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Laparoscopic Versus Open Cystogastrostomy for Pancreatic Pseudocysts: A Comparative Study

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Abstract:- Introduction: Pancreatic pseudocyst (PP) is an accumulation of pancreatic juice surrounded by a wall of fibrous or granulation tissue that results from acute, and chronic pancreatitis. To treat PP, various surgical techniques are used including open and laparoscopic cystogastrostomy. Therefore, the current study compared the outcomes of open and laparoscopic cystogastrostomy. Method: The current study included all patients who had open cystogastrostomy (OCG) and laparoscopic cystogastrostomy (LCG) for PPs at Hayatabad Medical Complex Peshawar beginning between 2015 and 2021. The operation time, duration of postoperative hospital stays, and postoperative morbidity and mortality rates were compared between the two surgical techniques. The statistical analysis was carried out using a statistical package for social sciences (SPSS v25). The analysis model for the current study was an intention-to-treat model. Results: There was a significant difference in the patient's BMI across the two groups (median: 25.00 vs 13.00, p = 0.032). The pseudocyst size in patients who underwent LCG was smaller than the OCG (8.50 vs 13.0, p<0.0001). The current study observed that median operation time was significantly less in the LCG compared to OCG (p<0.0001). The postoperative morbidity was higher in OCG compared to the LCG (p=0.001). A smaller hospital stay was observed in patients who underwent LCG compared to OCG (p<0.0001). Conclusion: The current study highlighted that LCG offers significantly better outcomes compared to OCG in terms of operation time, postoperative morbidity and mortality, hospital stay, and postoperative complications.

Keywords:- *Pancreatic Pseudocyst, Open Cystogastrostomy, Laparoscopic Cystogastrostomy.*

I. INTRODUCTION

Pancreatic pseudocyst (PP) is an accumulation of pancreatic juice surrounded by a wall of fibrous or granulation tissue that results from acute and chronic pancreatitis [1]. Although the rationale and appropriateness of intervention in PP associated with acute pancreatitis remain contentious, there is a consensus that large, persistent, and symptomatic cysts should be drained since they are often linked with complications [2]. Surgical or endoscopic techniques may be used for the internal drainage of PP [3]. Endoscopic treatment is a promising method, but it requires skills and may be linked to stent-related problems, insufficient drainage, repetitive operations, and perforation risk. Surgical draining of PP remains the most common technique [4, 5].

Traditionally, pancreatic pseudocysts are treated with open surgical drainage. Percutaneous, endoscopic, and laparoscopic drainage procedures are becoming more prevalent with the advancement in medical technology [3, 6]. Cyst gastrostomy is a surgical procedure that creates an aperture between a pancreatic pseudocyst and the stomach where the cyst is emptied into the stomach. This operation was undertaken to prevent a potentially fatal rupture of the pancreatic pseudocyst. After the first intervention, radiographic cyst resolution was used to determine treatment success. Re-intervention was defined as needing further treatments due to persisting symptoms and a remnant pseudocyst [7].

However, no comparative studies have compared the outcomes and efficacy of laparoscopic and open cyst gastrostomy for PP. Therefore, the current study was conducted to compare the outcomes of open and laparoscopic cyst gastrostomy.

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II. METHOD

A. Patients

The current study included all patients who had open cystogastrostomy (OCG) and laparoscopic cystogastrostomy (LCG) for PPs at Hayatabad Medical Complex Peshawar beginning between 2015 and 2021. Patients who had laparoscopic or open pancreatic cystojejunostomy or cystoduodenostomy were excluded.

The drainage was performed if there were acute and chronic PPs-related symptoms. On imaging, these PPs exhibited fluid collections older than six weeks and were encircled by a well-defined wall. All acute PPs were chronic (>6 weeks), big (6 cm in diameter), and symptomatic, necessitating surgical removal. A preoperative abdominal ultrasound or abdominal computed tomography (CT) scan confirmed the presence of a PP. The CT data were utilized to distinguish between a pancreatic pseudocyst, in which fluid predominates, and walled-off pancreatic necrosis, in which necrotic tissue predominates.

B. Outcome variables

The operation time, duration of postoperative hospital stays, and postoperative morbidity and mortality rates were compared between the two surgical techniques. Postoperative mortality was defined as the number of deaths within 30 days following surgery or hospitalization. The postoperative morbidity rate Included any complications that occurred within thirty days following surgery. The severity of complications was determined using the Dindo-Clavien classification [8]. The duration of the postoperative hospital stay was defined as the time between the operation and discharge. Operative time was defined as the period (in minutes) between the initial incision and the final skin wound closure.

C. Procedure

PPs were drained laparoscopically using an anterior route (endogastric or transgastric) or a posterior approach (exogastric). Large retrogastric pseudocysts that are immediately visible and palpable during laparoscopy are suitable for the anterior approach, while the posterior route was appropriate for smaller pseudocysts that are not readily palpable. We aim to construct a wide fenestration between the PP and the stomach lumen with a minimum diameter of 4–5 cm to provide proper drainage and debridement and reduce the likelihood of PP recurrence. OCG was performed through an upper midline or transverse laparotomy. With OCG, the margin of the cystogastrostomy was regularly oversewn, but at LCG, it was done selectively.

