

## Surgical Management of Local Complications in Acute Pancreatitis: Indications and Outcomes

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### Abstract

**Aim:** To assess the effectiveness of various surgical treatment options for local complications arising from acute pancreatitis.

**Method:** A retrospective analysis was conducted in the surgical department of a hospital. Patients with local complications from acute pancreatitis who received laparoscopic, retroperitoneal, or open surgical treatments between Department of Surgery, RDJM Medical College and Hospital, Turki, Muzaffarpur, Bihar, India were identified using a purposive sample strategy. Each case was evaluated based on its indication, perioperative outcome, and associated comorbidities.

**Result:** The surgical department had a total of 96 patients who were hospitalized specifically for acute pancreatitis or its associated complications. Twelve patients were surgically treated with either open necrosectomy, cysto-enterostomy, VARD, or external drainage. These treatments were required due to the failure of endoscopic or radiographic approaches or because the lesions were situated in inaccessible regions for these techniques. Every patient saw clinical improvement after surgery, and the incidence of complications was deemed acceptable given the seriousness of the condition.

**Conclusion:** Pancreatic necrosis and fluid collection can now be managed with a variety of endoscopic procedures, although surgery is still necessary for the full management of the condition.

**Keywords:** Acute pancreatitis, Clinical, Local complications, Intensive care unit, Surgical management.

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### Introduction

Acute pancreatitis is a rapid inflammation of the pancreas that is not caused by bacteria. It develops when digestive enzymes are prematurely triggered inside acinar cells and may cause harm to the pancreas, surrounding tissues, and other organs. [1,2] The etiology of acute pancreatitis is widely established, but the precise mechanisms behind its pathogenesis and progression remain incompletely elucidated. Acute pancreatitis has ramifications that affect both the immediate area and the whole body. It is predicted to occur in 13 to 45 instances per 100,000 people per year. Acute hospitalization is required for the third most common gastrointestinal ailment in the United States. Women are more likely to get acute biliary pancreatitis, but middle-aged men are more likely to develop alcoholic pancreatitis. [3,4]

The morbidity and mortality of acute pancreatitis are significantly influenced by the timing and mode of management for these local complications. [5,6] For most instances involving local problems, less intrusive methods such as percutaneous drainage or endoscopic drainage procedures are sufficient for management. The death rate for mild pancreatitis ranges from 0% to 1%, whereas severe pancreatitis has a mortality rate ranging from 15% to 30%. The main determinant of death in acute pancreatitis is organ failure. Necrotizing pancreatitis often begins three to four weeks after the first infection, although a subsequent necrotic infection occurs in around 30% of individuals with this condition. Infected necrosis has a 100% fatality rate if left untreated. [7,8] The initial management of SAP generally involves medical intervention, with a focus on providing intensive support to the affected organs.

The surgical intervention for SAP is a grim process that is linked to complications in 34% to 95% of patients, with a death rate ranging from 11% to 39%. Surgical procedures can result in chronic pancreatic insufficiency. The elevated mortality rate observed in surgical procedures is a result of the risks associated with operating on severely unwell patients who are suffering from sepsis and often have multiple organ failure.

The treatment of SAP often involves debates and disagreements on the surgical procedure and the optimal timing for it. In the past, laparotomy was utilised by specialists to remove and drain the retroperitoneal infected necrosis during the initial stage of severe acute pancreatitis (SAP). Nevertheless, research has indicated that performing surgery at an early stage is frequently associated with a higher death rate. Additionally, multiple studies have demonstrated that some patients with retroperitoneal infected necrosis can be effectively treated without resorting to risky surgical procedures. Consequently, numerous experts recommend postponing surgery. Over the past several decades, there has been an increase in the number of deaths during early surgery for patients with severe acute pancreatitis (SAP) who underwent traditional laparotomy. [9] This procedure, which involves removing contaminated tissue from the area behind the abdomen, can cause significant damage and complications. Based on multiple studies indicating a high death rate for severe necrotising pancreatitis, the 2002 International Acute Pancreatitis guidelines advised against performing surgery within the first 14 days after the condition starts, unless there is a worsening of multiple organ failure and clinical condition. Further research has indicated that delaying surgery beyond 28 to 30 days can lead to a decrease in morbidity and mortality rates. [10] This extended time period allows for a clear distinction between healthy and dead tissue, which reduces the chances of severe infection and widespread inflammation after surgery. Additionally, it lowers the risk of accidental damage to nearby organs and excessive bleeding during the operation. The present study aims to assess the effectiveness and results of various surgical treatment options for local complications arising from acute pancreatitis.

## Methodology

### Study Area

The study was conducted in the Department of Surgery, RDJM Medical College and Hospital, Turki, Muzaffarpur, Bihar, India for one year.

## Study Type

A hospital-based retrospective study was conducted.

## Inclusion and Exclusion Criteria

The study included patients who received laparoscopic, retroperitoneal, or open surgical treatments to manage local complications of acute pancreatitis between Department of Surgery, RDJM Medical College and Hospital, Turki, Muzaffarpur, Bihar, India. The study excluded participants who had concurrent vascular and bowel-related problems.

## Procedure

The clinical, laboratory, and imaging findings, including the contrast-enhanced CT scan results, were documented according to the proforma. Furthermore, the assessment of each procedure, perioperative result, and related problems was conducted in all the cases under study. Using the Karl Storz© laparoscopic equipment, the pancreatic surgery expert surgical team executed all minimally invasive procedures with the patient under general anesthesia. Using the 2012 revision of the Atlanta classification, we evaluated the local consequences of acute pancreatitis. All problems were rated according to their severity using the Clavien Dindo system.

