

Comparison between Surgical and Endoscopic management of Pancreatic Pseudocyst and Walled-off Pancreatic Necrosis

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Abstract

BACKGROUND:

Surgical management is the standard approach for pancreatic pseudocyst and walled off pancreatic necrosis. With newly evolving procedures and a comprehensive approach, management of walled off pancreatic necrosis and pancreatic pseudocyst is taking a new turn. A multi-centric study comparing surgical and endoscopic management of pancreatic pseudocyst and walled off pancreatic necrosis was performed.

METHODS:

Data was collected retrospectively from multiple centers and patients were followed up till date since the time of intervention. The outcomes were therapeutic success, post-operative complications, recurrence rate, mortality and duration of hospitalization.

RESULTS:

At the end of the follow-up period, none of the patients who received endoscopic intervention had a recurrence, compared to 2 patients in the surgical group. There was 16.67% mortality in the surgical group and only 3.33% mortality in the endoscopic group. Significantly high mortality was seen in the patients with Walled-Off Pancreatic Necrosis treated surgically, compared to no mortality in the patients treated endoscopically. 86 % of the patients in the endoscopic group had resolution of the disease following intervention compared to 70% in the other group. There were no statistically significant differences in mortality, resolution or recurrence of disease following intervention between the two groups. However, the length of hospital stay was significantly shorter for patients who underwent endoscopic intervention than open surgery.

CONCLUSION:

Endoscopic drainage of Pancreatic Pseudocysts and Walled off Pancreatic necrosis have demonstrated a therapeutic success rate, mortality and recurrence statistically comparable to that seen in surgical treatment, but with reduced time of hospitalization, supporting its use as the preferred initial modality for drainage.

Keywords: Pancreatic Pseudocyst, Walled Off Pancreatic Necrosis, Endoscopic, Surgical, Management

1. INTRODUCTION

Pancreatic Fluid collections are peri-pancreatic or intra-pancreatic collections which are not surrounded or encased by epithelium or fibrotic capsule. Both entities are typical late complications of acute pancreatitis. Pancreatic Fluid collections are divided into acute (present for less than four weeks) and chronic (lasting past four weeks).

Acute peri-pancreatic fluid collections after four weeks are referred to as a **pseudocyst**. Fluid collections associated with necrotising pancreatitis are referred to as an **acute necrotic collection (ANC)** before four weeks and as **Walled Off Pancreatic Necrosis (WOPN)** after that period. In practice, the lesion is either a pancreatic fluid collection that *does not contain necrotic components*, which when mature (>4 weeks) is best termed a **PANCREATIC PSEUDOCYST**, or a post-necrotic collection *that contains necrotic components* which when mature (>4 weeks) is best termed as **WALLED OFF PANCREATIC NECROSIS**.

The two principal indications for treating pancreatic pseudocysts are to relieve symptoms and to treat complications. In most cases, Pancreatic Pseudocysts are asymptomatic and resolve spontaneously without any intervention. *Indications to drain Pancreatic Pseudocysts are limited to symptomatic patients, size (>6 cm), and rapid growth and/or associated with complications, such as infection and bleeding.* Drainage can be performed by endoscopic, surgical (cystogastrostomy or cystojejunostomy), or percutaneous procedure. In the absence of symptoms or evidence of enlargement, conservative management is usually reasonable. The desire to allow time for spontaneous resolution to occur must be balanced against the risk of complications while waiting for cyst wall maturity. An enlarging asymptomatic pseudocyst that has been present for 6 weeks is usually treated.

For Walled off Pancreatic Necrosis, Image-guided Percutaneous catheter drainage has been the primary treatment previously. With advent of technology, VARD [(Video-Assisted Retroperitoneal Debridement) where the superficial necrosis is removed under direct vision, followed by further debridement under videoscope assistance], EUS Guided Drainage of collection and Direct Endoscopic Necrosectomy have been introduced as new modalities for dealing with Walled Off Pancreatic Necrosis.