D. Postoperative management

Patients were permitted to consume oral fluids postoperatively, followed by soft food as soon as they were able. The abdominal drains and nasogastric stomach decompression were withdrawn as soon as the caring surgical team deemed it appropriate. Patients were discharged from the hospital when they were sufficiently ambulatory and could tolerate a soft diet. Following surgery, they were instructed to adhere to a soft diet for 10–14 days before resuming a solid meal. All patients were routinely monitored in the surgical clinic, and cross-sectional imaging was performed regularly, as required.

E. Statistical analysis

The statistical analysis was carried out using a statistical package for social sciences (SPSS v25). The analysis model for the current study was an intention-to-treat model. For this purpose, we used a case-matched protocol (3:1) for LCG and OCG. The normality of the data was assessed using the normality test. Based on the normality test, non-parametric statistics were applied. As appropriate, a comparison between groups was carried out using the Mann–Whitney U-test and the Kruskal walis test. The chi-square of independence was used to compare categorical variables, and Bonferroni correction was applied for repeated analysis. Significance was accepted at the 5% level.

III. RESULTS

A total of 40 participants were recruited in the current study, amongst which 30 patients were in the LCG and 10 were in OCG, based on case-match protocol (3:1). There was a significant difference in the patient's BMI across the two groups (median: 25.00 vs 13.00, p = 0.032). The pseudocyst size in patients who underwent LCG was smaller than the OCG (8.50 vs 13.0, p<0.0001). The detail can be seen in Table 1.

		LCG		OCG		P-value
		Median (range)	N (%)	Median (range)	N (%)	
Age		54.00 (30-94)		54.50 (38-70)		0.756
Gender	Male		22 (84.6)		4 (15.4)	0.056
	Female		8 (57.1)		6 (42.9)	
BMI		25.00 (23-27)		27.00 (23-29)		0.032
Size of the pseudocyst		8.50 (6-12)		13.00 (11-16)		<0.0001
Surgical approach	Trans-gastric (anterior)		24 (75)		8 (25)	0.668
	Exo-gastric (posterior)		6 (75)		2 (25)	

Table 1:- Characteristics of the patients in the current study.

The current study observed that median operation time was significantly less in the LCG compared to OCG (p<0.0001). The postoperative morbidity was higher in OCG compared to the LCG (p=0.001). A smaller hospital stay was observed in patients who underwent LCG compared to OCG (p<0.0001). There was only one case of postoperative mortality in the OCG group, as shown in Table 2.

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IV. DISCUSSION

The current study assesses the comparison of the postoperative outcomes between LCG and OCG procedures and highlights that LCG offers significantly better outcomes compared to OCG in terms of the operation time, postoperative morbidity and mortality, hospital stay, and postoperative complications.

In our research, the prolonged operating time in the open cystogastrostomy group might be attributed to the additional time required to open and close the abdomen during laparotomy and the increased frequency of a consultant-level surgeon doing laparoscopic drainage. In a systematic analysis of the literature, LCG (n =40) of PPs was associated with low morbidity (7%), short postoperative hospital stays (median: 4d) and recurrence rates (6.7%) to those reported following open surgery [9].

		LCG		OCG		P-value
		Median (range)	N (%)	Median (range)	N (%)	
Operation time		67.00 (55-80)		96.00 (87-107)		<0.0001
Postoperative morbidity	Yes		3 (33.3)		6 (66.7)	0.001
	No		27 (87.1)		4 (12.9)	
Postoperative hospital stays		5.50 (3-8)		11.50 (06-16)		<0.0001
Postoperative mortality	Yes		0 (0)		1 (100)	0.079
	No		30 (76.9)		9 (23.1)	
Dindo-Clavien classification	Grade I		11 (84.6)		2 (15.4)	0.328
	Grade II		11 (78.6)		3 (21.4)	
	Grade III		6 (66.7)		3 (33.3)	
	Grade IV		2 (66.7)		1 (33.3)	
	Grade V		0 (0)		1 (100)	

Table 2:- The comparative outcome of the LCG and OCG procedure

Although trained laparoscopic surgeons have generally accepted LCG, open surgery has a role in the therapy of PP, such as in patients with recurrent PPs after OCG, the presence of numerous PPs, and patients who have had several open abdominal procedures in the past [10]. Endoscopic drainage, especially when aided by endoscopic ultrasound (EUS), is also an important alternative management option for PPs, and is favoured when the PP is indenting the stomach or duodenum and in the absence of necrotic pancreatic tissue [11]. Endoscopic drainage was effective in 65–100% of selected patients [12] and was linked with failure to drain, morbidity, and recurrence rates of 15.4%, 13.3%, and 10.7%, respectively [9]. A recent randomized controlled trial comparing endoscopic drainage (n = 20) to OCG (n = 20) for the treatment of PPs revealed a considerably shorter hospital stay (2 vs 6 days, P = 0.001), reduced cost, equivalent morbidity and death rates, and no recurrences with the endoscopic technique [13]. To present, there are no RCTs comparing the results of endoscopic drainage (ED) with LCG. However, endoscopic drainage is restricted when the stomach does not share a wall with the PP and the space between the stomach and the PP wall is more than one centimeter [14]. Moreover, ED needs a highly trained endoscopist and does not permit necrotic tissue debridement or adjunctive treatments such as cholecystectomy at the same time.

The study's main limitations are data collection, the study's patient group, and the potential for bias in the random selection of participants. Our patient sample included a diverse range of potential causes for their acute pancreatitis, RCTs can only be conducted successfully in a multicenter context.

V. CONCLUSION

The current study highlighted that LCG offers significantly better outcomes compared to OCG in terms of operation time, postoperative morbidity and mortality, hospital stay, and postoperative complications.

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