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Case Series

Outcomes and insights from a case series of laparoscopic gastrojejunostomy for gastric outlet obstruction

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ABSTRACT

Laparoscopic gastrojejunostomy (LGJ) has been proposed as the technique preferred over open gastrojejunostomy technique for relieving gastric outlet obstruction (GOO) due to malignant and benign disease. This study investigates the feasibility and safety of LGJ for GOO compared to the open technique of gastrojejunostomy. This retrospective study reviewed 10 patients (8 males, 2 females) who underwent LGJ at SMS Medical College and Hospital from 2023 to 2024. Data was collected from hospital records, focusing on patient demographics, medical history, symptoms, diagnostic workup, operative details, and postoperative outcomes. The long-term outcomes and survival rates were also assessed. The 10 patients had a mean age of 38.9 years (range: 30-74). Surgical indications included benign duodenal strictures (6 patients) along with 4 cases with malignancy (2 for palliative treatment of gallbladder carcinoma and 2 for pancreatic head carcinoma). The average operative time was 90 minutes, and the average hospital stay was 5 days. There were no intraoperative or postoperative mortalities, anastomotic leaks, conversions to open surgery, or dumping syndrome cases. Only one of the ten patients assessed, a case of pancreatic head carcinoma, experienced a complication in the form of grade A delayed gastric emptying. All other patients advanced to accept clear liquids by postoperative day 3 and semi-solid food by day 4, with discharge on day 5. No reoperations were required, and pain control was effective, with the visual analog scale (VAS) score reducing from a maximum of 3 on the day of surgery. Laparoscopic gastrojejunostomy is a safe and effective approach for treating gastric outlet obstruction, providing favourable outcomes in both benign and malignant cases. The procedure is associated with low morbidity, minimal postoperative complications, and effective symptom relief, making it an optimal surgical option which is arguably superior to open gastrojejunostomy for managing GOO.

Keywords: Gastric outlet obstruction, Laparoscopic gastrojejunostomy, Peptic ulcer disease, Periampullary malignancy, Minimally invasive surgery, Postoperative outcomes, Palliative surgery

INTRODUCTION

Gastric outlet obstruction (GOO) can result from advanced stages of various disease processes. Historically, peptic ulcer disease (PUD) was the leading and most common cause of GOO.[1]

However, with the advent of proton-pump inhibitors and the successful eradication of *H. pylori*, GOO due to PUD has become rare, and most cases today are attributed to periampullary malignancies.[2,3] The primary goal of surgery, particularly in patients with advanced malignancies, is to restore oral intake and improve the patient's quality of life.[4-6] Several treatment options for GOO have been described. Traditionally, open gastrojejunostomy (GJ) was the standard surgical approach.

However, compared to laparoscopic surgery, patients undergoing open laparotomy often experience greater postoperative pain and require longer hospital stays.[7] With the increasing prevalence of minimally invasive techniques, laparoscopic GJ has emerged as a preferred method, offering reduced patient morbidity and mortality.

CASE SERIES

A retrospective review was conducted on patients who underwent laparoscopic gastrojejunostomy at SMS Medical College and Hospital, Jaipur between 2023 and 2024. Cases were identified using the hospital database, and Hospital records were reviewed for patient demographics, medical history, presenting symptoms, diagnostic findings, operative details, postoperative outcomes and pathologic findings. Additionally, long-term outcomes and survival rates were assessed to provide a comprehensive understanding of the procedure's effectiveness and patient prognosis.

Operative procedure

Laparoscopic gastrojejunostomy (LGJ) is a minimally invasive surgical procedure used to create a bypass between the stomach and jejunum, primarily for managing gastric outlet obstruction (GOO) caused by either benign or malignant conditions. The procedure begins with preoperative evaluation, including imaging studies and laboratory tests, followed by the administration of general anaesthesia and positioning of the patient in a supine position with a slight Trendelenburg tilt. After establishing pneumoperitoneum, a laparoscope is inserted through an infraumbilical port, along with additional ports for working instruments.

