

COMPARATIVE STUDY OF OPEN CYSTOGASTROSTOMY VS LAPAROSCOPIC CYSTOGASTROSTOMY IN THE MANAGEMENT OF SYMPTOMATIC PSEUDOCYSTS OF PANCREAS

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ABSTRACT

Introduction: Pseudocyst of pancreas is a common sequelae of acute pancreatitis and it might require a surgical intervention for its management. Depending on the site of pseudocyst, various surgical procedures can be performed, cystogastrostomy by both open and laparoscopic approach being one of them. In this series, we aim to compare the efficacy and outcomes of open cystogastrostomy (OCG) and laparoscopic cystogastrostomy (LCG). **Materials and Methods:** A prospective observational comparative study was designed and carried out over a period of 18 months at a tertiary care centre enrolling cases of symptomatic pancreatic pseudocyst managed surgically. Demographic details, history, clinical findings, radiological findings, operative time, blood loss, post operative pain, and course in hospital was noted. Statistical analysis was done using independent t test as deemed appropriate. **RESULTS:** We found that LCG when compared with OCG is associated with shorter operative time (135 mins vs 115 mins) with statistically insignificant differences in blood loss. Patients undergoing LCG has lesser pain (3 vs 5.5 on visual analogue scale), required lesser drainage via abdominal drains (0 vs 3 days) and had fewer days of hospital admission (9 days vs 11 days). The postoperative morbidity of these procedures due to complications like surgical site infection was found to be 4.55% (1/22) for LCG and 21.43% (6/28) for OCG, with a p-value of 0.0294. **Conclusion:** LCG is safe, feasible, effective, requires a shorter hospital stay and enables early resumption of diet with reduced post-operative morbidity and mortality at nearly the same cost and thus is also cost-effective when compared to OCG.

KEYWORDS: Laparoscopic, cystogastrostomy, minimal access surgery.

INTRODUCTION

Pseudocyst of pancreas is one of the most common sequelae of acute pancreatitis and is a common cystic lesion. A pancreatic pseudocyst is defined as a fluid collection within or adjacent to the pancreas that becomes completely encapsulated with a mature, nonepithelialized, fibrous, inflammatory wall.

Open surgical cystoenterostomy has traditionally been the gold standard for internal drainage. Newer endoscopic and laparoscopic techniques have demonstrated similar efficacy in pseudocyst resolution along with the benefits of a minimally invasive approach, including decreased morbidity and hospital length of stay. When the anterior pseudocyst wall is seen to be

directly opposed to the posterior stomach wall from its location in the lesser sac, generally cystogastrostomy is the internal drainage procedure of choice. This study aims to compare the open & laparoscopic methods of cystogastrostomy and their clinical outcomes in patients.

AIMS AND OBJECTIVES

To evaluate the feasibility, efficacy and clinical outcome of patients undergoing laparoscopic cystogastrostomy (LCG) and open cystogastrostomy (OCG) for symptomatic pseudocysts of the pancreas.

MATERIALS AND METHODS

A prospective observational comparative study was designed and carried out over a period of 18 months at a tertiary care hospital after taking due permission from the Institutional Ethics Committee. Cases of symptomatic pancreatic pseudocyst, diagnosed by clinical and radiological work up were enrolled in the study.

Patients between the age group of 20-60 years of both sexes, having pseudocysts of diameter more than 6 cm and a wall thickness of more than 6 mm were included. A written informed consent was obtained prior, and a detailed note of pre operative, intra operative and post operative period was taken down. Demographic details, history, clinical findings, radiological findings, operative time, blood loss, post operative pain, and course in hospital was noted. Statistical analysis was done using independent t test as deemed appropriate.

