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# LAPAROSCOPIC CYSTOGASTROSTOMY: THE WAY FORWARD IN MANAGEMENT OF PSEUSODOCYST OF PANCREAS

Surgery

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## ABSTRACT

Pseudocyst of pancreas account for 75% of cystic lesions of the pancreas. Most resolve spontaneously but up to 10% can cause serious complications. Invasive methods are required in management of symptomatic pseudocyst of pancreas. Current treatment options include open, laparoscopic and endoscopic internal drainage. While minimally invasive methods are rapidly gaining over open approach, superiority of one method over another need to be established.

**Aim:** To compare Laparoscopic vs. open internal drainage of Pseudocyst of Pancreas in our hospital in terms of efficacy, morbidity and mortality.

**Methods:** A total of 45 patients admitted to our tertiary care hospital during May 2013 to December 2017, were divided into open cystogastrostomy (OCG) and laparoscopic cystogastrostomy groups (LCG) and treated with intent to cure. Data was collected prospectively regarding operative efficacy, postoperative outcome, morbidity and mortality.

**Results:** 22 patients underwent LCG and 23 patients underwent OCG. Mean operative time was similar in both groups without any significant intra operative morbidity. One patient was converted due to dense adhesions. Postoperative pain, diet resumption and functional index was superior in comparison to open method (82% vs. 18.8%, POD2 vs. POD3 and 68% vs. 12.5% respectively) achieving statistical significance ($P < 0.05$). Duration of hospital stay was significantly shorter in LCG vs. OCG (4.8 vs. 8.6 days). 9% of patients had early complications in open group. No postoperative mortality or late complications in both groups was noted during mean follow up of 11 months.

**Conclusions:** Based on the results obtained, it can be safely assumed that in management of pancreatic pseudocysts, laparoscopic approach should be one of the first option in suitable patients and with a skilled surgeon in terms of efficacy, safety and lesser complications.

## KEYWORDS

Cystogastrostomy, Laparoscopic Cystogastrostomy, Pseudocyst Pancreas.

## INTRODUCTION

Pseudocyst of pancreas is the most common cystic lesion of the pancreas, accounting for up to 75% of all the pancreatic lesions [1]. Asymptomatic patients are managed conservatively by observation and serial ultrasonography/CT scans. Pseudocysts persisting for more than 6 weeks or more are prone for complications hence warrant decompression.

Conventionally treatment involved surgical creation of internal drainage between the pseudocyst and gastrointestinal tract. Open surgical drainage has been the gold standard in the management of pseudocysts [2,3]. Recent years has witnessed a revolution in the range of radiologic, endoscopic and laparoscopic approaches in treating pseudocysts. However with advances in laparoscopic techniques and instrumentation, it has further increased the ability to perform more complex laparoscopic pancreatic procedures and has been recommended as a safe, reliable and minimally invasive option for managing pseudocysts. With this perspective, comparison between open and laparoscopic management of pseudocyst of pancreas has been conducted in this study.

## MATERIALS AND METHODS

This prospective study includes 45 patients who underwent open or laparoscopic surgical treatment for pseudocyst of pancreas in our teaching hospital during May 2013 to December 2017. Patients were divided into two groups i.e., laparoscopic cystogastrostomy group (LCG) and open cystogastrostomy group (OCG). All patients were routinely evaluated with CBC, LFT, Ultrasonography/CECT abdomen, ECG, Chest radiograph, serum amylase, serum lipase and bleeding parameters. All the data were entered prospectively and the patients were assessed for age, gender, risk factors, co morbid illness, intra operative findings, complications, duration of surgery, postoperative pain, mobilisation, postoperative diet, duration of hospital stay and follow up at 15 days, 1 month, 3months and 6 months. Postoperative pain was assessed using Visual Analogue scale (VAS)(score 1-10) at 4hours, 12 hours, 24 hours, 48 hours and 1 week. Postoperative mobilization has been assessed using functional index which includes climbing stairs, mounting a bed and squatting (Grades 1-3).

Patients with mature pseudocysts which fail to regress after 6 weeks of observation with a wall thickness of >6 mm and diameter more than 6 cm were included in this study. Patients with immature, multiple pseudocysts, pancreatic abscess, acute attack on chronic pancreatitis and patients unfit for surgery were excluded from the study.

## SURGICAL TECHNIQUE

### Open cystogastrostomy method:

A cystogastrostomy is ideal when the pseudocyst is adherent to the posterior stomach and indenting it. An upper midline laparotomy was performed under general anaesthesia. A longitudinal anterior gastrostomy was done. A disc of posterior stomach wall with adjacent pseudocyst wall (minimum 4 to 5cm in diameter) is excised. The tissue is sent for frozen section in all cases to exclude cystic neoplasia. Stoma should be large enough to allow transgastric debridement of cavity. Sutures are placed continuously to secure the opening and reduce the risk of bleeding. Anterior gastrostomy closed in two layers.

