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Original research article

Prospective analysis of laparoscopic cholecystectomy outcomes at Srinivas institute of medical sciences, Mangalore: A two-year study

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Abstract

Background: Laparoscopic cholecystectomy has become the gold standard for the treatment of symptomatic cholelithiasis owing to its minimally invasive nature and rapid postoperative recovery. This prospective study evaluates the outcomes, safety, and efficacy of laparoscopic cholecystectomy performed at Srinivas Institute of Medical Sciences, Mangalore, from January 2023 to June 2024.
Methods: In this single-center prospective observational study, 200 consecutive patients with symptomatic cholelithiasis underwent elective laparoscopic cholecystectomy. Preoperative evaluation, intraoperative parameters (Operative time, blood loss, and conversion rate), postoperative complications, length of hospital stay, and 30-day follow-up data were recorded. Statistical analysis was performed using SPSS version 25.0, and outcomes were compared with established benchmarks from the literature.
Results: Of the 200 patients enrolled, 150 (75%) were female and 50 (25%) male, with a mean age of 45.3±12.1 years. The mean operative time was 55±15 minutes, and the conversion rate to open surgery was 2% (n = 4). Postoperative complications were noted in 5% (n = 10) of patients, which included bile spillage, minor wound infections, and transient postoperative pain. The average length of hospital stay was 2.1±0.8 days. There were no mortalities, and all patients showed satisfactory recovery during the 30-day follow-up.
Conclusion: Our findings support that laparoscopic cholecystectomy is a safe and effective procedure with minimal morbidity and low conversion rates when performed in a tertiary care setting. These results are consistent with global standards, reaffirming the procedure's role as the treatment of choice for symptomatic cholelithiasis.
Keywords: Laparoscopic cholecystectomy, minimally invasive surgery, cholelithiasis, surgical outcomes, prospective study, Mangalore

Introduction

Since its introduction in the late 1980s, laparoscopic cholecystectomy has revolutionized the management of gallstone disease by offering reduced postoperative pain, shorter hospital stays, and improved cosmetic outcomes compared to the traditional open approach [1]. Despite these advantages, the procedure requires a high level of surgical expertise, and outcomes may vary depending on patient factors and institutional protocols. In recent years, advancements in laparoscopic instruments and imaging have further optimized surgical results [2].

At Srinivas Institute of Medical Sciences, our surgical unit has embraced these innovations to enhance patient care. This study was designed to prospectively evaluate the operative outcomes, complication rates, and overall safety of laparoscopic cholecystectomy performed in our institution over a period of 18 months. Our objectives were to determine operative efficiency, document perioperative complications, and compare our results with established international benchmarks [1, 3].

Materials and Methods

- **Study Design and Patient Selection:** This prospective observational study was conducted between January 2023 and June 2024 at Srinivas Institute of Medical Sciences, Mangalore. The study was approved by the Institutional Ethics Committee, and written informed consent was obtained from all patients. Inclusion criteria were adults aged 18–75 years diagnosed with symptomatic cholelithiasis on ultrasonography. Exclusion criteria included patients with acute cholecystitis requiring

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emergency intervention, coagulopathies, or severe cardiopulmonary comorbidities.

- **Preoperative Evaluation:** All patients underwent a detailed clinical evaluation, laboratory investigations (complete blood count, liver function tests, coagulation profile), and abdominal ultrasonography. Patients with deranged liver enzymes or evidence of common bile duct stones underwent further evaluation with magnetic resonance cholangiopancreatography (MRCP).
- **Surgical Technique:** All procedures were performed under general anesthesia using a standard four-port technique. After establishing pneumoperitoneum with a Veress needle, a 10-mm umbilical port was introduced for the laparoscope, and three additional ports (Two 5-mm and one 10-mm) were inserted under direct vision. The critical view of safety was meticulously achieved in all cases prior to clipping and division of the cystic duct and artery. Intraoperative parameters such as operative time, blood loss, and any complications (e.g., bile duct injury) were recorded. In cases where anatomical delineation was unclear or complications arose, conversion to an open procedure was considered.
- **Postoperative Management and Follow-Up:** Postoperatively, patients received standard analgesia and were monitored for complications. Early ambulation was encouraged, and oral intake was resumed on the first postoperative day. Patients were discharged once they met the set criteria for recovery. A follow-up visit was scheduled at 30 days postoperatively to assess wound healing, residual symptoms, and overall recovery.
- **Data Analysis:** Data were recorded in a standardized proforma and analyzed using SPSS version 25.0. Continuous variables were expressed as mean ± standard deviation, and categorical variables as percentages. Statistical significance was assessed using chi-square tests for categorical data and Student's t-test for continuous data, with a p-value of <0.05 considered statistically significant.

