



Postoperative Outcomes after Laparoscopic and Open Gastrectomy

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Article History

Volume 6, Issue 8, 2024

Received: 03 June 2024

Accepted: 12 Aug 2024

Published: 30 Aug 2024

[doi:10.48047/AFJBS.6.8.2024.3826-3831](https://doi.org/10.48047/AFJBS.6.8.2024.3826-3831)

ABSTRACT

Background: Surgical treatment of gastric diseases, particularly cancer, still incorporates gastrectomy as an essential procedure. With the introduction of laparoscopy, laparoscopic gastrectomy has become a compelling option in comparison to open surgery owing to its possible advantages in recovery and complication rates associated with the surgery. This study aims to evaluate the difference in postoperative outcomes of laparoscopic and open gastrectomy regarding operative times, recovery profiles, and complication rates.

Methods: This study was carried out from January 2022 to January 2023, enrolling a total of 78 patients who had undergone laparoscopic (n=42) and open (n=36) gastrectomy. Hospital stay, bowel function return time, and other complications were collected along with demographic information, intraoperative details, and postoperative outcomes.

Results: While laparoscopic gastrectomy was associated with a longer operative duration (192.4 ± 25.1 vs. 165.2 ± 22.3 minutes, $p < 0.001$), it resulted in significantly less blood loss ($p = 0.005$), shorter hospital stay ($p = 0.001$), earlier oral intake ($p < 0.001$), and fewer wound and pulmonary complications. No difference was observed in 30-day mortality or reoperation rates between the groups.

Conclusion: Laparoscopic gastrectomy demonstrates superior short-term outcomes compared to the open approach, with fewer complications and faster recovery, making it a viable option for elective gastric surgery when expertise is available.

Keywords: Laparoscopic gastrectomy, open gastrectomy, postoperative complications, minimally invasive surgery, gastric cancer, recovery outcomes.

INTRODUCTION

Surgical treatment for benign and malignant gastric disease, especially gastrectomy, requires action for both surgical and medical methods. Historically, surgical gastrectomy was performed via an open technique, but it has more recently progressed into laparoscopic gastrectomy. Laparoscopic gastrectomy is done with the aid of a camera system, and aims to make surgical trauma as minimal as possible while preserving the function of the organ, the underlying cancer, and non-invasively accessing the abdomen [1-3].

Laparoscopic gastrectomy is gaining popularity because it offers benefits such as decreased postoperative discomfort, smaller incisions, shorter hospital admissions, and quicker resumption of daily activities. Regardless of these perceived benefits, apprehensions persist about the lengthier operative time, steep learning trajectory, as well as the complex nature of lymph node removal and anastomosis under minimally invasive conditions owing to the meticulous techniques involved [4-6].

Different comparative studies and randomized trials have been conducted to try and solve these issues, each arriving at different conclusions. Some studies have shown clear improvement in recovery after surgery, whereas others focus on the importance of careful patient selection and surgical skill. Also, differences in outcomes among less experienced and more experienced centers contributes to the existing confusion on agreement [7-9].

In light of these existing controversies, this particular study sought to evaluate the differences in postoperative outcomes for laparoscopic versus open gastrectomy within a single institution. The focus was to evaluate recovery markers, complication rates, and intraoperative parameters to assess the practical advantages and limitations of each approach in a real-world surgical setting.

METHODOLOGY

This observational comparative study was conducted for one year 'from January 2022 to January 2023' at Department General Surgery unit 2 Central Park Hospital Lahore. A total 78 participants who underwent gastrectomy for different reasons, most commonly for gastric carcinoma. Approval from the ethical review board was acquired. Patient records were kept confidential, and the study complied with the Declaration of Helsinki.

The research utilized a retrospective cohort approach. They were subdivided according to the surgical method used: laparoscopic gastrectomy and open gastrectomy. Of the 78 patients studied, 42 underwent laparoscopic procedures and 36 had conventional open gastrectomy. The sample size was calculated by analyzing the surgical logs within the study period and including all qualifying participants meeting the set inclusion criteria.

Inclusion Criteria

- Patients 18 years and older.
- Patients who have undergone total or partial gastrectomy for benign or malignant gastric conditions.
- Accessibility to the entire medical file with all documents including the operational and post operational monitoring records

Exclusion Criteria

- Patients who required emergency surgery.
- Those who had undergone previous major abdominal surgery.
- Patients with incomplete data or who were lost to follow-up within 30 days postoperatively.
- Patients undergoing palliative or bypass procedures without resection.

Data were collected retrospectively from hospital records, including preoperative, intraoperative, and postoperative notes. Baseline demographics such as age, gender, body mass index (BMI), comorbidities (including diabetes and hypertension), ASA (American Society of Anesthesiologists) physical status classification, and ECOG (Eastern Cooperative Oncology Group) performance status were recorded.

'Operative variables included the type of gastrectomy (total or subtotal), surgical approach (laparoscopic or open), duration of surgery, estimated blood loss, and any intraoperative complications'. Tumor-related data such as location, TNM stage, and whether neoadjuvant chemotherapy was administered were also documented when applicable.