RESULTS

A total of 50 patients were studied, out of which 22 underwent LCG and 28 underwent OCG. Out of them, 37 were males while the rest 13 were females (74% vs 26%). 17 patients (34%) belonged to the age group of 41-50 years making it the most common decade. All the 50 patients complained of dull aching pain felt in abdomen mostly in epigastrium (100%). 60% (30 patients) of them complained of nausea & vomiting on having food. 56% (28 patients) had a lump felt in their abdomen as a complaint. 46% (23 patients) experienced early satiety on having meals, whereas fever & anorexia was seen in 14% (7 patients) & 18% (9 patients) of the patients respectively.

The median operative time in LCG was found to be 115min (80-220min) and that in OCG was 135min (60-220min) with a p-value of 0.0329 i.e. statistically significant. The median blood loss during the two procedures was compared and was found to be 77.5ml

(50-100ml) for LCG and 85ml (60-110ml) for OCG with a p-value of 0.0778 i.e. >0.05 and hence was statistically insignificant. Thus, there was no significant difference in blood loss during either of the procedures. Two cases in the LCG group were converted to the open procedure due to intractable bleeding during the surgery.

Post operative outcomes were measured with parameters like pain, recovery, morbidity and mortality and cost incurred by the patient. Patients who underwent LCG had a median pain score of 3 as per the visual analogue scale on POD2 (range: 2- 5) and were given analgesics for a median period of 5 days (3-9), while the OCG group had a median score of 5.5 (range: 4-8) on pain scale and were administered post-op analgesia for median period of 6 days (3-20). The p-value for pain score & for the duration of post-op analgesia was <0.00001& 0.0023 respectively thus, indicating that there is significant difference in the two techniques with LCG having lesser post-op pain and requirement of analgesia compared to OCG.

The median duration of abdominal drains required post-surgery for LCG was 0 days (0-2) and that for OCG was 3days (2-12). The p-value for this observation was <0.00001 and was found to be significant. Thus, the open procedure required drainage of operative site for longer duration.

The bowel sounds returned and oral feeds were initiated after a median period of 24hrs (24-48) in LCG cases and after 30hrs (24-72) in OCG cases with a p-value of 0.0951. Hence, there was no difference between the two approaches with regards to post-op bowel activity and starting of oral feeds. Antibiotics were used for a median period of 5 days (5-10) in LCG cases and for 7 days (5-15) in OCG cases and the duration was found to be significantly different with a p-value of 0.0002. The patients who underwent LCG had a median hospital stay for a period of 9 days (6-16) post-operatively and 11 days (7-53) for OCG cases with a p-value of 55 0.0256.

Observations (median)	LCG	OCG	p value and inference
Duration of drains (days)	0 (0-2)	3 (2-12)	<0.00001 (S)
Return of bowel sounds (hours after surgery)	24 (24-48)	30 (24-72)	0.0951 (NS)
Resumption of oral feeds (hrs after surgery)	24 (24-48)	30 (24-72)	0.0951 (NS)
Duration of antibiotics used postoperatively (days)	5 (5-10)	7 (5-15)	0.0002 (S)
Duration of hospital stay (days)	9 (6-16)	11 (7-53)	0.0256 (S)

Only one patient from the LCG group developed fever post-operatively which responded to medical management. On the other hand, two patients who underwent OCG developed fever postoperatively, of which one patient was found to have lower respiratory tract infection (LRTI) which responded to antibiotics and the other patient was not found to have any specific cause for fever and subsided with antipyretics. Three patients who underwent OCG developed wound infection in the form of wound gape at the incision site

that were deep up to the subcutaneous plane and were managed by daily cleaning & dressing with healing by secondary intention. Another patient developed wound dehiscence with exposure of the rectus sheath and was managed with daily cleaning and dressing followed by secondary suturing of the wound. One patient was shifted to the intensive care unit (ICU) post-operatively due to poor ventilatory drive and was monitored in the ICU for a period of 7 days following which he succumbed to death.