Step-up approaches where multistage approach with delayed intervention has been proposed has shown improved mortality and morbidity rates. The *endoscopic step-up approach consists of EUS-guided transluminal drainage followed by, if necessary, Direct Endoscopic Necrosectomy*, while the *surgical step-up approach consists of percutaneous catheter drainage followed by, if necessary, VARD (Video-Assisted Retroperitoneal Debridement)*.

For several years, open surgical approach was considered the criterion standard treatment, but with evolvment of less invasive techniques, such as laparoscopic and endoscopic drainage, these new techniques have gained increased usage in recent years.

2. OBJECTIVES

The aim of this study is to compare surgical and endoscopic approaches for treatment of Pancreatic Pseudocyst and Walled Off Pancreatic Necrosis. The outcomes are **therapeutic success, post-operative complications, recurrence rate, mortality, and duration of hospitalization**.

3. METHODS:

- **Data Extraction:** Data was collected retrospectively from operative registers of *three high-volume centers* and *patients were followed up till date since the time of intervention*. A proforma was used to

document the responses of the patients during follow-up. Appropriate consent was also taken for the study.

- **Type of Study:** *Analytical retrospective study* between surgical and endoscopic treatment of pancreatic pseudocyst and Walled Off Pancreatic Necrosis.
- **Sample Size:** 60 patients
- **Eligibility Criteria:**

Inclusion criteria:

- All Patients from all age groups *who have undergone intervention* for Pancreatic pseudocyst and Walled off Pancreatic Necrosis, surgical or endoscopic, have been included in this study.

Exclusion criteria:

- Patients who have undergone Percutaneous drainage were not included.
- Patients with past history of abdominal surgery
- Moribund patients

❖ **Outcomes assessed:** The outcomes were therapeutic success, post-operative complications, recurrence rate, mortality, and duration of hospitalization.

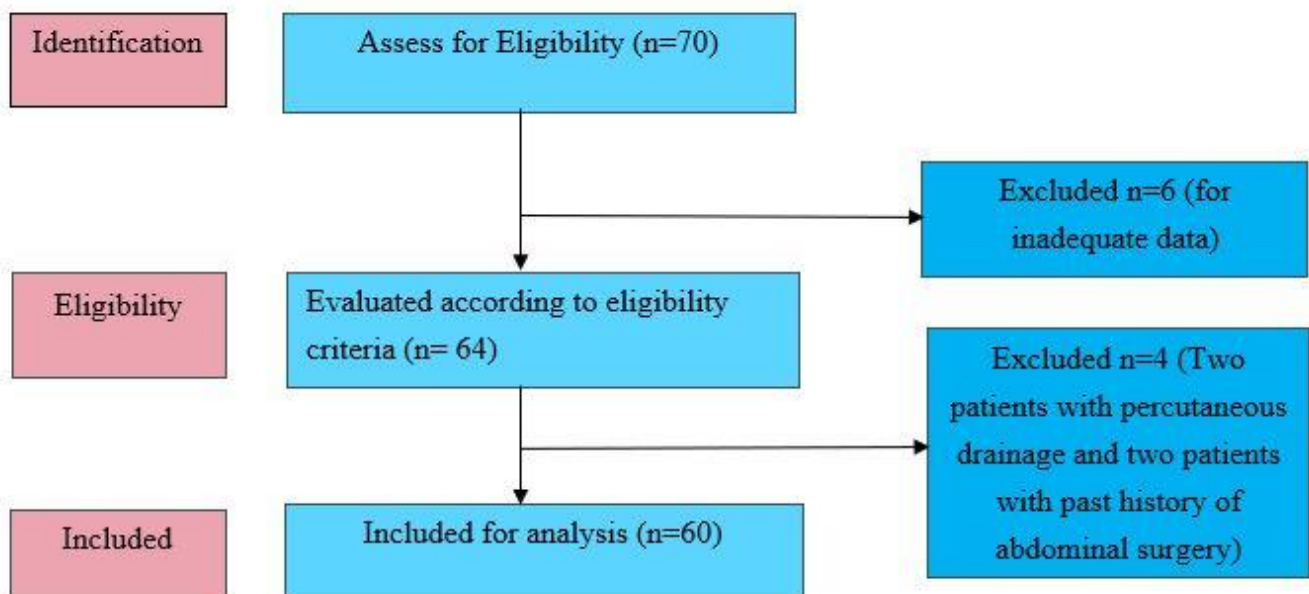
Therapeutic success was defined as **complete resolution or decrease in pseudocyst size to ≤ 2 cm in imaging method with total improvement of symptoms** after the first intervention.