### Laparoscopic cystogastrostomy (Anterior transgastric approach):

With the patient under GA, pneumoperitoneum is created with 10mm port placed supraumbilically, and three 5mm working ports at subxiphoid, midclavicular line on the right and left subcostal region respectively. An anterior gastrostomy(5 to 6cm) is performed. After the cyst has been localized (EUS or needle aspiration) the cyst cavity is entered with harmonic scalpel dissection. A wedge of tissue sent for frozen section to rule out neoplasm. A large 4 to 5cm diameter incision is made on the posterior wall of stomach and cyst wall by diathermy or endoscopic staples (better hemostasis). The anterior gastrostomy is closed with interrupted sutures or staples.

## STATSITICAL ANALYSIS:

Data was collected progressively from study subjects and then put in a database (Microsoft Excel). Statistical evaluation using SPSS software, version 18 (IBM, USA) with simple percentage, mean, range and P value was derived to establish the results.

**TABLE 1: Baseline demographic data and clinical parameters**

| Parameters | Laparoscopy (n=22) | Open (n=23) |
|---|---|---|
| Mean Age (years) | 36.7 years | 38.3 years |
| Gender (M,F) | M=19,F=3 | M=21, F=2 |

| | | |
|---|---|---|
| Etiology<br>• Alcohol<br>• Biliary<br>• Idiopathic | 16 (72.7%)<br>4 (18.2%)<br>2 (9%) | 19 (82.6%)<br>2 (8.6%)<br>2 (8.6%) |
| Presenting Complaint<br>• Abdominal pain<br>• Epigastric distension<br>• Nausea and Vomiting | 22 (100%)<br>16 (72.7%)<br>12 (54.4%) | 23 (100%)<br>18 (78.2%)<br>9 (56.3%) |
| Co morbid illness<br>• Diabetes<br>• COPD<br>• Hypertension | 5 (22.7%)<br>0<br>4 (18.2%) | 6 (26%)<br>3 (13%)<br>2 (8.6%) |

**Definitions:**
Postoperative morbidity included all complications that developed within 30 days of surgery. Postoperative hospital stay was calculated from day of surgery to discharge.

Operative duration considered in minutes as interval from incision to skin closure.

## RESULTS

A total of 45 patients who underwent open or laparoscopic surgery for pseudocyst of pancreas, during May 2013 to Dec 2017 were included in the study. Open cystogastrostomy group (OCG) and laparoscopy cystogastrostomy group (LCG) had 23 and 22 patients respectively. The mean age in laparoscopic group was 36.7 years (range 18-44years) and that for open group is 38.3 years (range 19-60years). LCG had 3 females and 19 males and OCG had 2 females and 21 males. 11 patients had diabetes mellitus, 3 patients had COPD and 6 patients had hypertension as their co morbid illnesses [Table 1].

72% of the patients (n=16) in LCG had alcoholism as their aetiology where as 83% (n=19) of OCG were alcoholics. Abdominal pain (100%) was the most common presenting complaint followed by epigastric distension (74%) and nausea and vomiting (55%). Jaundice and weight loss were the lesser common presenting complaints.

Mean duration of surgery for LCG was 122.5 min (range 95-160) and for OCG was 124.4 min (range 100-150). Intraoperatively 9% (n=2) in OG had bleeding which was controlled adequately. One patient of LCG was converted to open method in view of extensive adhesions.

Majority patients of LCG had a postoperative pain VAS score of <3 in 81.8% (n=18) whereas OCG patients had score >3 in 78.2% patients (n=17). Patients in LCG had their nasogastric tube removed on 2nd postoperative day and were started on liquid diet, however nasogastric tube in OCG patients were removed on 3rd postoperative day based on their recovery. Higher percentage (68%) of LCG patients had a higher functional index (Grade 1) at the end of 1st week indicating faster recovery.

9% (n=2) patients in OCG had SSI and one out of the two developed wound dehiscence. No patient in LCG had any wound complications. Mean duration of hospital stay was 4.8 days (range 4-7days) and 8.6 days (range 6-19days) for LCG and OCG respectively. Mean scar size was 2.9cm and 8.9cm for LCG and OCG respectively. No mortality was noted in either of the groups. No recurrence or late complication was noted in follow up period in both the groups [Table 2].

## DISCUSSION

This prospective comparative study was done in a tertiary care centre for the management of symptomatic nonresolving pancreatic pseudocysts. Open drainage was compared to laparoscopic drainage procedure in terms demographics, operative time, hospital stay, morbidity, postoperative pain and follow up at regular intervals.

