

Original Article

# Post-Operative Complications Among Patients Treated with Cystogastrostomy for Pancreatic Pseudocyst

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**Conflict of Interest: None.**

Ullah N., et al. (2024). 4(1): DOI: <https://doi.org/10.61919/jhrr.v4i1.613>

## ABSTRACT

**Background:** Pancreatic pseudocysts represent a clinical challenge, often resulting from pancreatitis, trauma, or surgery. Traditional management strategies have ranged from conservative treatments to surgical interventions, with varying degrees of invasiveness and associated complications. The evolution of minimally invasive techniques, such as laparoscopic cystogastrostomy (LCG), has offered new avenues for treatment, albeit with an imperative need for a thorough understanding of their outcomes and efficacy.

**Objective:** This study aimed to evaluate the post-operative complications among patients undergoing LCG for pancreatic pseudocysts, contributing to the body of knowledge on patient outcomes and informing clinical practice.

**Methods:** A descriptive case series was conducted at the Department of General Surgery, Lady Reading Hospital, from April 2023 to October 2023. Seventy patients with pancreatic pseudocysts, confirmed via imaging, were included. Those with previous surgeries for pseudocysts were excluded. All procedures were performed by a single experienced consultant. Post-operative complications were monitored within 24-48 hours, including anastomosis leakage, pneumoperitoneum, bleeding, and perforation. Data were analyzed using SPSS version 25, employing mean and standard deviation for continuous variables, and frequencies and percentages for categorical ones. Chi-square tests were used to explore the association between gender and complications, with significance set at  $p < 0.05$ .

**Results:** Among the patients, 55.7% were female, and 44.3% were male. Post-operative complications included anastomosis leakage (11.4%), pneumoperitoneum (7.1%), bleeding (18.6%), and perforation (4.3%). No significant association was found between gender and any complication (anastomosis leakage  $p = 0.68$ , pneumoperitoneum  $p = 0.25$ , bleeding  $p = 0.63$ , perforation  $p = 0.42$ ).

**Conclusion:** LCG for pancreatic pseudocysts is associated with a notable incidence of complications, including bleeding as the most common. The lack of significant gender disparity in complication rates underscores the procedure's applicability across a diverse patient demographic. These findings advocate for refined surgical techniques and patient management strategies to minimize post-operative risks, contributing to the advancement of care for individuals with pancreatic pseudocysts.

**Keywords:** Pancreatic Pseudocyst, Laparoscopic Cystogastrostomy, Post-operative Complications, Bleeding, Anastomosis Leakage, Pneumoperitoneum, Perforation.

## INTRODUCTION

A pancreatic pseudocyst represents a distinct type of fluid collection within the pancreas, characterized by its high amylase content along with other pancreatic enzymes, and is encapsulated by a unique fibrous tissue wall, notably lacking an epithelial lining (1). These pseudocysts commonly emerge as a consequence of chronic pancreatitis but can also originate from acute pancreatitis, pancreatic trauma, or post-pancreatic surgery events (2, 3). With the increasing incidence of pancreatitis and advances in radiographic technologies, there has been an enhanced identification of pancreatic pseudocysts (4). They constitute the majority of pancreatic cystic lesions, accounting for about two-thirds, in contrast to pancreatic cystic neoplasms which only represent 10-15% (4). Despite their prevalence, pancreatic pseudocysts are less likely to become malignant compared to other pancreatic lesions; however, there is a critical need to recognize a subgroup of tumors with malignant potential, including serous cystadenomas, mucinous cystic neoplasms, and intraductal papillary mucinous neoplasms (6). The differentiation of pancreatic pseudocysts from

other lesions is pivotal and is facilitated by the analysis of enzyme and tumor markers in the cystic fluid obtained through fine-needle aspiration, aiming to prevent misdiagnosis and its severe consequences.

Historically, the management of pancreatic pseudocysts was predominantly through open surgical drainage, with alternative treatments including percutaneous catheter drainage and endoscopic drainage (7, 8). Laparoscopic Cystogastrostomy (LCG) has emerged as the preferred approach for managing symptomatic pancreatic pseudocysts or those presenting a risk of complications, such as persistent pain, obstruction, infection, bleeding, or rupture (9). The utilization of imaging modalities like ultrasound, CT scan, or MRI plays a crucial role in the diagnostic process and in assessing the pseudocyst's characteristics before undertaking cystogastrostomy (10). The minimally invasive nature of cystogastrostomy offers multiple advantages in treating pancreatic pseudocysts, chiefly by effectively draining the pseudocyst contents and thus alleviating symptoms (11, 12).

Given the scarcity of literature on this topic at the local level, the aim of this study is to evaluate the post-operative complications encountered by patients who have undergone cystogastrostomy for the treatment of pancreatic pseudocyst. It is imperative for healthcare providers to remain vigilant regarding post-operative issues that may arise, as understanding the incidence, nature, and contributing factors of these complications is vital for enhancing patient care and outcomes. This highlights the necessity for further research dedicated to identifying strategies for the prevention and management of post-operative complications associated with cystogastrostomy.

