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ORIGINAL ARTICLE

The Efficacy of Laparoscopic Cholecystectomy in Patients Suffering from Acute Cholecystitis

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ABSTRACT

Background: Acute cholecystitis is one of the most common occurring gall bladder conditions requiring surgical removal.
Objective: To assess the efficacy of laparoscopic cholecystectomy in patients suffering from acute cholecystitis.
Study Design: Prospective comparative study
Place and Duration of Study: Department of Surgery Unit-2, Gulab Devi Hospital, Lahore from 1st March 2023 to 31st August 2023.
Methodology: One hundred and ten patients were enrolled. Those patients within the age group of 20-65 and suffering from acute cholecystic were included. A total of 80 patients under went laparoscopic procedure while 20 patients undergo open cholecystectomy (initially 30 but later converted to laparoscopic cholecystectomy). The clinical diagnosis was based on the physical finding's pf right upper quadrant tenderness, leukocytosis ≥12,000/ml, guarding/rebound, as well as the gross morphological diagnosis intraoperatively. The patients were divided into two groups as laparoscopic and open cholecystectomy. In each patient's outcome comparison between open a laparoscopic cholecystectomy was performed on the basis of the mean patient age, operative time, hospital stay, complication rate.
Results: The mean age of laparoscopic cholecystectomy and open cholecystectomy group patients was 42.41 and 46.39 years respectively. The female's ratio was way above males with 93.75% in laparoscopic cholecystectomy group and 85% in open cholecystectomy group. The Complication comparison within the two groups presented increased risk of respiratory and gastrointestinal complications in open cholecystectomy group verses laparoscopic cholecystectomy group. There was increased bleeding risk at operation theatre table in open cholecystectomy group in addition to the urinary and wound infection. However, the open cholecystectomy group has significantly lower risk of intra operative bleeding as well as common bile duct injury in comparison to the laparoscopic cholecystectomy group. The comparison of operational time and hospital stay showed within laparoscopic and open cholecystectomy showed a significant decrease in the operational time (129±38 vs 157±34 min) as well as length of hospital stay (2.81±2.17 vs 9.29±6.55 days) in laparoscopic surgery than open surgical protocol for acute cholecystectomy.
Conclusion: Laparoscopic cholecystectomy is emerging as a reliable, safe, and cost-effective procedure for treating acute cholecystitis. Complications and mortality rates are generally lower for laparoscopic cholecystectomy compared to open cholecystectomy
Key words: Efficacy, Laparoscopic cholecystectomy, Open cholecystectomy, Acute cholecystitis

INTRODUCTION

Gall bladder not only performs the function of storing bile but also concentrates it for various functioning. The concentrated bile may lead into the formation of stones inside the gall bladder in cases of disrupted homeostasis. The disrupted homeostasis results from higher levels of lipids and cholesterol in the liver and cholesterol-crystal nucleation[1].

Acute cholecystitis is a significant health issue, with a prevalence of around 10-15% in the general population, primarily due to gallstones[1]. In the United States, approximately 500,000 operations are performed annually to treat acute cholecystitis or recurrent biliary colic. The prevalence of gallstones, the primary cause of acute cholecystitis, varies across countries. Some studies suggest a prevalence of 10-15% of the general population with gallstones while in other countries 1-3% of people symptomatic from asymptomatic gallstones[2].

Acute cholecystitis accounts for 3-10% of all patients with abdominal pain[4]. The gender disparity is clearly seen among cases with a higher risk in women above forties year of age. Other cases at higher risk of acute cholecystitis includes older age, certain medication as well as pregnancy[1,5,6]. In cases where cystic blockage is resulted due to the stone formation, the acute cholecystic occurs. The acute cholecystitis may be accompanied with biliary colic[7-9].

The present study was conducted to assess the efficacy of laparoscopic cholecystectomy in patients suffering from acute cholecystitis. The research methodology applied a comparative approach with the open surgery method and interpreted significant findings about the effectiveness of the laparoscopic procedure.

MATERIALS AND METHODS

This prospective comparative study was conducted at Department of Surgery Unit-2, Gulab Devi Hospital, Lahore from 1st March 2023 to 31st August 2023. As the prevalence of acute cholecystectomy in Pakistan is about 4.2% in males where as it is 14.2% in females[10] therefore a total of 110 patients were enrolled in this study wherein sample size was calculated using aforesaid prevalence, 95% CI, 80% power of test an 5% margin of error. Those patients within the age group of 20-65 and suffering from acute cholecystic were enrolled in the study. The clinical diagnosis was based on the physical findings of right upper quadrant tenderness, leukocytosis ≥12,000/ml, guarding/rebound, as well as the gross morphological diagnosis intraoperatively. Histological diagnosis was based on the infiltration of neutrophil, state of necrosis, micro perforation, and edema. Those patients suffering from choledocholithiasis, autoimmune disease, pregnant women, diabetes mellitus, hypertension was excluded from the study. The patients were divided into two groups as LC (laparoscopic) and OC (open cholecystectomy). Those with complicated (perforated) acute cholecystitis were underwent open cholecystectomy while the other cases were laparoscopically operated. An antibiotic as well as antithrombotic prophylaxis was conducted with the pre-operational time and was continued up to 24-48 hours post-operatively. Surgery was performed in 72hours bracket. Those patients undergoing laparoscopy were ensured for the cleanliness of all ports, drains and telescope used and was conducted through experienced laparoscopic surgeon. The surgical technique was similar as define by French school[11]. In cases of open surgery, a professional general surgeon operates with subcostal incision removing adhesion and performing cholecystectomy. In each patient's outcome comparison between open laparoscopic cholecystectomy was performed on the basis of the mean patient age, operative time, hospital stay, complication rate. A well-structured questionnaire was used for documenting all the relevant data. The data was analyzed using SPSS version 26.0 through applying chi square test. P value <0.05 was considered significant.