## Data Analysis

The statistical analysis was conducted using SPSS software, specifically version 27. The student's t-test was used to compare the mean values between the two groups for data that follows a parametric distribution. Either the Chi-square test will be used to analyze categorical data. P-value below 0.05 indicated the statistical significance of result.

## Result

A total of 96 patients were brought to the surgery department with either a diagnosis of acute pancreatitis or with complications arising from acute pancreatitis. Out of the total, 88 individuals experienced local problems because of acute pancreatitis. The patients were treated utilizing the step-up method, which involved initially adopting conservative care and only resorting to minimally invasive procedures when necessary. A total of 12 patients underwent surgical intervention because of the failure of endoscopic or radiological interventions, or due to the lesions being located in positions that were not accessible using these procedures.

**Table 1: The demographic and clinical characteristics of patients**

Variables	Frequency	Percent
Male patients	7	14.11
Female	5	12.03
Clinical characteristics		
Etiology		
Ethanol	4	11.17
Biliary	7	14.01
Others	2	3.9
Complications associated with pancreatic fluid collection (PFC) category		
Abnormal neutrophil count	2	5.16
WON	4	17.51
Pseudocyst	4	16.67
PPC	2	4.11
Location of the cavity		
Body or tail	8	19.12
Head	4	12.14

Out of the 12 individuals included in the study, 2 people had PPC. All of these patients were treated with external drainage since they continued to have symptoms. Two patients who had abnormal neutrophil count were first treated with conservative therapy. However, a second contrast-enhanced CT

scan was conducted due to the patient's persistently high body temperature and deteriorating health, and the results revealed evidence of infected tissue death. In addition, four people showed signs of WON.

**Table 2: Clavien-Dindo categorization of complications after surgical intervention.**

Variables	Frequency	Percent
0 Grade	1	5.0
1 Grade	3	15.0
2 Grade	5	17.2
3 Grade	2	13.0
4 Grade	1	2.6

Both laparoscopic and open cystogastrostomies were performed on all patients. The four patients who were found to have pseudocysts all had symptoms and cysts that were bigger than 6 cm. This group did not suffer any fatalities. Three patients had infections at the site of surgery, and four patients needed external continuous positive airway pressure support due to hospital-acquired pneumonia. Because to postoperative bleeding, three patients who had open necrosectomy had to have re-exploration the following day.

### Discussion

The treatment of SAP often involves debates and disagreements on the surgical procedure and the optimal timing for it. In the past, laparotomy was utilised by professionals to remove and drain the infected necrosis in the retroperitoneal area during the initial stage of severe acute pancreatitis (SAP). Nevertheless, research has indicated that performing surgery at an early stage is frequently associated with increased mortality rates. [11-13] Additionally, several studies have demonstrated that conservative management without high-risk surgical intervention can be successful for certain patients with

retroperitoneal infected necrosis. Consequently, numerous experts recommend postponing surgery. Over the past several decades, there has been an increase in the number of deaths during early surgery for patients with severe acute pancreatitis (SAP) who underwent traditional laparotomy. This procedure, which involves removing contaminated tissue from the area behind the abdomen, can cause significant damage and complications. Gastrointestinal surgeons, radiologists, and gastroenterologists are actively investigating minimally invasive techniques as an alternative to operational necrosectomy due to its high morbidity and mortality rates. [14] Due to technological developments and the use of more precise endoscopic equipment, the mortality rate of patients suffering from severe pancreatitis has decreased, and they have less problems compared to those who undergo open debridement treatment. Alternative methods such as percutaneous catheter drainage (PCD), endoscopic transgastric operations, and less invasive treatments have been suggested as options instead of open necrosectomy. If less invasive treatment is ineffective or if the necrosis has extended to areas that are inaccessible via an

endoscope, it is advisable to have open abdominal surgery.

The study found that peripancreatic fluid collections, specifically ANC and pseudocyst, were the most frequent cases that required surgical intervention. Minimally invasive treatments were used to handle WON and pseudocyst in over 80% of the instances. Although the majority of instances with acute necrotising pancreatitis (ANC) were treated using video-assisted retroperitoneal debridement, patients with pancreatic pseudocysts (PPC) were treated utilising laparoscopic and open external drainage procedures. Furthermore, a single patient experienced pancreatitis as a result of hypertriglyceridemia. Our research revealed a higher incidence of biliary pancreatitis in females, but alcoholic pancreatitis was more common in men, consistent with worldwide trends. [15-17] The current preferred treatment for acute necrotic collection is the "step-up" approach. The term "step-up" was coined by the Dutch PANTER research and has been widely used in other sectors to describe minimally invasive treatments that may be gradually escalated to more invasive procedures for draining infected pancreatic necrosis. The management strategy for walled-off necrosis has seen changes and improvements throughout the years. Some necrotic tissue wounds may undergo spontaneous healing and may be treated conservatively if there are no symptoms or other problems, such as infection of the surrounding necrotic tissue.

### Conclusion

Patients with pancreatitis who experience localized complications should receive treatment at a specialized medical facility with highly skilled pancreatic surgeons. The availability of endoscopic methods, and surgical intervention remains an essential component in the management of pancreatic necrosis and pancreatic fluid collection. Furthermore, surgery has a significant role in determining the course of acute pancreatitis, and patients should have surgery as soon as the illness is advanced. It is crucial to take into account interdisciplinary treatment, taking into account the surgeon's expertise, the patient's comorbidities, and the clinical circumstances. Improved multi-organ failure care and more efficient minimally invasive necrosis removal methods are needed for future advancement.

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