Complications	LCG: n (%)	OCG: n (%)	p-value
Fever	1 (4.55)	2 (7.14)	
Wound infection	0	3(10.71)	
Wound dehiscence	0	1 (3.57)	
Death	0	1	
Nil	21	23	
Postoperative morbidity	1/22 (4.55)	6/28 (21.43)	0.0294 (S)
Postoperative mortality	0/22 (0)	1/28 (3.57)	0.1841 (NS)

The postoperative morbidity of these procedures due to above complications was found to be 4.55% (1/22) for LCG and 21.43% (6/28) for OCG, with a p-value of 0.0294. Thus, OCG was found to be a morbid procedure when compared to LCG.

The postoperative mortality of both procedures was 0% for LCG and 3.57% for OCG with a p-value of 0.1841. Hence, there was no significant effect of the procedure on postoperative mortality for the patient.

DISCUSSION

A pancreatic pseudocyst is defined as a fluid collection within or adjacent to the pancreas that becomes completely encapsulated with a mature, nonepithelialized, fibrous, inflammatory wall. In case of an episode of acute pancreatitis, fluid collection is called a pseudocyst only after at least four weeks have passed from the onset of the episode. A pseudocyst that persists beyond 4–6 weeks after an episode of pancreatitis, mostly presents with symptoms and shows failure to resolve if not intervened.

Open surgical cystoenterostomy has traditionally been the gold standard for internal drainage, with low recurrence rates for pseudocyst. Laparoscopic techniques have shown to have similar efficacy in pseudocyst resolution with the added benefits of a minimally invasive approach, with decrease in the morbidity and hospital stay of the patient. When the anterior pseudocyst wall is found to be directly in contact with the posterior stomach wall from its location in the lesser sac, cystogastrostomy is the internal drainage procedure of choice.

In our study, 50 patients who underwent cystogastrostomy for symptomatic pseudocyst were studied for open vs laparoscopic approach. 28 of them underwent open cystogastrostomy (OCG) and 22 underwent laparoscopic cystogastrostomy (LCG). The number of males who underwent the procedure was 37 and rest 13 were females and the female to male ratio was 0.35.

Pancreatic pseudocyst is more commonly seen in males as compared to females due to higher incidence of pancreatitis in males. Also, alcohol abuse is most commonly associated with pseudocyst formation after pancreatitis (50% to 70% of cases) in most 59 case series, which commonly occurs in male population. Similar results were seen in studies conducted by Khalid et al.^[1] with a female to male ratio of 12/28 (i.e.0.43) & Palanivelu et al.^[2] (32/76 i.e. 0.42) The age range of the patients studied was 21-59 years with a mean age of 40.1 years. Thus, majority of patients were of middle-aged group.

The mean age of study conducted by Palanivelu et al. (2007) was 43.6 years (18-70). Khaled et al. found the mean age to be 57 years (26-79). Majority of our patients presented with abdominal pain > nausea-vomiting > lump in abdomen > early satiety > anorexia > fever.

Similarly, patients in Palanivelu et al. (2007) study had mainly pain in abdomen as the most common symptom followed by abdominal lump, nausea-vomiting, early satiety and fever. The median operative time required for OCG & LCG was 135min and 115min respectively. These results were comparable with Khaled et al. (2004) with operative 60 time of 95min for OCG and 62min for LCG. Palanivelu et al. (2007) found the operative time to be 110min for OCG and 86min for LCG.

Observation	Ambore et al.			Khaled et al.		Palanivelu et al	
	LCG (n=22)	OCG (n=28)	p-value	LCG (n=30)	OCG (n=10)	LCG (n=90)	OCG (n=2)
Operative Time (min)	115 (80-220)	135 (60-220)	0.0329 (S)	62 (25-250)	95 (40-220)	86	110
Blood loss (ml)	77.5 (50-100)	85 (60-110)	0.0778 (NS)	91 (50-120)	N/A	66 (N/A)	120 (N/A)
Conversion to open surgery	2 (9.09)	N/A		2 (6.7)	N/A		N/A