RESULTS

A total of 80 patients under went laparoscopic procedure while 20 patients undergo open cholecystectomy (initially 30 but later converted to LC). The mean age of LC ad OC group patients was 42.41 and 46.39 years respectively. The female's ratio was way above males with 93.75% in LC group and 85% in OC group. Table 1

Initially total cholecystectomy was planned in 30 patients, however due to complications including severity of inflammation (8 cases), laceration (2) and bleeding of the gallbladder fossa/liver in (3 cases)they had to be converted into laparoscopic surgery, thus resulting the aforementioned statistical count of laparoscopic and open surgery actually performed. Fig 1

The Complication comparison within the two groups presented increased risk of respiratory and GI complication in OC group verses LC group. There was increased bleeding risk at OT table in OC group in addition to the urinary and wound infection. However, the OC group has significantly lower risk of intra operative bleeding as well as CBD injury in comparison to the LC group. Fig 2

The comparison of operational time and hospital stay showed within laparoscopic and open cholecystectomy showed a significant decrease in the operational time (129 ± 38 vs 157 ± 34min) as well as length of hospital stay (2.81 ± 2.17 vs 9.29 ± 6.55 days) in laparoscopic surgery than open surgical protocol for acute cholecystectomy. Table 2

Table 1: Age and gender distribution of patients within LC and OC groups

	LC n=80	OC n=20	P value
Age (Mean ± SD)	42.41 ± 12.12	46.39 ± 15.27	0.521
Males	05 (6.25)	03 (15)	0.345
Females	75 (93.75)	17 (85)	0.211

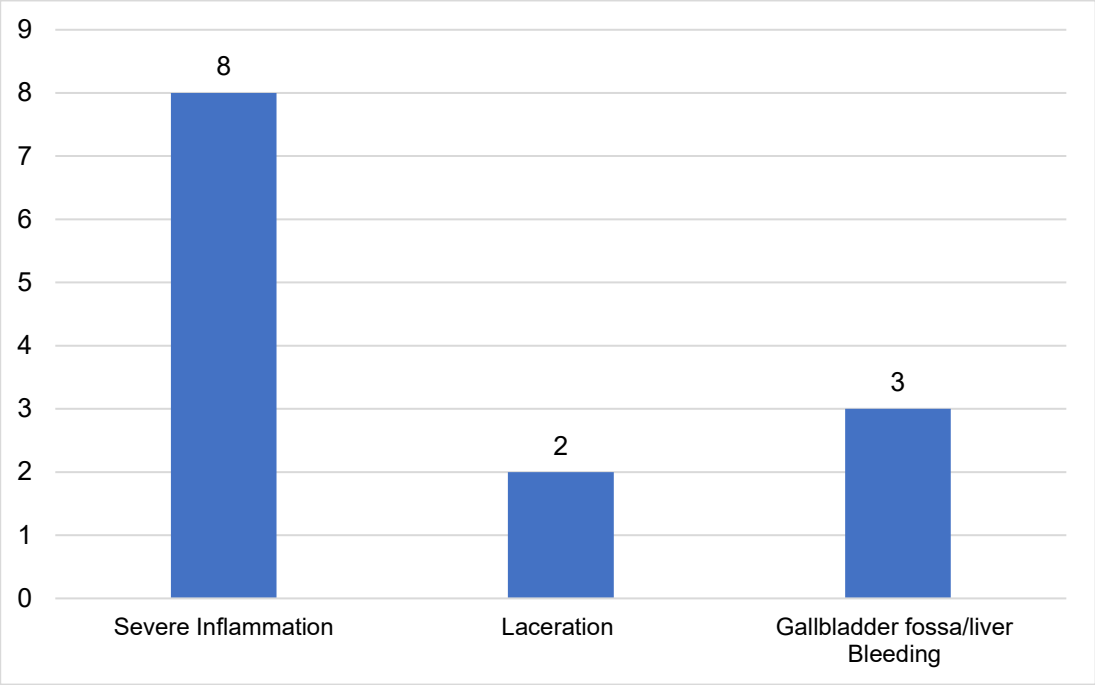

Figure 1: OC patients converted to LC due to inflammation, laceration or GB/liver bleed

