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Original article

Day-Case Laparoscopic Cholecystectomy: A Single-Center Experience from Benghazi Medical Center

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Abstract
Day-case laparoscopic cholecystectomy (LC) is widely recognized as a safe and cost-effective treatment for symptomatic gallstone disease. Advances in minimally invasive surgery, anesthesia, and perioperative care have facilitated early discharge without increasing postoperative morbidity. This study evaluated the feasibility, safety, and clinical outcomes of day-case laparoscopic cholecystectomy at Benghazi Medical Center, Benghazi, Libya. A retrospective cross-sectional study was conducted between January 2021 and December 2022 and included 315 patients who underwent elective laparoscopic cholecystectomy for symptomatic cholelithiasis. Patients with complicated gallstone disease, emergency procedures, or concomitant surgeries were excluded. Demographic data, comorbidities, operative findings, postoperative outcomes, length of hospital stay (LOS), and readmission rates were analyzed. Patients were grouped according to hospital stay (≤24 hours and >24 hours). Statistical analysis was performed using SPSS version 25, with $P < 0.05$ considered statistically significant. The median age was 38 years (IQR 20–50), and 91.7% of patients were female. Most patients (87%) had no significant comorbidities. The mean postoperative LOS was 1.2 ± 0.57 days. Twenty-three patients (7.3%) were discharged on the same day, and 231 (73.3%) were discharged within 24 hours. Conversion to open surgery occurred in 4.1% of cases. The overall complication rate was low, and the readmission rate was 1.6%. Drain placement was significantly associated with prolonged hospital stay ($P < 0.001$), while other demographic and clinical variables showed no significant association. Day-case laparoscopic cholecystectomy at Benghazi Medical Center is feasible and safe. With proper patient selection and optimized perioperative management, early discharge can be achieved with low complication and readmission rates.
Keywords: day-case surgery, laparoscopic cholecystectomy, gallstone disease, length of stay, Libya

Introduction

Laparoscopic cholecystectomy (LC) is the gold standard for the surgical management of symptomatic gallstone disease due to its minimally invasive nature, reduced postoperative pain, shorter hospital stays, and faster recovery compared with open cholecystectomy [1]. Day-case LC has increasingly been adopted worldwide as a safe and effective strategy that enhances recovery, reduces healthcare costs, and improves resource utilization [2]. Systematic reviews have demonstrated that LC performed in a day surgery setting yields complication and readmission rates comparable to inpatient procedures [3,4]. Appropriate patient selection is essential for successful day-case surgery. Factors such as American Society of Anesthesiologists (ASA) class, age, and body mass index (BMI) have been shown to influence discharge success [5]. Structured perioperative protocols further reduce unexpected admissions and improve patient satisfaction without increasing adverse outcomes [2].

Delayed discharge after elective LC has been associated with older age, increased operative difficulty, gallbladder wall thickening, and prolonged operative time [6]. Early discharge within 24 hours has been shown to produce outcomes comparable to longer hospitalization [7]. Readmission rates following LC are generally low, reported at approximately 3%, with most cases related to surgical complications such as bile duct injury, wound infection, or postoperative nausea and vomiting (PONV) [8].

Despite strong evidence supporting day-case LC, implementation varies across healthcare systems. Local data are necessary to guide practice and optimize perioperative pathways. This study aimed to evaluate the feasibility and clinical outcomes of elective laparoscopic cholecystectomy at Benghazi Medical Center, Benghazi, Libya, and to identify clinical and operative factors associated with prolonged hospital stay.

Methods

Study design and setting

This retrospective cross-sectional study was conducted at Benghazi Medical Center, Benghazi, Libya, between 1 January 2021 and 31 December 2022.

Study population

A total of 315 patients who underwent elective laparoscopic cholecystectomy for symptomatic gallstone disease were included.

Eligibility criteria

Patients of all ages and both genders who underwent elective laparoscopic cholecystectomy were eligible for inclusion in the study. However, those who underwent open cholecystectomy, combined surgical

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procedures, or emergency surgery were excluded. Additionally, patients presenting with common bile duct stones, cholangitis, pancreatitis, jaundice, significant liver dysfunction, or incomplete medical records were not considered for inclusion.

Group classification
Patients were categorized into two groups according to length of hospital stay (LOS). Group A included patients discharged within 24 hours (LOS ≤ 24 hours). Group B included patients hospitalized for more than 24 hours (LOS > 24 hours).

Data collection
Data collected included age, gender, comorbidities (hypertension, diabetes mellitus, ischemic heart disease), previous abdominal surgery, preoperative ultrasound findings (including gallbladder wall thickening), operative details, drain placement, conversion to open surgery, postoperative complications, LOS, and readmission.

