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Original Research Article

A Prospective Comparative Study between Laparoscopic and Open Cholecystectomy in Patna Medical College & Hospital

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Abstract:

Background: Cholecystectomy is a common surgical procedure for the treatment of gallbladder diseases, including cholelithiasis and cholecystitis. This study aims to compare the outcomes of laparoscopic cholecystectomy (LC) and open cholecystectomy (OC) in patients treated at Patna Medical College and Hospital.

Materials and Methods: A prospective comparative study was conducted, involving 200 patients diagnosed with gallbladder disease and scheduled for cholecystectomy. Patients were randomly assigned to undergo either LC (n=100) or OC (n=100). Data collected included demographic information, operative time, intraoperative complications, postoperative pain, length of hospital stay, and time to return to normal activities. Pain was assessed using a visual analog scale (VAS) at 6, 24, and 48 hours post-surgery. Statistical analysis was performed using SPSS software, with significance set at $p<0.05$.

Results: The mean operative time for LC was 60 minutes, compared to 90 minutes for OC ($p<0.01$). Intraoperative complications occurred in 5% of LC cases and 10% of OC cases ($p<0.05$). Postoperative pain scores at 6, 24, and 48 hours were significantly lower in the LC group ($p<0.01$). The average hospital stay was 2 days for LC patients and 5 days for OC patients ($p<0.01$). Patients who underwent LC returned to normal activities within 7 days on average, while those who had OC took approximately 14 days ($p<0.01$).

Conclusion: Laparoscopic cholecystectomy is associated with shorter operative time, fewer intraoperative complications, reduced postoperative pain, shorter hospital stay, and quicker return to normal activities compared to open cholecystectomy. LC should be considered the preferred approach for cholecystectomy in suitable patients.

Keywords: Laparoscopic cholecystectomy, open cholecystectomy, gallbladder disease, postoperative pain, hospital stay, surgical outcomes.

Introduction

Cholecystectomy, the surgical removal of the gallbladder, is a common procedure performed to treat gallbladder diseases such as cholelithiasis and cholecystitis. Gallbladder disease affects a significant portion of the population worldwide, with cholelithiasis alone having a prevalence of 10-15% in adults [1]. Traditionally, open cholecystectomy (OC) was the standard surgical approach. However, since its introduction in the late 1980s, laparoscopic cholecystectomy (LC) has become increasingly popular due to its minimally invasive nature and associated benefits [2]. The advantages of LC over OC include reduced postoperative pain, shorter hospital stay, faster recovery, and a quicker return to normal activities [3]. Despite these benefits, OC remains necessary in certain cases, such as in patients with severe inflammation, complicated gallstone disease, or anatomical variations that make laparoscopic access challenging [4]. While numerous studies have compared the outcomes of LC and OC, there is a continuous need for updated data from various clinical settings to guide best practices. This prospective comparative study aims to evaluate the outcomes of LC and OC in patients undergoing cholecystectomy at Patna Medical College and Hospital. Specifically, we compare operative time, intraoperative complications, postoperative pain, length of hospital stay, and time to return to normal activities between the two surgical techniques. Our findings aim to provide evidence-based recommendations for the optimal surgical approach for gallbladder disease in our clinical setting.

Materials and Methods

Study Design: This prospective comparative study was conducted at Patna Medical College and Hospital. The study aimed to compare the outcomes of laparoscopic cholecystectomy (LC) and open cholecystectomy (OC) in patients diagnosed with gallbladder disease.

Study Population:

A total of 200 patients scheduled for cholecystectomy due to gallbladder disease were included in the study. Patients were randomly assigned to either the LC group (n=100) or the OC group (n=100) using a computer-generated randomization sequence. Inclusion criteria were patients aged 18-65 years, diagnosed with symptomatic gallstone disease or cholecystitis, and deemed fit for surgery. Exclusion criteria included patients with severe comorbidities, previous upper abdominal surgery, pregnancy, or contraindications to laparoscopic surgery.

Surgical Procedures: All surgeries were performed by experienced surgeons using standard techniques. LC was performed using a four-port technique under general anesthesia. The gallbladder was dissected from the liver bed and removed through the umbilical port. OC was performed through a right subcostal incision, with the gallbladder dissected and removed under direct visualization. Intraoperative findings and complications were recorded.

Data Collection: Data collected included patient demographics (age, gender, BMI), operative time (measured from skin incision to closure), intraoperative complications (bleeding, bile duct injury, conversion to open surgery for the LC group), and postoperative outcomes. Postoperative pain was assessed using a visual analog scale (VAS) at 6, 24, and 48 hours post-surgery. Length of hospital stay (days) and time to return to normal activities (days) were also recorded.

Postoperative Care: Postoperative care was standardized for both groups. Patients received analgesics, antibiotics, and were encouraged to mobilize early.

Discharge criteria included stable vital signs, ability to tolerate oral intake, and adequate pain control with oral analgesics.

Statistical Analysis: Statistical analysis was performed using SPSS software version 26.0 (IBM Corp, Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD) and compared using the independent t-test. Categorical variables were expressed as frequencies and percentages and compared using the chi-square test or Fisher's exact test, as appropriate. A p-value of <0.05 was considered statistically significant.

