

## Assessment of Different Surgical Management Modalities in Local Complications of Acute Pancreatitis

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### 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 General Surgery. A purposive sampling method was utilized to recruit the patients. 383 patients were admitted to the surgery department with the diagnosis of acute pancreatitis or with complications of acute pancreatitis. Among them, 50 patients had local complications due to acute pancreatitis.

**Results:** Out of 50 patients, 46% were females and 54% were male. 50% had ethanol etiology and 32% had pseudocyst pancreatic fluid collection. According to the location, 70% were at body or tail. According to Clavien-Dindo classification, 30% were in grade 2 followed by grade 1 (26%) and grade 4 (22%).

**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

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### Introduction

Acute pancreatitis (AP) is defined as an acute inflammatory attack of the pancreas with a sudden onset of symptoms, which, in the absence of post necrotic damage to the gland, results in complete resolution of histology, physiology, and symptoms and provided the initiating cause is removed there will be no further attacks. The commonest causes for AP are gallstones (40–65%) and alcohol (25–40%), and the remainder (10–30%) are due to a variety of causes including autoimmune and genetic risk factors. [1,2] Irrespective of etiology, the trigger factors cause supraphysiological intracellular signaling resulting in trypsin activation within the zymogen granules. [3-5] The resultant acinar cell death causes a localized and systemic inflammatory response. Initially, the most prominent features are distant organ dysfunction notably the lungs and kidneys, which in most cases is of short duration (< 48 h). [6,7]

The majority of patients suffering from acute pancreatitis will have a mild, self-limited and uncomplicated course. Pancreatic necrosis may develop in up to 10%-20% of patients, because of insufficient perfusion of pancreatic parenchyma to support metabolic requirements, leading to a

prolonged clinical course with up to 30% mortality in case of infected necrosis. [8] Local and systemic complications, mild or life-threatening, such as pancreatic and/or peripancreatic fluid collections, walled-off necrosis, infected pancreatic necrosis, disconnected pancreatic duct syndrome and vascular complications can occur. The successful management of these patients needs a multidisciplinary team composed by gastroenterologists, surgeons, interventional radiologists, and specialists in critical care medicine, infectious disease, and nutrition. Intervention is generally required for infected pancreatic necrosis and less commonly in patients with sterile necrosis who are symptomatic (gastric or duodenal outlet or biliary obstruction). [9] The surgical odyssey in managing necrotizing pancreatitis is a notable example of how evidence-based knowledge leads to improvement in patient care. Open surgical necrosectomy has been the traditional surgical treatment for years. However, although it provides a wide access but it is associated with high morbidity (34%-95%) and mortality (11-39%). In the last decades treatment has moved towards minimally invasive techniques: laparoscopy, retroperitoneal

and endoscopic or percutaneous approaches. These can allow open surgery to be postponed in a sub-acute setting or even to avoid it. [10-13]

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

### Materials and Methods

A hospital-based retrospective study was conducted in the Department of General Surgery at SKMCH, Muzaffarpur, Bihar, India for one year. A purposive sampling method was utilized to recruit the patients. 390 patients were admitted to the surgery department with the diagnosis of acute pancreatitis or with complications of acute pancreatitis. Among them, 50 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. All complications were graded according to the Clavien-Dindo classification.<sup>7</sup> Data were analyzed using the statistical package for the social sciences (SPSS) version 20.

### Results

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

Variables	N	%
<b>Gender</b>		
Male	27	54
Female	23	46
<b>Clinical characteristics</b>		
<b>Etiology</b>		
Biliary	19	38
Ethanol	25	50
Others	6	12
<b>Category of pancreatic fluid collection (PFC)/complications</b>		
PPC	8	16
ANC	18	36
WON	8	16
Pseudocyst	16	32
<b>Location of the cavity</b>		
Head	15	30
Body or tail	35	70

Out of 50 patients, 46% were females and 54% were male. 50% had ethanol etiology and 32% had pseudocyst pancreatic fluid collection. According to the location, 70% were at body or tail.

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

Clavien-Dindo classification	N	%
Grade 0	8	16
Grade 1	13	26
Grade 2	15	30
Grade 3	3	6
Grade 4	11	22

According to Clavien-Dindo classification, 30% were in grade 2 followed by grade 1 (26%) and grade 4 (22%).

### Discussion

The primary goal of treatment for acute necrotic collection is to drain the content and remove all infected pancreatic tissues. [14] The available treatment options include open and laparoscopic transperitoneal drainage, image-guided retroperitoneal drainage, and endoscopic transgastric approaches. [8] 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. [15] 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. [16] However, if the WON is infected, intervention is warranted in the form of endoscopic drainage or open necrosectomy. 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. [17] These include transpapillary pancreatic duct stenting, transmural drainage, or a combination of both. [18,19] Transpapillary stent placement and endoscopic ultrasound (EUS)-guided transmural drainage (EUS-TM) for PPC drainage report a wide range of clinical success. [20-22] However, when these modalities are not suitable for the patient surgical management is an acceptable modality for managing pancreatic pseudocyst. [23]

There is no single surgical procedure that is appropriate for all pseudocysts. The most important factor dictating the mode of treatment is local expertise. [24] 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. [25] 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. [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.

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