Results

Patient Demographics and Preoperative Characteristics: A total of 200 patients were included in the study, of whom 150 (75%) were female and 50 (25%) were male. The mean age was 45.3 ± 12.1 years (range: 18–75 years). Most patients (80%) presented with recurrent episodes of biliary colic, while 20% had a history of intermittent dyspepsia and upper abdominal discomfort.

Operative Parameters

- **Operative Time:** The mean operative time was 55 ± 15 minutes.
- **Blood Loss:** Mean estimated intraoperative blood loss was minimal (<50 mL in most cases).
- **Conversion Rate:** Four patients (2%) required conversion to open cholecystectomy due to severe inflammation and unclear anatomical delineation.
- **Intraoperative Complications:** No major bile duct injuries were encountered. Minor complications included controlled bile spillage in 3% of cases, which were managed with copious irrigation.

Postoperative Outcomes

- **Complications:** Overall postoperative complications occurred in 10 patients (5%). These were predominantly minor wound infections (3%) and transient postoperative pain requiring extended analgesia (2%). No patient developed bile leak or significant sepsis.
- **Length of Hospital Stay:** The average hospital stay was 2.1 ± 0.8 days.
- **30-Day Follow-Up:** At 30 days, all patients demonstrated satisfactory wound healing and symptom resolution, with no readmissions for bile-related complications.

Discussion

Our prospective study demonstrates that laparoscopic cholecystectomy performed at Srinivas Institute of Medical Sciences is associated with excellent outcomes, corroborating its status as the standard of care for symptomatic cholelithiasis [1, 2]. The low conversion rate (2%) and minimal intraoperative blood loss observed in our series are in line with findings from other high-volume centers [4, 5]. The mean operative time of 55 minutes reflects a high level of surgical proficiency and adherence to standardized techniques.

- **Comparison with the Literature:** The overall complication rate of 5% in our study compares favorably with the rates reported in earlier studies, which range from 3% to 8% [2, 6]. Similar to the work by Strasberg [3], our emphasis on achieving the critical view of safety contributed to the absence of major bile duct injuries. Furthermore, the low conversion rate observed in our study reinforces the feasibility of laparoscopic cholecystectomy even in patients with challenging anatomy, provided that the surgical team is well-trained and vigilant [1, 7].
- **Factors Influencing Outcomes:** Our study underscores the importance of patient selection and preoperative optimization. Detailed preoperative imaging and adherence to strict inclusion criteria likely contributed to the favorable outcomes observed. Additionally, the use of a standardized four-port technique and intraoperative strategies for managing difficult dissections (such as the decision to convert to open surgery when necessary) ensured patient safety [4].

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Limitations

The limitations of our study include its single-center design and the relatively short duration of follow-up. Although 30-day outcomes provide a good snapshot of early recovery, longer-term follow-up would be beneficial to assess late complications such as incisional hernias or bile duct strictures. Furthermore, while the study sample was representative of our institution's patient population, multi-center studies would be useful to generalize these findings to broader populations [8].

Future Directions: Future studies could focus on long-term outcomes, cost-benefit analyses, and quality-of-life assessments following laparoscopic cholecystectomy. The integration of enhanced recovery after surgery (ERAS) protocols and the use of advanced energy devices could further refine the procedure and potentially reduce complication rates.

Conclusion

This prospective study confirms that laparoscopic cholecystectomy is a safe, effective, and efficient treatment for symptomatic cholelithiasis when performed under standardized protocols in a high-volume tertiary care center. The low complication and conversion rates, along with the short hospital stays, underscore the benefits of minimally invasive surgery. Our findings support the continued use and further refinement of laparoscopic techniques in the management of gallstone disease.

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Conflicts of Interest

The authors declare no conflicts of interest.

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