Post-operative complications consist of immediate events such as bleeding, surgical site infection and delayed events like incisional hernia, pancreatic fistula and others.

Recurrence was defined as a **new pseudocyst observed by imaging methods at follow-up after previously reported resolution.**

Duration of hospitalization was **length of stay from day of surgical or endoscopic approach to discharge.**

❖ **Consort Flow Diagram:**



❖ **Data Analysis:** Collected data was tabulated in MS Excel and evaluated. Two Proportion test was performed to compare therapeutic success, mortality, and recurrence of the two groups.

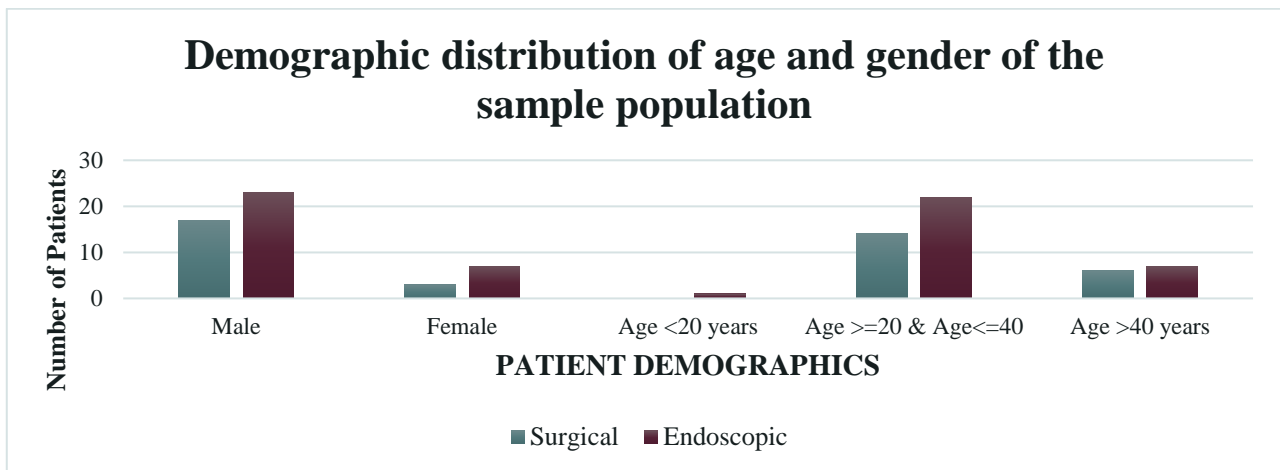
4. RESULTS:

A total of 60 patients were included of which 40 patients had Pancreatic Pseudocyst and 20 of them had Walled Off Pancreatic Necrosis. 30 patients were treated surgically whereas the rest were treated endoscopically. Main causative factor was *Chronic Pancreatitis*. Out of the surgical group, *Open Cystogastrostomy* was the most common approach, done in 50% of patients whereas *EUS guided drainage* was the principal procedure in the endoscopic group.

