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UNDER 30 MINUTES OR IT'S A SIN: A PROSPECTIVE OBSERVATIONAL STUDY ON THE RELATIONSHIP BETWEEN OPERATIVE SPEED AND SAFETY IN LAPAROSCOPIC CHOLECYSTECTOMY

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Abstract

Background: Laparoscopic cholecystectomy (LC) has become the gold standard for gallstone disease due to its minimally invasive nature, rapid recovery, and reduced morbidity. Debate persists on whether operative efficiency, particularly procedures completed in <30 minutes, compromises patient safety.

Methods: A prospective observational study was conducted at Saveetha Medical College, Chennai, between January–December 2024. A total of 100 patients undergoing LC for benign gallbladder disease were stratified into Group A (<30 minutes; n=40) and Group B (≥30 minutes; n=60). Data on demographics, intraoperative findings, complications, conversion rates, postoperative outcomes, and 30-day readmission were analyzed using Chi-square and t-tests ($p<0.05$).

Results: Patients in Group A were generally younger and less likely to present with acute inflammation. Conversion rates were 0% in Group A versus 6.7% in Group B ($p=0.03$). Major complications including bile duct injury (1.7%) and intra-abdominal abscess (1.7%) occurred only in Group B. Median hospital stay was significantly shorter in Group A (1 vs 3 days, $p<0.001$). Readmission rates were identical at 5%.

Conclusion: Operative time under 30 minutes was associated with reduced hospital stay but not with increased complication rates. Prolonged operative duration reflected greater disease complexity and higher conversion rates. Surgeons should prioritize safe dissection and adherence to the "critical view of safety" rather than arbitrary time goals.

Keywords: Laparoscopic cholecystectomy, operative time, surgical safety, bile duct injury, conversion rate

INTRODUCTION

Laparoscopic cholecystectomy (LC) has revolutionized gallbladder surgery since its introduction in the late 1980s, replacing open cholecystectomy as the gold standard for symptomatic cholelithiasis and benign gallbladder disease [1]. The benefits of LC include less postoperative pain, faster recovery, shorter hospital stay, and improved cosmetic outcomes [2]. Operative time varies according to patient anatomy, the severity of gallbladder inflammation, and surgeon experience [3].

In surgical practice, speed is often perceived as a surrogate marker of technical proficiency. However, operative safety principles emphasize accuracy, meticulous dissection, and adherence to established protocols, particularly the "critical view of safety" (CVS) described by Strasberg [4]. While shorter operative times can reflect efficiency and experience, they may risk incomplete dissection or iatrogenic injury if critical steps are compromised [5]. Conversely, prolonged operative duration is frequently associated with complex cases such as acute cholecystitis, dense adhesions, or aberrant biliary anatomy [6].

Several studies have linked longer operative times to increased morbidity. Zdichavsky et al. identified acute inflammation and high BMI as predictors of prolonged LC [7]. Pucher et al., in a large meta-analysis, reported a correlation between operative time >90 minutes and increased bile duct injury, suggesting that time may be an indirect marker of complexity rather than causation [8]. Similarly, Richardson et al. observed that major bile duct injuries were more frequent in difficult cases requiring extended dissection [9].

Despite these concerns, there is limited literature on whether a "fast" LC—completed in less than 30 minutes—compromises patient safety compared to longer procedures. This study was therefore designed to evaluate the safety outcomes of LCs performed in <30 minutes versus ≥30 minutes, focusing on complication rates, conversion to open surgery, and postoperative recovery.

MATERIALS AND METHODS

Study Design: Prospective observational study.
Setting: Department of General Surgery, Saveetha Medical College, Chennai.
Study Period: January–December 2024.
Sample Size: 100 consecutive patients undergoing elective LC for benign gallbladder disease.
Grouping:
Group A: Operative time <30 minutes (n=40)
Group B: Operative time ≥30 minutes (n=60)
Inclusion Criteria: Age ≥18 years,Symptomatic cholelithiasis, chronic cholecystitis, gallbladder polyps
Exclusion Criteria: Emergency LC for gallbladder perforation or empyema,Suspected gallbladder malignancy,Prior upper abdominal surgery with dense adhesions
Surgical Technique: Standard four-port LC under general anesthesia. CVS was achieved prior to clipping cystic duct and artery. Operative time was recorded from incision to skin closure.
Outcome Measures: Intraoperative complications, conversion rate, bile duct injury, wound infection, intra-abdominal abscess, length of hospital stay (LOS), and 30-day readmission.
Statistical Analysis: SPSS v27. Continuous variables analyzed with Student's t-test/Mann–Whitney U, categorical variables with Chi-square/Fisher's exact. $p<0.05$ was considered significant.
Ethics: Institutional ethics approval was obtained; informed consent was taken.

RESULTS

Of the 100 patients, 40 were allocated to Group A and 60 to Group B. The mean age was comparable between groups (44.8±12.5 vs 47.1±13.2 years, p=0.46), with a female predominance overall (65% vs 58.3%, p=0.48). Acute cholecystitis was more frequent in Group B (15%) than in Group A (5%), though not statistically significant (p=0.12).

Conversion to open cholecystectomy occurred exclusively in Group B (6.7%), reaching statistical significance (p=0.03). Complication rates were not significantly different: 7.5% in Group A versus 10% in Group B (p=0.63). However, major complications—including one bile duct injury (1.7%) and one intra-abdominal abscess (1.7%)—were recorded only in Group B. Median LOS was significantly shorter in Group A (1 vs 3 days, p<0.001). Readmission within 30 days was equal at 5% for both groups.