The surgeon conducts a thorough exploration of the abdominal cavity to assess the extent of the obstruction and mobilizes the stomach's greater curvature. The jejunum is then identified approximately 30 cm distal to the ligament of Treitz and mobilized for a tension-free anastomosis. A side-to-side or end-to-side anastomosis is created using a linear stapler, ensuring that the anastomosis is adequately sized and tension-free. After inspecting the anastomosis for leakage and bleeding, the procedure is concluded by closing the port sites and transferring the patient to the recovery unit for monitoring. Postoperatively, the patient is kept nil per oral for two days before gradually advancing the diet as tolerated. LGJ offers several advantages including reduced postoperative pain, shorter recovery time, and decreased length of hospital stay, making it a valuable option in the surgical management of gastric outlet obstruction. However, awareness of potential complications, such as anastomotic leaks and bowel obstruction, is essential for ensuring successful patient outcomes.

Demographics, etiopathology and surgical outcomes

In this retrospective study, we analysed 10 patients (8 males and 2 females) with a mean age of 38.9 years (range 30-74 years) who underwent laparoscopic gastrojejunostomy (LGJ) at our institution between 2023 and 2024. The outcomes revealed promising results for the management of gastric outlet obstruction (GOO) using LGJ. The surgical indications included benign strictures in the duodenum (D1) in 6 patients as well as 4 cases with malignancy (2 palliative LGJ for gallbladder carcinoma and 2 cases of pancreatic head carcinoma).

The average operative time was 90 minutes, with a mean hospital stay of 5 days. Importantly, there were no post-operative or intraoperative mortalities, no anastomotic leaks, no conversions to open surgery, and no cases of dumping syndrome. Post-operatively, patients were kept nil per oral for 2 days, progressed to clear liquids by day 3 and semi-solid diet by day 4, with discharge on day 5. One patient suffering from pancreatic head carcinoma had post operative complication of grade A delayed gastric emptying. The patient was able to progress to a semisolid diet by postoperative day 7.

Follow-up visits on postoperative day 10 showed improved feeding and nutritional status with no need for reoperation, further highlighting the procedure's success. Pain control was also effective, with an average maximum VAS score of 3 on the day of surgery, which continued to decrease during the recovery period. Till the time of writing this study, no patient presented with complaints of incisional hernia postoperatively. These findings suggest that LGJ is a safe and effective option for treating GOO, yielding positive outcomes in both benign and malignant cases.

Table 1: Demographic characteristics and causes of obstruction of patients undergoing laparoscopic gastrojejunostomy.

Parameter	Details
Demographic characteristics	
Total patients	10
Gender distribution	Male: 8, Female: 2
Age range (in years) (average)	30 to 74 (38.9)
BMI (Average)	17 to 23 (21)
Average duration (months) of pre-operative symptoms	4-8
Pre-operative OGD scopy	No passage of scope/ guide wire into D1
Indications for surgery	Benign stricture at D1: 6 patient's malignant cases: 4 patients, (Palliative for gallbladder carcinoma: 2 pancreatic head carcinoma: 2)

Table 2: Intraoperative details and surgical outcomes of patients.

Surgical outcome	
Operative time (average)	90 minutes
Length of hospital stay	5 days
Post-operative mortality	0%
Intraoperative mortality	0%
Anastomotic leak	0%
Conversion to open surgery	0%
Dumping syndrome	0%
Delayed gastric emptying	10%
Post-operative care	Nil per Oral (NPO) for 2 days, passed flatus on POD 2, No drain placed intraoperatively
Diet progression (average)	Liquids allowed on POD 3, semi-solid diet on POD 4
Discharge (average)	POD 5
Follow-up	On POD 10
Reoperation required	0
Average vas pain score	3 on the day of surgery, decreased post-op

DISCUSSION

Different modalities have been described for the treatment of GOO resulting from advanced malignancy and benign disease. Open GJ used to be the only method to relieve GOO. Since the introduction of endoscopic stenting and laparoscopic surgery, less invasive approaches are now more commonly being used. In this study, we reviewed our experience of laparoscopic gastrojejunostomy as a treatment modality for GOO in comparison to open gastrojejunostomy. In our study, the average operative time for laparoscopic gastrojejunostomy (GJ) was 90 minutes, which is notably shorter than the average 111 to 140 minutes reported in prior literature for open GJ procedures.[8,9] This variation can be attributed to several factors, including the increasing proficiency and experience of the surgical team over time. Previous studies have consistently demonstrated that operative time decreases as surgeons gain more expertise with laparoscopic techniques and specific procedures.[11] The reduction in time in our case series reflects this learning curve, emphasizing the role of technical skill development in achieving greater efficiency while maintaining surgical precision.