DEMOGRAPHICS:

In the selected population, *majority of the population were males (80%) in the age group 20-40 years (72%).*

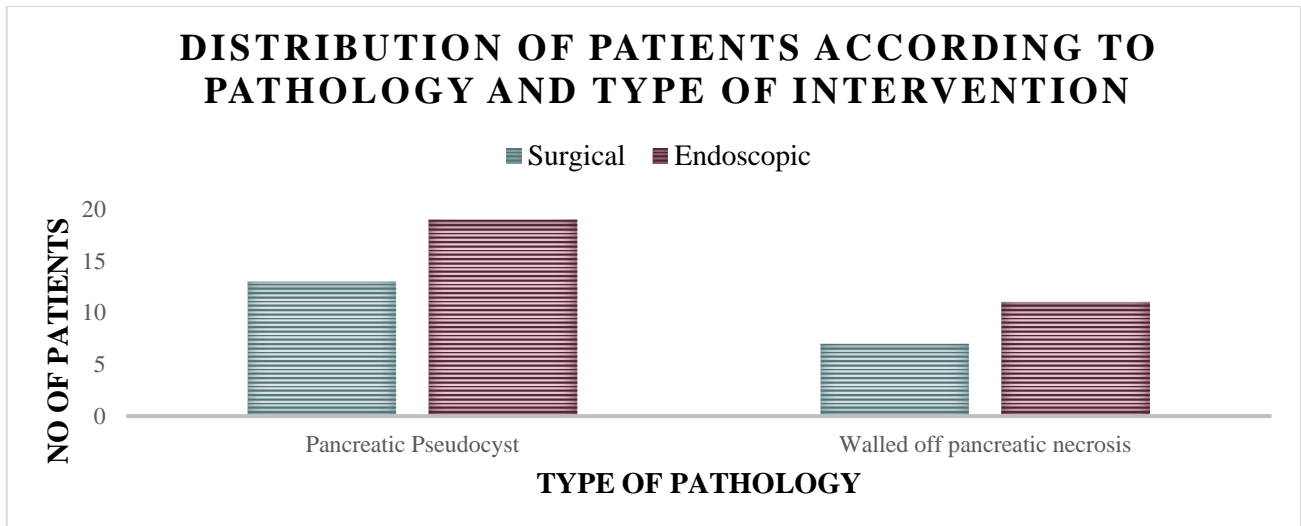
Age	Age in years	Number of patients in surgical group	Number of patients in endoscopic group
	<20	0	1
	20-40	22	22
	>40	8	7
Gender			
	Male	26	23
	Female	4	7



DISTRIBUTION OF PATIENTS ACCORDING TO PATHOLOGY AND TYPE OF INTERVENTION:

In this study, 30 patients had endoscopic intervention done and 20 patients had open surgical intervention done. 13 of the patients with PP had open surgery and the rest had endoscopic drainage. In patients with walled off pancreatic necrosis, 7 patients had open surgery and the rest had endoscopic intervention done.

	Pancreatic Pseudocyst	Walled off pancreatic necrosis.
Surgical approach	21	9
Endoscopic approach	19	11



OUTCOMES:

1. Therapeutic Success:

Resolution occurred in 47 patients, out of which Endoscopic group had therapeutic success in 86.67% of patients and Surgical group had therapeutic success in 70% of patients. There was significant difference in treating WALLED OFF PANCREATIC NECROSIS via endoscopic intervention which showed a resolution of 81.81% with single therapeutic success in the surgical group.

No statistically significant difference (*p-value:0.51*) was seen in between the groups regarding resolution of the disease.

	Number of patients in Surgical group	Number of patients in Endoscopic group	P value
Number of patients who achieved therapeutic success	21(70%)	26(86.66%)	0.51
Number of patients without therapeutic success	9 (30%)	4(13.33%)	

2. Recurrence:

10% of the patients in the surgical group had recurrence of disease whereas there was no recurrence in the endoscopic group. There was no statistically significant difference between the two groups. (*p value: 0.96164*)