Postoperative outcomes were the primary focus and included length of hospital stay, time to oral intake, return of bowel function, incidence of surgical site infections, pulmonary complications, anastomotic

leaks, reoperation rates, and 30-day mortality. 'All complications were categorized according to the Clavien-Dindo classification system'.

In this study, data were input and analyzed through SPSS version 25.0. The independent t-test was utilized to compare continuous variables expressed as means with standard deviations. Categorical variables were summarized with frequencies and percentages, and the Chi-square test or Fisher's exact test, as appropriate, were used for comparisons. Statistical significance was set for p values less than 0.05.

RESULT

Out of 78 patients who underwent gastrectomy, 42 patients (53.8%) underwent laparoscopic surgery while 36 patients (46.2%) 'underwent open gastrectomy'. 'The mean age of patients in the laparoscopic group was slightly lower (54.2 ± 9.6 years) compared to the open group (56.8 ± 10.1 years), but this difference was not statistically significant ($p = 0.274$)'. Male predominance was seen in both groups (64.3% in laparoscopic vs. 66.7% in open, $p = 0.812$). The mean BMI was also comparable between both groups ($p = 0.435$). Comorbidities including hypertension and diabetes were evenly distributed and did not show significant differences. Most patients in both groups had an ASA score of II or III, and ECOG status was comparable, indicating similar preoperative fitness.

Table 1: Baseline Demographics and Clinical Characteristics

Variable	Laparoscopic (n=42)	Open (n=36)	p-value
Mean Age (years)	54.2 ± 9.6	56.8 ± 10.1	0.274
Male Gender (%)	27 (64.3%)	24 (66.7%)	0.812
BMI (kg/m^2)	23.9 ± 3.1	24.5 ± 3.4	0.435
Hypertension (%)	18 (42.9%)	16 (44.4%)	0.891
Diabetes Mellitus (%)	14 (33.3%)	13 (36.1%)	0.790
ASA Score II–III (%)	35 (83.3%)	30 (83.3%)	1.000
ECOG ≤ 2 (%)	38 (90.5%)	32 (88.9%)	0.815

The laparoscopic group's mean operative time (192.4 ± 25.1 minutes) 'was significantly longer than that of the open group's (165.2 ± 22.3 minutes) with $p < 0.001$ '. The estimated blood loss, however, was significantly lower for the laparoscopic group ($p = 0.005$). Total gastrectomy was more common in the open group, although this was not statistically significant. Intraoperative complications were seen in two subjects from the open group and one from the laparoscopic group.

Table 2: Operative Parameters

Variable	Laparoscopic (n=42)	Open (n=36)	p-value
Operative Time (min)	192.4 ± 25.1	165.2 ± 22.3	<0.001
Blood Loss (mL)	145.6 ± 30.8	208.7 ± 45.2	0.005
Total Gastrectomy (%)	16 (38.1%)	19 (52.8%)	0.192
Intraoperative Complications (%)	1 (2.4%)	2 (5.6%)	0.587

Recovery for patients who received laparoscopic gastric surgery was markedly enhanced, as demonstrated by their hospital stays, which on average, was lower (5.3 ± 1.7 days) in comparison to the open surgery cohort (7.1 ± 2.4 days), displaying a statistically significant difference ($p = 0.001$). They also resumed taking liquids and returned to normal intestinal activity at an accelerated rate when compared to patients with open procedures. Complications after the surgery, like wound infection and respiratory complications, were noted to be lower in the laparoscopic group. Mortality for both groups in the 30 days after the operation was done was none, and reoperation rate, hospital readmission rate, and other associated metrics were similar for both groups.

Table 3: Comparison of Postoperative Recovery and Complication Rates between Laparoscopic and Open Gastrectomy

Outcome Variable	'Laparoscopic (n=42)'	'Open (n=36)'	p-value
Hospital Stay (days)	5.3 ± 1.7	7.1 ± 2.4	0.001
Time to Oral Intake (days)	2.1 ± 0.8	3.5 ± 1.2	<0.001
Return of Bowel Function (days)	2.9 ± 0.9	4.2 ± 1.1	<0.001
Wound Infection (%)	1 (2.4%)	6 (16.7%)	0.027
Pulmonary Complication (%)	2 (4.8%)	7 (19.4%)	0.045
Reoperation (%)	1 (2.4%)	2 (5.6%)	0.587