## MATERIAL AND METHODS

A descriptive case series was conducted between April 2023 and October 2023, in the Department of General Surgery at Lady Reading Hospital to assess the post-operative complications in patients treated with Laparoscopic Cystogastrostomy (LCG) for pancreatic pseudocyst. Seventy patients who presented with pancreatic pseudocysts and were admitted through the surgery Outpatient Department (OPD) for elective LCG were enrolled in this study. The inclusion criteria were patients with a diagnosis of pancreatic pseudocyst, while those who had previously undergone surgery for pancreatic pseudocyst were excluded to maintain the homogeneity of the study population. The demographic details of all participants, including age, Body Mass Index (BMI), and gender, were meticulously recorded.

All surgical procedures were carried out by a single consultant, who brought to the table over five years of experience in laparoscopic surgeries, ensuring consistency in surgical expertise across all cases. The study specifically focused on the immediate postoperative complications occurring within 24 to 48 hours after the procedure, such as anastomosis leakage, bleeding, pneumoperitoneum, and perforation.

For the analysis of collected data, the Statistical Package for the Social Sciences (SPSS) version 25 was utilized. Age and BMI were presented as mean  $\pm$  standard deviation to summarize the central tendency and dispersion of these continuous variables. In contrast, gender and the occurrence of complications were detailed in frequencies and percentages, providing a categorical overview of these aspects. The association between gender and the emergence of complications post-surgery was examined using the Chi-Square test, with a p-value of  $<0.05$  considered statistically significant, indicating a meaningful correlation between these variables.

The study adhered to strict ethical standards, ensuring compliance with the Declaration of Helsinki principles for medical research involving human subjects. Ethical approval was obtained from the institutional review board before the commencement of the study, and informed consent was acquired from all participants, ensuring they were fully aware of the study's nature and its potential risks and benefits. This ethical consideration underscores the commitment to uphold the rights and well-being of the participants throughout the research process.

The methodology employed in this study was meticulously designed to investigate the post-operative complications among patients undergoing LCG for pancreatic pseudocyst. The comprehensive data collection, coupled with the rigorous analysis using SPSS 25, aimed to provide valuable insights into the factors influencing the occurrence of complications, thereby contributing to the enhancement of patient care and surgical outcomes in this cohort.

## RESULTS

In the conducted study, the gender distribution among the seventy patients treated with Laparoscopic Cystogastrostomy (LCG) for pancreatic pseudocyst revealed a slight predominance of female participants, accounting for 55.7% of the total, while male participants comprised 44.3%. This demographic data underscores the importance of considering gender-specific factors in the analysis and management of pancreatic pseudocysts.

The incidence of postoperative complications, as detailed in Table 1, showed that anastomosis leakage occurred in 11.4% of cases, highlighting a significant concern in the postoperative period. The majority of patients, however, did not experience this complication, with 88.6% reporting no anastomosis leakage. Similarly, pneumoperitoneum was observed in a smaller fraction of

patients, 7.1%, further indicating the relative rarity of such complications within the study population. Conversely, a more significant percentage of patients, 18.6%, experienced postoperative bleeding, marking it as one of the more common complications encountered. Perforation was the least common complication, noted in only 4.3% of the patients, suggesting that, while serious, such incidents were infrequent.

Table 1: Overview of Postoperative Complications

Postoperative Complications	Number (N)	Percentage (%)
<b>Anastomosis Leakage</b>		
Yes	8	11.4%
No	62	88.6%
<b>Pneumoperitoneum</b>		
Yes	5	7.1%
No	65	92.9%
<b>Bleeding</b>		
Yes	13	18.6%
No	57	81.4%
<b>Perforation</b>		
Yes	3	4.3%
No	67	95.7%

Table 2: Stratification of Postoperative Complications by Gender

Postoperative Complications	Gender	Male (N)	Male (%)	Female (N)	Female (%)	P value
<b>Anastomosis Leakage</b>	Yes	3	37.5%	5	62.5%	0.68
	No	28	45.2%	34	54.8%	
<b>Pneumoperitoneum</b>	Yes	1	20.0%	4	80.0%	0.25
	No	30	46.2%	35	53.8%	
<b>Bleeding</b>	Yes	5	38.5%	8	61.5%	0.63
	No	26	45.6%	31	54.4%	
<b>Perforation</b>	Yes	2	66.7%	1	33.3%	0.42
	No	29	43.3%	38	56.7%	

Stratifying the postoperative complications by gender (Table 2) provides deeper insight into the distribution across different genders. Anastomosis leakage, for instance, was reported in 37.5% of male patients and 62.5% of female patients who experienced this complication, with a P value of 0.68, indicating no statistically significant gender difference. Pneumoperitoneum showed a more pronounced gender discrepancy, occurring in 20% of male patients and 80% of female patients facing this issue, though the association did not reach statistical significance (P value = 0.25). Bleeding, another notable complication, was observed in 38.5% of male and 61.5% of female patients who experienced bleeding, with a P value of 0.63, further indicating the lack of a significant gender impact on this outcome. Perforation, the least common complication, presented a different pattern, with 66.7% of occurrences in male patients and 33.3% in female patients, resulting in a P value of 0.42, which again suggests no significant gender-based difference in the incidence of this complication.