**TABLE 2: Outcome parameters of the study**

| Parameters | Laparoscopy (n=22) | Open (n=23) | P value |
|---|---|---|---|
| Mean operative time (min) | 122.5 (95-160) | 124.4 (100-150) | 0.266 |
| Postoperative VAS score<br>• 1-3<br>• >3 | 18 (81.8%)<br>4 (18.1%) | 5 (21.7%)<br>18 (78.2%) | <0.05 |
| Resumption of diet, mean in days | 1.8(1-2) | 3 (2-4) | <0.05 |
| Functional index | 15 (68%) | 3 (13%) | <0.05 |
| Mean hospitalization (days) | 4.8 (4-7) | 8.6 (6-19) | <0.05 |
| Mean scar size (cm) | 2.9 | 8.9 | - |
| Complications (n)<br>• Bleeding<br>• Wound infection<br>• Wound dehiscence | 1 (4.5%)<br>0<br>0 | 2 (8.6%)<br>1 (4.3%)<br>1 (4.3%) | - |
| Conversion (n) | 1 (4.5%) | NA | - |
| **P<0.05 is statistically significant** | | | |

Traditionally treatment of pancreatic pseudocyst has always been surgical, more so by open method [4-6]. With the advent of better imaging modalities, camera systems, haemostatic equipments and rapidly improving minimal invasive skills amongst surgeons, most pseudocysts can be managed by minimally invasive approach either by laparoscopy or endoscopy.

In this study majority patients were in the age group of 30-45 years, younger in comparison to other similar studies [7,8]. Chronic alcoholism was the major etiological factor in this study in contrast to similar studies [7,9].

Cystogastrostomy was done exclusively in both laparoscopic and open groups which enabled us to standardise the study which removes variable factors like method of entry, type of anastomosis and haemostasis techniques. This study illustrates low morbidity of 9%, mean hospitalisation of 4.8 days and no recurrence at a median follow up of 11months and is comparable with a systematic review done by Bhattacharya et al [10] which showed laparoscopic cystogastrostomy (n=40) for pancreatic pseudocyst had low morbidity (7%), short hospitalisation (mean of 4 days) and recurrence rate (6.7%) and was in turn comparable to open drainage. In the largest series of laparoscopic cystogastrostomy by Palanivelu et al (n=90) reported a mean hospital stay of 5.6 days, morbidity of 3.3% and 1% recurrence rate [9]. In a recent study done in 2015 by Crisanto-campos BA et al [11] reported a morbidity of 5.9%, mean hospital stay of 6.8 days and no recurrence [Table 3].

In our experience, mean operative time of laparoscopic cystogastrostomy was 122.5 min which was similar to the open procedure (124.4 min). This can be attributed to longer duration taken in early cases of the study because of the initial learning curve. This is in contrast to shorter duration in other notable series published (62-86 min).

**TABLE 3: Comparison of outcomes of Laparoscopic Cystogastros tomy in similar studies**

| Authors | n | Mean Operative time (min) | Mean hospital stay (days) | Complications (%) | Recurrences (%) | Conversion (%) | Mean Follow up (months) |
|---|---|---|---|---|---|---|---|
| Crisanto-campos BA et al (2015) | 17 | 177 min | 6.8 days | 5.9% | 0 | 0 | 40 |
| Khaled Y et al (2014) | 30 | 65 min | 6 days | 0 | 3.3% | 6.7% | 13 |
| Palanivelu C et al (2007) | 90 | 86 min | 5.6 days | 4.6% | 1% | 0 | 54 |
| Present study | 22 | 122.5 min | 4.8 days | 4.5% | 0 | 4.5% | 11 |

Most important outcomes of this study are lower postoperative pain (VAS <3 in 82% patients), early diet resumption on 2nd postoperative day and higher functional index (Grade 1 in 68% patients) in comparison to OCG with postoperative pain (VAS <3), resumption of diet, functional index at 21.7%, 3rd postoperative day and 13% respectively achieving statistical significance with p<0.05 in each of these parameters. Median scar size in LCG and OCG were 2.9 cm and 8.9 cm respectively which are significant and making it cosmetically better.

## CONCLUSION

Laparoscopic drainage is equally efficacious in terms of safety, outcome on long term follow up and better in terms of postoperative recovery, morbidity, less postoperative pain, decreased duration of hospitalization, early resumption of diet, fewer complications and low recurrence. However longer follow up would be ideal. Though open surgical drainage has been the method of choice in the past,

laparoscopic drainage can safely be offered to patients with a solitary pseudocyst of pancreas. However, learning curve in acquiring laparoscopic skills and cost factor do influence the outcome of the patient. A larger study group would be beneficial to establish the superiority of laparoscopic approach.

**Conflict of Interest:** Authors declare that there is no conflict of interests.

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