30-day Mortality (%)	0 (0%)	0 (0%)	–
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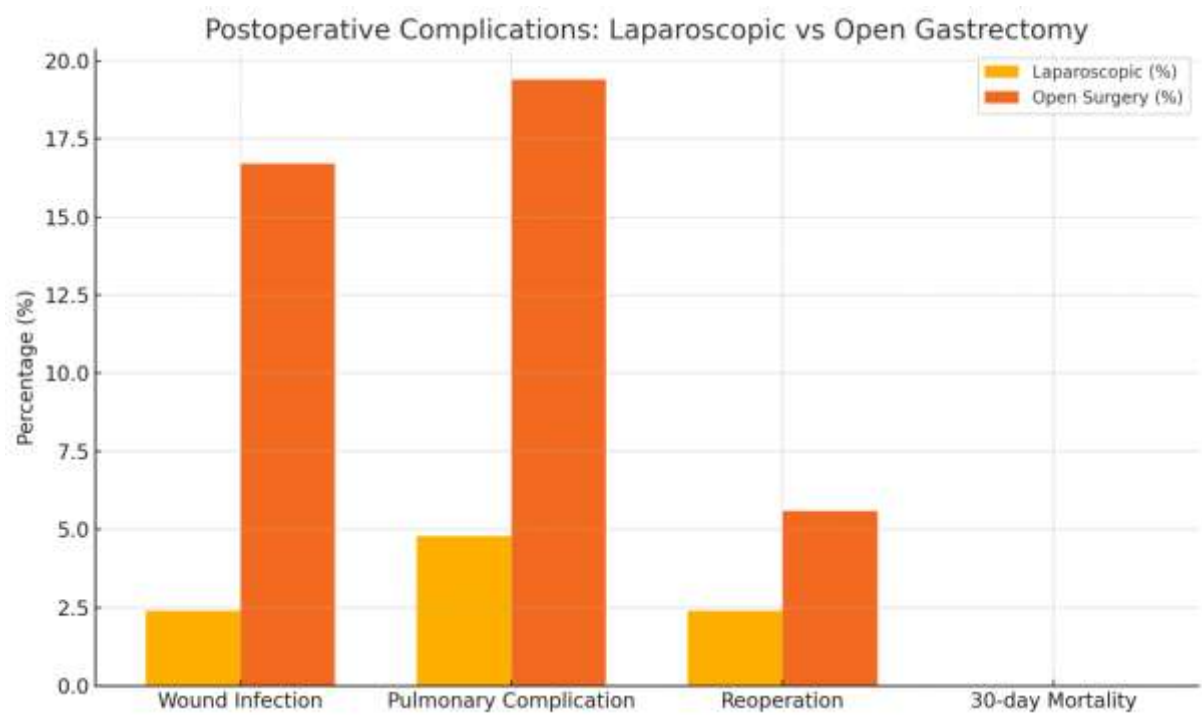


Figure 1: graph comparing the percentage of postoperative complications between laparoscopic and open gastrectomy groups. It visually highlights the lower complication rates observed in the laparoscopic group, particularly for wound infections and pulmonary issues.

DISCUSSION

The results of this study add to the existing literature which endorses laparoscopic gastrectomy as a safe intervention when contrasted with open surgery, especially regarding short-term postoperative results. Despite the laparoscopic method having a considerably longer surgical duration, it provided substantial benefits concerning reduced blood loss, faster attainment of recovery milestones, and lower incidence of complications such as wound infections and pulmonary complications.

The reported outcomes are in accordance with some studies around the world which recognize the benefits of laparoscopic surgery. Reports showed less postoperative complications and shorter duration of hospitalization for patients who underwent laparoscopic gastrectomy as opposed to open surgical methods [10-12]. Similarly, studies demonstrated in their Japanese cohort that laparoscopic approaches resulted in better functional recovery and fewer pulmonary complications, especially in elderly patient [13, 14].

Our study also observed that patients in the laparoscopic group resumed oral intake and bowel function significantly earlier than those in the open surgery group. This aligns with studies reported faster gastrointestinal recovery in patients undergoing laparoscopic distal gastrectomy. Early mobilization and minimal bowel handling during laparoscopy are likely contributors to this improved recovery profile [15, 16].

One of the key benefits identified was the significantly reduced rate of surgical site infections in the laparoscopic group. Previous studies support this finding, attributing it to the smaller incisions and reduced exposure of abdominal contents in laparoscopic procedures. Moreover, pulmonary complications were also lower in our laparoscopic group, which may reflect decreased postoperative pain, improved respiratory effort, and faster ambulation [17, 18].

Despite these advantages, the longer operative duration observed in laparoscopic cases remains a recognized limitation. This is consistent with global literature, particularly among centers in the learning phase or with less laparoscopic experience. Nevertheless, with advancements in technology and increasing surgeon expertise, operative times are expected to decrease over time.

Importantly, oncological outcomes such as lymph node harvest and need for reoperation were comparable in both groups, supporting the oncological safety of the laparoscopic approach. This finding was corroborated by studies, which affirmed no significant compromise in tumor clearance between the two techniques [19, 20].

The strengths of this study include a well-defined cohort and comprehensive comparison of clinically relevant outcomes. However, limitations should also be acknowledged. The study was conducted at a single institution, limiting generalizability, and the retrospective nature may introduce selection bias. Additionally, long-term survival and recurrence rates were not evaluated in this analysis and require future follow-up.

CONCLUSION

Laparoscopic gastrectomy provides considerable short-term benefits in comparison with open surgery regarding intra-operative hemorrhaging, postoperative recovery period, and complication rates while still preserving surgical safety. Its longer operative time is offset by early recovery and reduced morbidity, making it an advantageous procedure, particularly when performed at experienced centers. Future prospective studies with long-term follow-up are essential to assess oncological equivalence and survival outcomes more robustly.

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