Additionally, patient-related factors, such as simpler anatomy or reduced complexity of the cases in our series, may have also contributed to the decreased operative time. This improvement underscores the potential for refining laparoscopic GJ as a more time-efficient option to open technique, with benefits for both surgical teams and patient outcomes. The median length of postoperative hospital stay observed in this case series was 5 days, which is shorter than the reported length of stay for open cases. Jeurnink et al performed a systemic review of publications on GJ between 1996 and 2006.[11] Of the 297 cases of GJ, 226 patients had open GJ, and their average length of stay ranged from 8.5 days to 24 days. Patients in this study had a median time to solid food intake of 4 days, which was comparable to that of laparoscopic GJ cases cited in the literature. Alam et al and Kazanjian et al both reviewed patients with GOO secondary to inoperable cancer and found the median time to solid food after laparoscopic GJ to be 4 days.[12] In our study, median time to solid food after LGJ was also 4 days.[13] In contrast, open GJ generally required 7 days before a patient could resume solid food.[9] This data shows that laparoscopic GJ can lead to excellent results with reduced intraoperative time and blood loss, earlier recovery of oral feeding, and shorter length of stay than open GJ. In addition, open surgery carries the risk of development of an incisional hernia postoperatively which is reduced significantly with a laparoscopic procedure. Till date, none of the patients of our study had a documented incisional hernia that required repair on follow-up.

In our study, one patient suffered a complication in the form of grade A delayed gastric emptying and was able to tolerate semi solid foods by postoperative day 7 following laparoscopic gastrojejunostomy (GJ). In contrast, a systematic review by Jeurnink et al reported a complication rate ranging from 0% to 31% for laparoscopic GJ and 0% to 88% for open GJ procedures.[11] Among complications, delayed gastric emptying was the most commonly reported issue. Zhang et al identified delayed gastric emptying as a frequent complication, consistent with the findings of Guzman et al who observed this condition in 20% of their patients (4 out of 20) after laparoscopic GJ.[14] Similarly, Brune et al reported delayed gastric emptying in 18% of cases (3 out of 16 patients).[15,16] However, these rates were lesser than the incidence of delayed gastric emptying reported to be 26% following open gastrojejunostomy by Doberneck et al.[17] These findings highlight the variability in complication rates and the prominence of delayed gastric emptying as a common postoperative challenge in laparoscopic GJ, further emphasizing the importance of surgical expertise and careful postoperative management.

In our study, the average VAS (maximum pain score of 3 on the day of surgery, which decreased post-operatively) aligns with findings from several studies that emphasize the superiority of laparoscopic gastrojejunostomy (GJ) in reducing post-surgical pain and accelerating recovery. Zhang et al reported a reduction in postoperative pain and improved recovery times in patients undergoing laparoscopic GJ for gastric outlet obstruction (GOO) secondary to malignancy.[14] Similarly, Guzman et al, highlighted that laparoscopic GJ resulted in lower pain scores and shorter hospital stays compared to open surgery. Brune et al also found a significant reduction in postoperative pain and quicker recovery after laparoscopic GJ for palliative treatment of GOO.[16] In concurrence to past studies, our study also confirms that the laparoscopic technique offers significant benefits in managing pain and facilitating faster recovery with lower complication rates, reinforcing the effectiveness of laparoscopic GJ in the treatment of GOO.

CONCLUSION

This case series underscores the safety and efficacy of laparoscopic gastrojejunostomy (GJ) as a reliable and potentially superior alternative to open GJ for treating gastric outlet obstruction (GOO) in both benign and malignant conditions. The procedure demonstrated key benefits, including reduced intraoperative blood loss and time, quicker recovery of oral feeding, shorter hospital stays and lesser chances of complications such as mortality, anastomotic leak, delayed gastric emptying or dumping syndrome. With zero conversion to open surgery and excellent postoperative recovery, this study reinforces laparoscopic GJ as an effective surgical option. Larger studies are recommended to validate these findings and guide standardized protocols by further analyzing the nuances of this procedure.

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