Statistical analysis
Data were analyzed using SPSS version 25. Continuous variables were expressed as mean ± standard deviation or median (IQR). Categorical variables were expressed as frequency and percentage. Chi-square test was used for comparisons. A P value < 0.05 was considered statistically significant.

Ethical approval
The study was approved by the Research Ethics Committee of Benghazi Medical Center. Patient confidentiality was maintained.

Results
Patient Characteristics
A total of 315 patients underwent elective laparoscopic cholecystectomy during the study period (2021–2022) at Benghazi Medical Center. The median age was 38 years (IQR 20–50), and females comprised 91.7% of the study population. When stratified by length of hospital stay (LOS), 231 patients (73.3%) were discharged within 24 hours, while 84 patients (26.7%) required hospitalization beyond 24 hours. Baseline demographic and clinical characteristics according to LOS are presented in Table 1. There were no statistically significant differences between groups regarding age, gender, hypertension, diabetes mellitus, or previous abdominal surgery (all P > 0.05).

Table 1. Baseline Characteristics by Length of Stay

Variable	LOS ≤24 h (n=231)	LOS >24 h (n=84)	OR (95% CI)	P-value
Age >65 years	6 (2.6%)	5 (6.0%)	2.39 (0.71–8.04)	0.16
Female sex	214 (92.6%)	75 (89.3%)	0.69 (0.29–1.63)	0.41
Hypertension	9 (3.9%)	6 (7.1%)	1.42 (0.49–4.12)	0.52
Diabetes mellitus	8 (3.5%)	5 (6.0%)	1.58 (0.53–4.71)	0.41
Previous abdominal surgery	5 (2.2%)	6 (7.1%)	3.44 (1.01–11.7)	0.08

Preoperative Variables
Preoperative ultrasound findings and surgical indications are summarized in Table 2. Gallbladder stones were present in the majority of patients, and gallbladder wall thickening was observed in a smaller proportion. Although gallbladder wall thickening and pericholecystic fluid were more frequent in the LOS >24-hour group, none of the preoperative variables were significantly associated with prolonged hospitalization (all P > 0.05).

Table 2. Preoperative Ultrasound Findings and Indications

Variable	LOS ≤24h	LOS >24h	OR (95% CI)	P-value
Gall bladder wall thickening	26 (11.3%)	16 (19.0%)	1.69 (0.87–3.29)	0.12
Pericholecystic fluid	5 (2.2%)	5 (6.0%)	2.84 (0.78–10.3)	0.11
Acute cholecystitis	29 (12.6%)	20 (23.8%)	1.53 (0.82–2.84)	0.18

Operative Variables
Operative findings and intraoperative factors are presented in Table 3. Conversion to open surgery occurred in 4.1% of cases and was more frequent in the prolonged LOS group; however, this association did not reach statistical significance (P = 0.09). Drain placement was performed in 12.4% of patients and was significantly associated with LOS >24 hours (P < 0.001).

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Table 3. Operative Variables

Variable	LOS ≤24h	LOS >24h	OR (95% CI)	P-value
Conversion to open	5 (2.2%)	8 (9.5%)	2.31 (0.87–6.12)	0.09
Drain placement	17 (7.4%)	22 (26.2%)	4.49 (2.23–9.04)	<0.001

Multivariate Analysis

Multivariate logistic regression analysis was performed to identify independent predictors of prolonged hospitalization. Variables included age, gender, hypertension, diabetes mellitus, gallbladder wall thickening, conversion to open surgery, and drain placement. As shown in Table 4, drain placement remained the only independent predictor of prolonged LOS (adjusted OR 3.87; 95% CI 1.91–7.84; P < 0.001).

Table 4. Multivariate Logistic Regression for Prolonged LOS (>24h)

Variable	Adjusted OR	95% CI	P-value
Age >65 years	1.78	0.48–6.56	0.39
Female sex	0.83	0.33–2.07	0.69
Hypertension	1.26	0.39–4.01	0.70
Diabetes mellitus	1.34	0.41–4.33	0.63
Gall bladder wall thickening	1.41	0.69–2.87	0.34
Conversion to open	1.92	0.63–5.86	0.25
Drain placement	3.87	1.91–7.84	<0.001

Postoperative Outcomes

Postoperative outcomes are summarized in Table 5. The mean postoperative LOS was 1.2 ± 0.57 days. Same-day discharge was achieved in 7.3% of patients. The overall readmission rate was 1.6%. Postoperative pain and postoperative nausea and vomiting were slightly more frequent among patients with prolonged LOS; however, these differences were not statistically significant (P > 0.05).