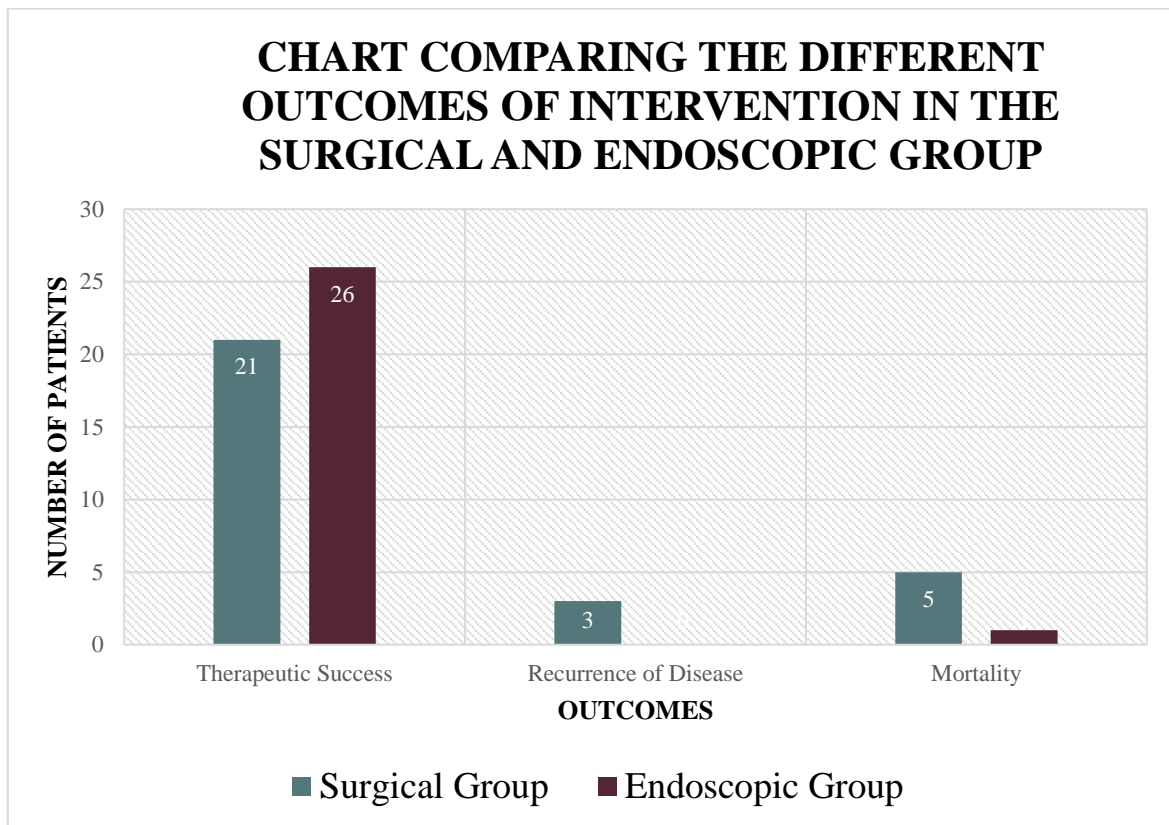
Recurrence	Number of patients in Surgical group	Number of patients in Endoscopic group	P value
Number of patients who had recurrence.	3 (10%)	0	0.96

Number of patients without any recurrence	27 (90%)	30 (100%)	
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3. Mortality:

There was 16.67% mortality in the surgical group with 3.33% in the latter, but there was no statistically significant difference (p-value: 0.95728) between the two. Significantly high mortality was seen in the patients with WALLED OFF PANCREATIC NECROSIS treated surgically, compared to no mortality in the patients with Pancreatic Pseudocyst.