The LCG proved to be a faster procedure when compared to OCG thus decreasing the morbidity and postoperative pain. The increased time required for OCG may be explained due to longer time required to open

and close the abdomen during laparotomy and also by presence of senior expertise present during the laparoscopic procedure. Both LCG & OCG had a minimal median blood loss of 77.5ml and 85ml

respectively. Khaled et al (2004) also reported that blood loss was minimal (<100ml per procedure) in both groups. 2 patients were converted from laparoscopic to open procedure due to intractable bleeding during the surgery. Similar results were seen from other studies (Khaled et al. & Palanivelu et al). LCG was associated with significantly lesser postoperative pain compared to OCG with a median numerical pain score of 3/10 vs 5.5/10. Khalid et al. (2004) & Palanivelu et al. (2007) also confirmed the same from their studies.

LCG is associated with less postoperative pain due to shorter skin incisions and minimum tissue handling.

The postoperative morbidity and mortality were found to be significantly more in OCG cases due to previously mentioned factors.

Complications	LCG: n (%)	OCG: n (%)	p-value	Khaled et al.
Postoperative morbidity	1/22 (4.55)	6/28 (21.43)	0.0294 (S)	0.024 (S)
Postoperative mortality	0/22 (0)	1/28 (3.57)	0.1841 (NS)	0.061 (NS)

This was confirmed by high morbidity and mortality rates seen in studies by Khalid et al. and Palanivelu et al. In a systematic review of the literature, LCG (n =40) of PPs was associated with low morbidity (7%), short postoperative hospital stays (median of 4 days), and a recurrence rate of 6.7% that was comparable to recurrence rates reported after open surgery.^[3] The mean duration of hospital stay was found to be 9.2days for LCG and 12.4days for OCG and thus was significantly less for the former. The mean cost of the surgery was found to be Rs.3145.5 for LCG and Rs.3255.5 for OCG in a government setup. The cost, thus, was nearly equal for the two procedures. Though the cost for LCG is high as compared to OCG, the total cost of open procedure at discharge becomes more or less same as that of laparoscopic type due to longer hospital stay and added bed charges in a government-based institute. The same may differ in the private sector and needs to be studied. The laparoscopic approach for the cystogastrostomy appears to be technically challenging to the newly practicing surgeon and has a longer learning curve when compared to the open approach due to the precise dissection and fine movements required during laparoscopic anastomosis (sutured or stapled). Although LCG is been widely performed by skilled laparoscopic surgeons, open surgery does have a definite role in the management of PP such as in patients with recurrent pseudocysts following LCG, patients with multiple PPs and patients who had previous multiple open abdominal surgeries.^[4]

Endoscopic drainage, especially when aided by endoscopic ultrasound (EUS), is also an important alternative management option for pancreatic pseudocysts, and is favoured when the cyst is indenting the stomach or duodenum and in the absence of necrotic pancreatic tissue.^[5] In addition, ED requires a highly skilled endoscopist and it does not facilitate necrotic tissue debridement or adjuvant procedures such as cholecystectomy at the same stage.

Hence, the duration of postoperative analgesia required is longer for OCG than for LCG. The postoperative requirement of drains for OCG was found to be more than LCG. The recovery of the patient with respect to return of bowel sounds, starting of oral feeds and need for antibiotics was found to be similar for both the procedures. However, patients undergoing LCG had a shorter duration of hospital stay than those who underwent OCG probably due to more duration of postoperative pain and possibility of infection at suture site.

CONCLUSION

Laparoscopy plays a major role in the surgical management of pseudocysts, with excellent long-term outcomes and also facilitates debridement of the necrotic material along with cholecystectomy in same sitting in case of gall stone induced pancreatitis. It is safe, feasible, effective, requires a shorter hospital stay and enables early resumption of diet with reduced post-operative morbidity and mortality at nearly the same cost and thus is also cost-effective (in a government setup). In conclusion, this comparative study demonstrated that the laparoscopic approach to internal drainage of pancreatic pseudocysts through cystogastrostomy offered advantages over open surgery in terms of reductions in operating time, reduction in operative morbidity and reduction in postoperative hospital stay.

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