Table 5. Postoperative Outcomes

Outcome	LOS ≤24h	LOS >24h	P-value
Postoperative pain	22 (9.5%)	11 (13.1%)	0.31
Postoperative nausea and vomiting (PONV)	5 (2.2%)	3 (3.6%)	0.49
Readmission	2 (0.9%)	3 (3.6%)	0.62

Discussion

Outpatient laparoscopic cholecystectomy was first described by Reddick and Olsen in 1990, establishing the foundation for ambulatory biliary surgery [9, 10]. Early clinical experiences subsequently confirmed the feasibility and safety of outpatient laparoscopic cholecystectomy in carefully selected patients [11]. Since then, day-case surgery has been widely adopted across healthcare systems. In the United Kingdom and Ireland, day-case surgery is defined as admission and discharge on the same day without an overnight stay, whereas in the United States, the term “23-hour stay” is often used [12–14]. These variations reflect differences in healthcare policy rather than surgical safety.

In the present study conducted at Benghazi Medical Center, although procedures were not originally structured under a formal day-case pathway, early discharge was achieved in the majority of patients. The mean postoperative length of stay was 1.2 ± 0.57 days. A total of 7.3% of patients were discharged on the same day, and 73.3% were discharged within 24 hours. These findings are consistent with international reports demonstrating the feasibility of early discharge following elective laparoscopic cholecystectomy. Tebala et al. reported that more than 78% of patients were discharged within 24 hours, and 22.3% achieved same-day discharge [7]. Similarly, Seyednejad, Goecke, and Konkin concluded that a postoperative observation period of approximately four hours is sufficient to identify patients requiring unplanned admission [15].

Postoperative nausea and vomiting (PONV) remain recognized contributors to delayed discharge after laparoscopic cholecystectomy [16–18]. In the current study, PONV occurred in 2.5% of patients, which is lower than rates reported in previous studies. Franco reported overnight admission due to PONV in 13% of cases [18], while Lau and Brooks identified PONV as a major cause of unanticipated admission [10]. Similar findings were reported in Malaysia, where PONV was more frequent among day-case groups compared with overnight stay groups [16]. The relatively low PONV incidence observed in our cohort may reflect effective anesthetic techniques and appropriate antiemetic prophylaxis. Nevertheless, postoperative pain and PONV remain important targets for optimization in ambulatory laparoscopic cholecystectomy [19]. Adequate pain control is emphasized in day-case surgery guidelines [14]. In this study, 10.5% of patients required additional analgesia beyond the standard postoperative regimen. Franco reported residual pain in 24% of patients in a Paris cohort [18]. Although postoperative pain was more frequent among patients with prolonged hospitalization in our study, it did not independently predict extended length of stay in multivariate analysis.

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Drain placement emerged as the most significant determinant of prolonged hospital stay. In univariate analysis, drain insertion was strongly associated with length of stay greater than 24 hours, and it remained the only independent predictor after multivariate adjustment. Drain placement often reflects operative difficulty, including dense adhesions or inflammatory changes. Previous studies have suggested that increased operative complexity correlates with longer operative time and higher risk of complications [7]. Hakeem et al. reported that 24.5% of patients requiring unexpected overnight admission had a drain inserted [20]. Our findings are consistent with these observations and support selective rather than routine drain use to facilitate early discharge.

Readmission rate is an important quality indicator in day-case surgery. An acceptable readmission rate is generally considered to range between 1% and 2% [21]. In the present study, the readmission rate was 1.6%, which falls within internationally accepted benchmarks. This compares favorably with reported rates from the United States (4.6%) [22] and India (3.4%) [23]. The low readmission frequency observed in our cohort further supports the safety of early discharge strategies when appropriate patient selection and postoperative follow-up are ensured. Interestingly, demographic variables and comorbidities were not independently associated with prolonged hospitalization. Well-controlled hypertension and diabetes mellitus did not adversely affect postoperative recovery. This suggests that stable comorbid conditions alone should not preclude patients from consideration for day-case laparoscopic cholecystectomy.

Despite the demonstrated safety profile, only a minority of patients were discharged on the same day. Institutional policies, cautious postoperative monitoring, and patient preference may have influenced discharge timing. Given that more than 70% of patients were safely discharged within 24 hours and readmission rates remained low, implementation of structured day-case pathways and standardized discharge criteria may further increase same-day discharge rates in our setting.

Limitations

This study is limited by its retrospective design. Body mass index (BMI) and certain perioperative variables were not included in the regression model. Additionally, procedures were not initially planned under a standardized ambulatory protocol, which may have influenced discharge practices.

Conclusion

Day-case laparoscopic cholecystectomy is safe and feasible at Benghazi Medical Center, Benghazi, Libya. Most patients undergoing elective LC can be discharged within 24 hours, and selected patients may be safely discharged on the same day without increasing complication or readmission rates. Drain placement was the only independent predictor of prolonged hospital stay, highlighting the importance of operative factors in discharge decisions.

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Conflicts of Interest

The authors declare no conflicts of interest.

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