Characteristic	<30 min (n=40)	≥30 min (n=60)	p-value
Mean age (years)	44.8 ± 12.5	47.1 ± 13.2	0.46
Female sex (%)	65%	58.3%	0.48
Acute cholecystitis (%)	5%	15%	0.12
Mean BMI	25.5 ± 3.1	26.8 ± 3.5	0.15

Table 1. Baseline characteristics of study group

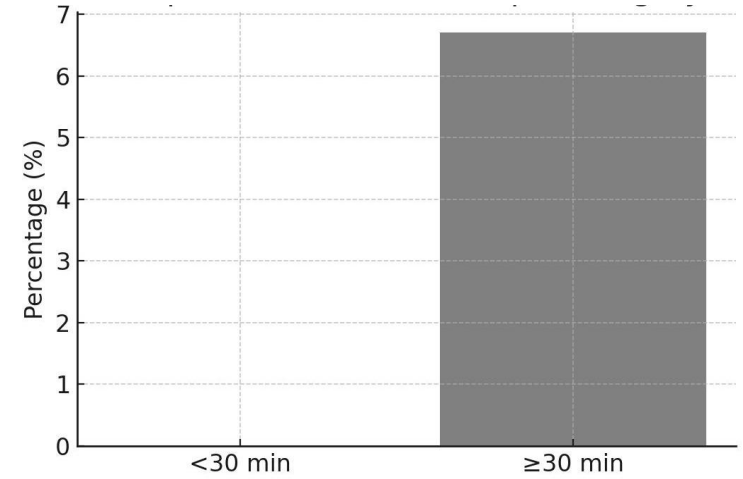

Figure 1. Rate of conversion to open surgery

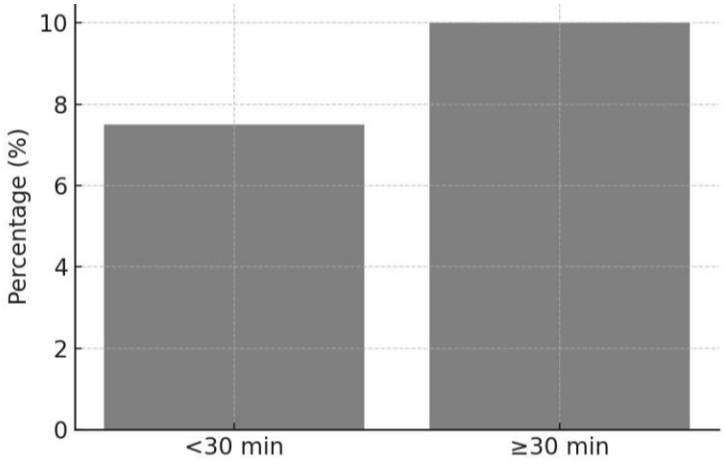

Figure 2. Overall complication rate in study group

DISCUSSION

This study examined whether operative time under 30 minutes in laparoscopic cholecystectomy compromises safety outcomes compared to longer procedures. Our findings indicate that while rapid operations were associated with shorter hospital stays, complication rates did not differ significantly between groups. Importantly, major complications, including bile duct injury and intra-abdominal abscess, were confined to the ≥30-minute group.

The results align with international evidence that operative duration primarily reflects case complexity rather than surgical proficiency. Pucher et al. demonstrated that prolonged operative time independently correlated with increased risk of bile duct injury, particularly in inflamed or anatomically challenging cases [8]. Similarly, Zdichavsky et al. identified acute inflammation and obesity as predictors of extended operative duration [7]. Our observation of higher conversion rates and complications in Group B supports this notion.

The concern that rapid LC may compromise safety has been debated. Strasberg emphasized that achieving the "critical view of safety" is paramount, regardless of operative speed [4]. Studies by Richardson et al. and Wang et al. confirm that biliary injuries are more closely associated with failure to obtain CVS than with shorter operative times [1,9]. In our study, no bile duct injuries occurred in the <30-minute group, suggesting that efficiency does not necessarily imply recklessness when surgical principles are upheld.

Interestingly, the median length of stay was significantly shorter in patients operated on within 30 minutes. This supports earlier reports that shorter procedures are associated with faster recovery and earlier discharge [10,11]. However, as seen in our data, disease severity and intraoperative difficulty rather than speed alone determine outcomes.

Limitations include the single-center design, modest sample size, and lack of long-term follow-up. Nonetheless, the prospective nature and strict operative time stratification strengthen the study's validity. In conclusion, our findings emphasize that while operative time <30 minutes is safe and associated with quicker recovery, prolonged procedures often reflect challenging pathology that carries inherent risks. Surgical training should discourage equating speed with skill, instead prioritizing safety, anatomical clarity, and meticulous dissection.

CONCLUSION

This prospective study demonstrates that laparoscopic cholecystectomy performed in under 30 minutes is not associated with increased complication rates and is linked to a significantly shorter hospital stay. In contrast, procedures lasting ≥30 minutes were more likely to involve acute inflammation, technical difficulty, higher conversion rates, and major complications.

These results suggest that operative duration should not be used as a surrogate marker of surgical skill or safety. Rather, it reflects case complexity and intraoperative challenges. Surgeons must focus on achieving the critical view of safety and adhering to meticulous dissection principles, irrespective of operative time. Speed should never supersede safety, and operative decisions should remain patient-centered.

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