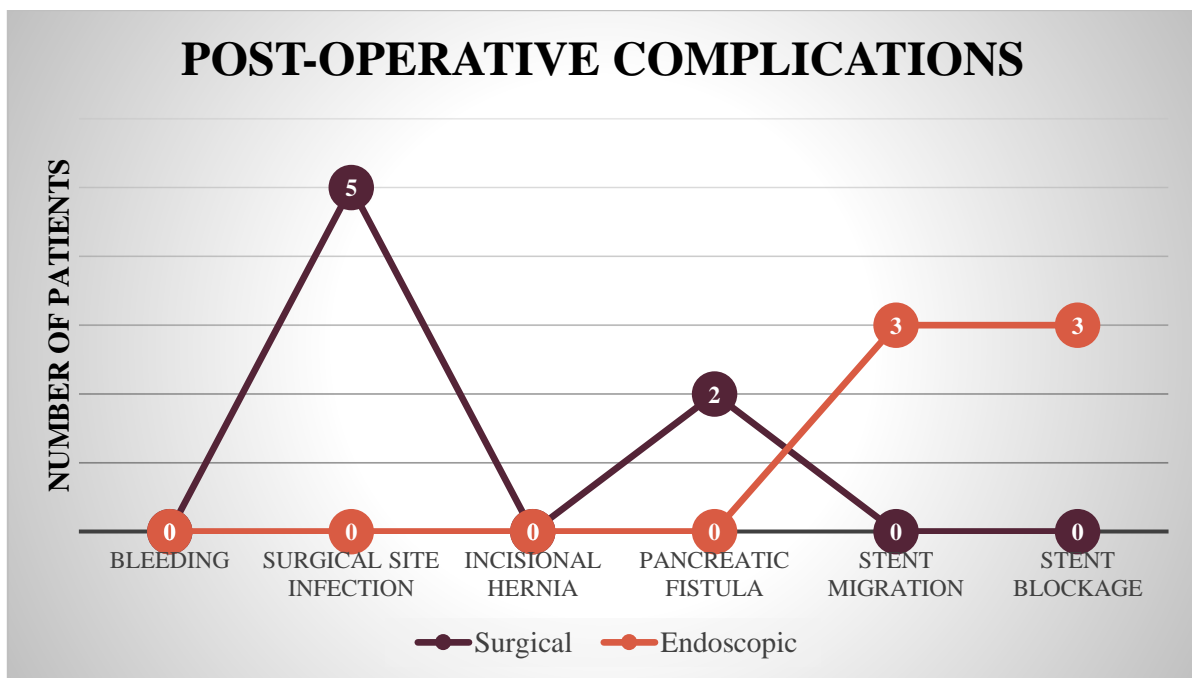
Mortality	Number of patients in Surgical group	Number of patients in Endoscopic group	P value
Number of patients who expired post-operatively.	5 (16.6%)	1 (3.33%)	0.95728



4. Post-operative complications:

There were no significant differences in post-operative complications in either of the groups. Two patients in the surgical group developed Pleuro-pancreatic fistula and 5 patients developed surgical-site infection. In the endoscopic group, 3 people developed stent blockage and migration of stent occurred in 3 people.

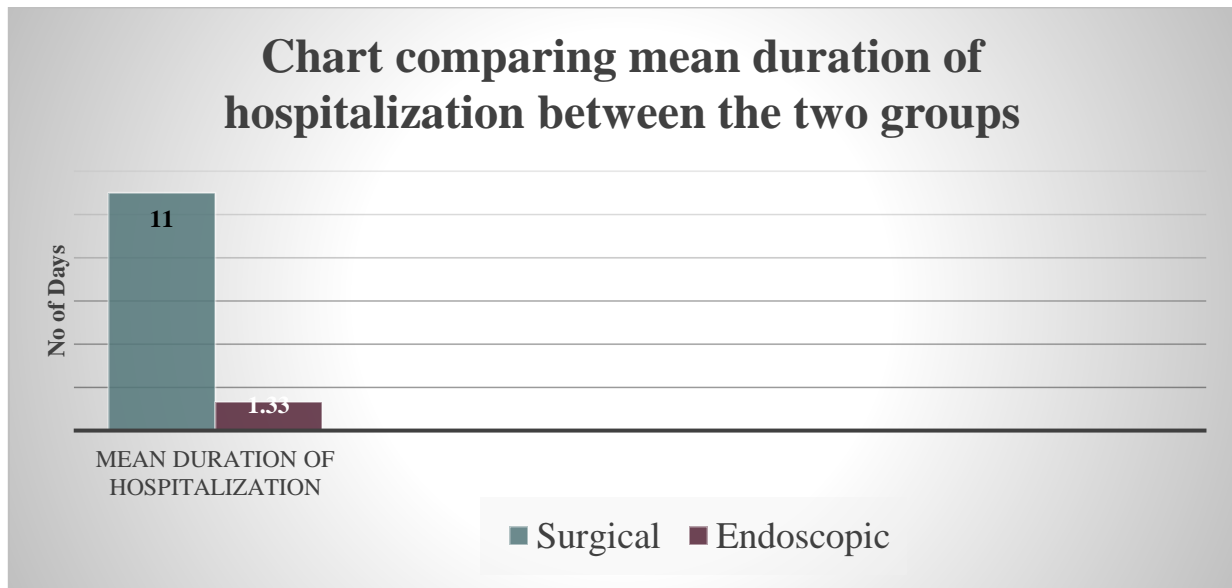
POST-OPERATIVE COMPLICATIONS	Number of patients with complications in surgical group	Number of patients with complications in endoscopic group
Bleeding	0	0
Surgical Site infection	5 (16.67%)	0
Incisional Hernia	0	0
Pancreatic fistula	2 (6.66%)	0
Stent migration	0	3 (10%)
Stent blockage	0	3 (10%)