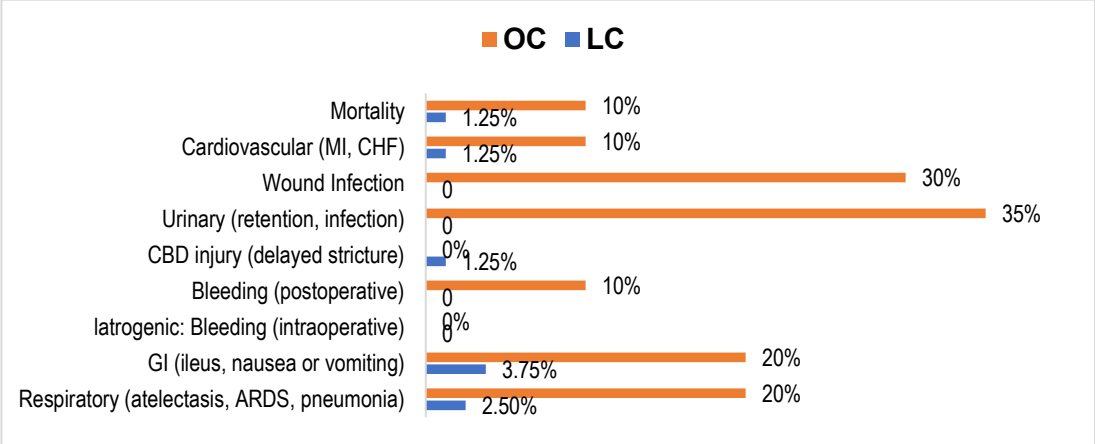

Figure 2: Comparison within the LC and OC group complications

Table 2: Comparison of operational time and hospital stay within groups

	LC n=80	OC n=20	P value
Operational time in min	129 ± 38	157 ± 34	0.045

Length of Hospital Stay in days	2.81 ± 2.17	9.29 ± 6.55	0.031

DISCUSSION

In the last ten years, laparoscopic cholecystectomy has become the dominant approach in managing hepatobiliary diseases. However, its role in treating acute cholecystitis remains uncertain. There have been significant inconsistencies in how acute cholecystitis is defined across various studies, as well as differences in surgeons' preoperative decisions regarding whether to perform open cholecystectomy as the primary procedure[12-14].

An interesting observation in this study was that patients chosen for open cholecystectomy in both the acute and chronic cholecystitis groups were similar, though this difference was not statistically significant. Additionally, the male-to-female ratio was higher in the open cholecystectomy group, although again, this finding was not statistically significant. These results align with previous studies, which suggest that men tend to experience symptoms later in life and often have more comorbid conditions[15].

In both the acute and chronic cholecystitis groups, shorter operating room times were observed for laparoscopic cholecystectomy compared to open cholecystectomy; however, this was only statistically significant in the chronic cholecystitis group and not in the acute cholecystitis group[16-17].

The length of hospital stay was significantly shorter for laparoscopic cholecystectomy compared to open cholecystectomy in both groups. These findings are consistent with both national and international standards for these procedures. Additionally, hospital costs were lower for the laparoscopic cholecystectomy group, primarily due to the shorter hospital stays and lower operating room charges for laparoscopic procedures. This reduction in hospital stay, combined with laparoscopic cholecystectomy being the preferred approach for gallbladder disease, plays a significant role in the economic aspects of treating this condition[18-19].

As a minimally invasive procedure, laparoscopic cholecystectomy is less taxing for patients, allowing for faster recovery. While open cholecystectomy remains the procedure of choice for many surgeons in treating acute cholecystitis due to its acceptable morbidity and mortality rates, any alternative must demonstrate improved outcomes over this method. In our study, the complication rate was higher for open cholecystectomy compared to laparoscopic cholecystectomy, though the difference was not statistically significant (P=.06). When complications were categorized by severity, mild complications (grade 1), typically occurring during the postoperative period (e.g., phlebitis and adynamic ileus), were more common in the open cholecystectomy group, likely due to the significantly longer postoperative recovery time (8.1 days versus 3.3 days). However, moderate to severe complications (grades 2, 3, and 4), often related to surgical technique, were similar between both groups[20-21].

CONCLUSION

Complications and mortality rates are generally lower for laparoscopic cholecystectomy compared to open cholecystectomy. However, iatrogenic injuries to the bile duct and liver, along with postoperative bleeding, were more frequent in the laparoscopic cholecystectomy group than in the open cholecystectomy group. Laparoscopic cholecystectomy is emerging as a reliable, safe, and cost-effective procedure for treating acute cholecystitis.

DECLARATION

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Authors contribution
Each author of this article fulfilled following Criteria of Authorship:
1. Conception and design of or acquisition of data or analysis and interpretation of data.
2. Drafting the manuscript or revising it critically for important intellectual content.
3. Final approval of the version for publication.

All authors agree to be responsible for all aspects of their research work.

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Data availability
The data that support the fndings of this study are available from the corresponding author, upon reasonable request.

Ethics approval
This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Gulab Devi Hospital, Lahore.

Consent to Participate
Informed consent was obtained from all individual participants included in the study.

Competing Interests
The authors declare that the research was conducted in the absence of any commercial or fnancial relationships that could be construed as a potential confict of interest.

Conflict of Interest

The authors declared no conflict of interest.

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