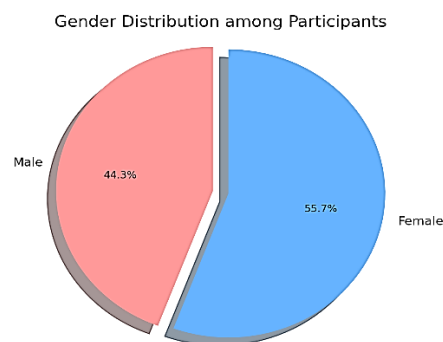


Figure 1 Gender

## DISCUSSION

In addressing the management of pancreatic pseudocysts, a range of treatment modalities including open surgery, percutaneous drainage, laparoscopic techniques, and endoscopic cystogastrostomy have been explored. Initial approaches often favor non-surgical interventions, emphasizing careful hydration, pain management, preventive antibiotics, and nutritional support through intravenous

or tube feeding, with the goal of fostering the natural resolution of the pseudocyst. Particularly in cases where pseudocysts exceed 5-6 cm in size and show progressive enlargement, as observed in our cohort, the imperative for invasive intervention escalates (13). Endoscopic cystogastrostomy (ECG) has emerged as the preferred standard due to its minimally invasive nature, expedited post-procedure recovery, and resultant reduction in the length of hospital stays (14). Despite the advantages of ECG, laparoscopic cystogastrostomy (LCG) remains a widely utilized method, offering positive outcomes albeit being more invasive. The necessity to occasionally transition to open surgery from endoscopic methods underscores the complexity of treating pancreatic pseudocysts. Comparatively, percutaneous cystogastrostomy (PCG) is less favored due to a heightened risk of recurrence and pancreatic fistula development.

While advancements in LCG have notably diminished complication rates, thereby enhancing the safety and efficacy of transmural drainage, the spectrum of potential complications, ranging from immediate postoperative issues to delayed complications due to retained transmural stents, warrants attention (15). Complication rates have been reported to vary widely, from 5% to 35%, with bleeding and perforation identified as the most common and severe adverse outcomes. The frequency of complications is influenced by the nature of the fluid collection and the procedural approach, with infected collections posing a higher risk of adverse events (16).

Our study, encompassing 70 patients with pancreatic pseudocysts (PP), noted a predominance of female patients, corroborating the gender distribution found in prior research that also reported a higher incidence of PP in females (17). The observed complications following LCG included anastomosis leakage in 11.4% of patients, pneumoperitoneum in 7.1%, bleeding in 18.6%, and perforation in 4.3%. These findings align closely with those of a similar study conducted in Pakistan, which reported anastomosis leakage in 15.71% of cases, pneumoperitoneum in 8.6%, and bleeding in 14.29% of patients (18). Moreover, the prominence of bleeding as a complication aligns with another study's findings, which suggested management through the administration of epinephrine (19), and perforation rates up to 4% post-LCG procedure have been documented (20).

The incidence of post-operative complications identified in our study—bleeding, anastomosis leakage, pneumoperitoneum, and perforation—underscores the inherent risks associated with the surgical management of pancreatic pseudocysts. The study's alignment with existing literature highlights the consistency of these complications across different cohorts. Despite these insights, our study acknowledges limitations such as the single-center design and the lack of long-term follow-up data to assess delayed complications. The necessity for a multicentric approach with a diverse patient population and extended follow-up periods is evident for a comprehensive understanding of the long-term outcomes and efficacy of LCG in the treatment of pancreatic pseudocysts. Future research should also explore comparative analyses between LCG and other less invasive techniques to refine patient selection criteria and optimize treatment strategies, aiming for reduced complication rates and enhanced patient care.

## CONCLUSION

The findings from this study on the post-operative complications following cystogastrostomy for pancreatic pseudocyst, specifically bleeding, anastomosis leakage, pneumoperitoneum, and perforation, underscore the critical nature of these potential outcomes in the surgical management of this condition. These insights have significant implications for healthcare, emphasizing the need for meticulous pre-operative planning, careful patient selection, and the adoption of best practices to mitigate risks. Furthermore, the data highlights the importance of ongoing research and innovation in surgical techniques to improve patient safety and outcomes. As healthcare continues to evolve, the quest for minimally invasive procedures with lower complication rates remains paramount, aiming to enhance the quality of life for patients suffering from pancreatic pseudocysts.

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