5. Duration of hospitalization:

Mean duration of hospitalization was 11 in the surgical group and 1.3 in the endoscopic group. Most of the endoscopic procedures were day-care procedures, justifying a significantly low hospital stay.

Duration of hospitalization	Number of days of hospital stay in Surgical group.	Number of days of hospital stay in Endoscopic group.	P value
Mean duration of hospitalization	11	1.33	



5. DISCUSSION:

This study compared different approaches for pancreatic pseudocyst and Walled off Pancreatic Necrosis using data from multiple high-volume centers. Despite similar clinical baseline, different approaches have different clinical outcome. After a thorough review of literature, a *significant lack of study regarding Walled off Pancreatic Necrosis was noticed*. This study aims to fill in that gap by including Walled off Pancreatic Necrosis and comparing its management via various modalities.

Endoscopic Ultrasound guided drainage allows for precise cavity segmentation and decreases risk of vascular injury. Double Pigtail stents or Self Expanding Metallic Stents are preferred for drainage. In our study, *all the endoscopic interventions were done under EUS guidance with stent placement* attributing reduced hospital stay in this group. (1)

With surgical approach, the technique of choice is based according to pseudocyst location, adjacent structures, and surgeon preference. Internal surgical drainage can be performed by communication between the pseudocyst and stomach, jejunum, or duodenum. (1) *In this study, the most common surgical approach was Cystogastrostomy in 50% of the cases.*

In a similar study by *Mohammad Khreiss et al* where they compared minimally invasive surgery and endoscopic management of sterile walled-off pancreatic necrosis concluded that there was no significant difference in the clinical outcomes and cost between the two. In another study by *Shyam Varadarajulu et al* Cystogastrostomy for pancreatic pseudocysts was compared by endoscopic and surgical methods and they inferred that despite the same clinical outcome, cost and duration of hospital stay was less in the endoscopic group.

This study found out that an endoscopic approach had a significantly shorter duration of hospitalization. There were no statistically significant differences in the therapeutic success, mortality, and recurrence of the disease between the two groups. We also found out that *patients with Walled off Pancreatic Necrosis had increased mortality and recurrence with lower resolution than in patients with pancreatic pseudocyst*. The patients of endoscopic group had multiple follow-up interventions due to *blockage or migration of stent*. Two patients in the surgical group developed *pleuro-*

pancreatic fistula as a complication. Considering all of these, **endoscopic intervention might be the preferred primary approach for both Pancreatic Pseudocyst and Walled off Pancreatic Necrosis.**

The main limitations of this study are a *limited sample size and a non-uniform follow-up period for the operated patients*. In the centers included in the study, *there were no patients operated laparoscopically for the same and thus they couldn't be included in the study*. Cost of treatment was not factored in as treatment was free of cost in one of the centers.

6. CONCLUSION:

Endoscopic drainage of Pancreatic Pseudocysts and Walled off Pancreatic necrosis have demonstrated a therapeutic success rate, mortality and recurrence statistically comparable to that seen in surgical treatment, but with reduced time of hospitalization, supporting its use as the preferred initial modality for drainage.

7. REFERENCES:

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