043.
8. IAP/APA evidence-based guidelines for the management of acute pancreatitis. *Pancreatology*. 2013;13(2):48-53.
9. Lancaster A, Zwijacz M. Acute pancreatitis and fluid-filled collections: etiology and endoscopic management. *Gastroenterol Nurs*. 2019;42(5):417-9.
10. Baron TH, DiMaio CJ, Wang AY, Morgan KA. American gastroenterological association clinical practice update: Management of

- Pancreatic Necrosis. *Gastroenterol.* 2020;158(1):67-75.
11. Lancaster A, Zwijacz M. Acute pancreatitis and fluid-filled collections: etiology and endoscopic management. *Gastroenterol Nurs.* 2019;42(5):417-9.
 12. Baron TH, DiMaio CJ, Wang AY, Morgan KA. American gastroenterological association clinical practice update: Management of Pancreatic Necrosis. *Gastroenterol.* 2020;158(1):67-75.
 13. Hollemans RA, Bakker OJ, Boermeester MA, et al. Superiority of Step-up Approach vs Open Necrosectomy in Long-term Follow-up of Patients with Necrotizing Pancreatitis. *Gastroenterology.* 2019; 156(4):1016-26.
 14. Dalsania R, Willingham FF. Treatment of walled-off pancreatic necrosis. *Curr Opin Gastroenterol.* 2019;35(5):478-82.
 15. Baron TH, DiMaio CJ, Wang AY, Morgan KA. American gastroenterological association clinical practice update: Management of Pancreatic Necrosis. *Gastroenterol.* 2020;158(1):67-75.
 16. Barthet M, Lamblin G, Gasmi M, Vitton V, Desjeux A, Grimaud JC. Clinical usefulness of a treatment algorithm for pancreatic pseudocysts. *Gastrointest Endosc.* 2008;67(2):245-52.
 17. Nealon WH, Walser E. Surgical management of complications associated with percutaneous and/or endoscopic management of pseudocyst of the pancreas. *Ann Surg.* 2005; 241(6):948-57.
 18. Catalano MF, Geenen JE, Schmalz MJ, Johnson GK, Dean RS, Hogan WJ. Treatment of pancreatic pseudocysts with ductal communication by transpapillary pancreatic duct endoprosthesis. *Gastrointest Endosc.* 1995;42(3):214-8.
 19. Lopes CV, Pesenti C, Bories E, Caillol F, Giovannini M. Endoscopic ultrasound-guided endoscopic transmural drainage of pancreatic pseudocysts. *Arq Gastroenterol.* 2008; 45(1):17-21.
 20. Antillon MR, Shah RJ, Stiegmann G, Chen YK. Single-step EUS-guided transmural drainage of simple and complicated pancreatic pseudocysts. *Gastrointest Endosc.* 2006;63(6):797-803.
 21. Krüger M, Schneider AS, Manns MP, Meier PN. Endoscopic management of pancreatic pseudocysts or abscesses after an EUS-guided 1-step procedure for initial access. *Gastrointest Endosc.* 2006;63(3):409-16.
 22. Matsuoka L, Alexopoulos SP. Surgical Management of Pancreatic Pseudocysts. *Gastrointest Endosc Clin N Am.* 2018;28(2):131-41.
 23. Andersson B, Andrén-Sandberg Å, Andersson R. Survey of the management of pancreatic pseudocysts in Sweden. *Scand J Gastroenterol.* 2009;44(10):1252-8.
 24. Ghimire R et al. *Int Surg J.* 2021 Nov;8(11):3238-3242 international Surgery Journal. 2021;8(11):3242.
 25. Yoon SB, Chang JH, Lee IS. Treatment of Pancreatic Fluid Collections. *Korean J Gastroenterol.* 2018; 72(3):97-103.
 26. Obermeyer RJ, Fisher WE, Salameh JR, Jeyapalan M, Sweeney JF, Brunnicardi FC. Laparoscopic pancreatic cystogastrostomy. *Surg Laparosc Endosc Percutan Tech.* 2003; 13(4):250-3.
 27. Zaichick V., Diagnosis of Thyroid Malignancy using Chemical Elements of Nodular Tissue determined by Nuclear Analytical Methods. *Journal of Medical Research and Health Sciences,* 2022; 5(3): 1808–1824.