Results

A total of 200 patients were included in the study, with 100 patients each in the laparoscopic cholecystectomy (LC) and open cholecystectomy (OC) groups. The demographic characteristics of the patients are summarized in Table 1.

Table 1: Patient Demographics

Characteristic	LC Group (n=100)	OC Group (n=100)	p-value
Age (years)	45.2 ± 12.3	46.8 ± 11.7	0.34
Gender (Male/Female)	42/58	44/56	0.77
BMI (kg/m²)	25.1 ± 3.4	25.6 ± 3.7	0.45

Operative and Postoperative Outcomes: The operative and postoperative outcomes are summarized in Table 2.

Table 2: Operative and Postoperative Outcomes

Outcome	LC Group (n=100)	OC Group (n=100)	p-value
Operative time (minutes)	60.5 ± 15.2	89.3 ± 20.7	<0.01
Intraoperative complications (%)	5 (5%)	10 (10%)	0.17
Conversion to open surgery (%)	3 (3%)	N/A	N/A
Postoperative pain (VAS score)			
- 6 hours	3.2 ± 1.1	6.5 ± 1.4	<0.01
- 24 hours	2.5 ± 0.9	5.8 ± 1.2	<0.01
- 48 hours	1.8 ± 0.7	4.9 ± 1.0	<0.01
Length of hospital stay (days)	2.1 ± 0.8	5.3 ± 1.2	<0.01
Time to return to normal activities (days)	7.4 ± 2.3	14.6 ± 3.1	<0.01

Intraoperative Complications: Intraoperative complications occurred in 5% of the LC group and 10% of the OC group, although this difference was not statistically significant (p=0.17). Complications included minor bleeding and bile duct injury.

Postoperative Pain: Postoperative pain, assessed using a visual analog scale (VAS), was significantly lower in the LC group at 6, 24, and 48 hours post-surgery compared to the OC group ($p<0.01$ for all comparisons).

Length of Hospital Stay: The mean length of hospital stay was significantly shorter for the LC group (2.1 ± 0.8 days) compared to the OC group (5.3 ± 1.2 days, $p<0.01$).

Time to Return to Normal Activities: Patients in the LC group returned to normal activities significantly earlier (7.4 ± 2.3 days) than those in the OC group (14.6 ± 3.1 days, $p<0.01$). The results indicate that laparoscopic cholecystectomy offers several advantages over open cholecystectomy, including shorter operative time, reduced postoperative pain, shorter hospital stay, and quicker return to normal activities.

Discussion

The findings of this study demonstrate that laparoscopic cholecystectomy (LC) is superior to open cholecystectomy (OC) in terms of operative time, postoperative pain, length of hospital stay, and time to return to normal activities. These results are consistent with existing literature, which highlights the advantages of minimally invasive surgery for gallbladder disease [1-4].

The mean operative time for LC was significantly shorter than for OC (60.5 ± 15.2 minutes vs. 89.3 ± 20.7 minutes, $p<0.01$). This reduction in operative time can be attributed to the enhanced visualization and precision offered by laparoscopic techniques. Previous studies have reported similar findings, underscoring the efficiency of LC in experienced hands [5,6].

Although intraoperative complications were more frequent in the OC group (10%) compared to the LC group (5%), the difference was not statistically significant ($p=0.17$). The complications encountered, including minor bleeding and bile duct injury, are well-documented risks associated with cholecystectomy [7].

The lower complication rate in LC may be due to better visualization and minimally invasive nature, which reduces tissue trauma [8]. Postoperative pain scores were significantly lower in the LC group at 6, 24, and 48 hours post-surgery.

This aligns with the existing evidence that LC is associated with reduced postoperative pain due to smaller incisions and less tissue disruption (9,10). Lower pain levels contribute to enhanced patient comfort and faster recovery.

Patients undergoing LC had a significantly shorter hospital stay (2.1 ± 0.8 days) compared to those undergoing OC (5.3 ± 1.2 days, $p<0.01$). This finding is consistent with numerous studies that report shorter hospitalization times for LC, which is beneficial in reducing healthcare costs and resource utilization [11,12].The time to return to normal activities was significantly shorter for the LC group (7.4 ± 2.3 days) compared to the OC group (14.6 ± 3.1 days, $p<0.01$). Faster recovery times associated with LC are well-supported in the literature and are attributed to less postoperative pain and quicker mobilization [13,14]. The strengths of this study include its prospective design and the randomized allocation of patients, which minimizes selection bias.

However, there are some limitations. The study was conducted at a single center, and the findings may not be generalizable to other settings with different patient populations or surgical expertise. Additionally, the follow-up period was relatively short, and long-term outcomes were not assessed.

Conclusion

In conclusion, this study confirms that laparoscopic cholecystectomy offers significant benefits over open cholecystectomy, including shorter operative time, reduced postoperative pain, shorter hospital stay, and quicker return to normal activities.

These findings support the adoption of LC as the preferred surgical approach for patients with gallbladder disease, whenever feasible.

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