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Outcome of laparoscopic cholecystectomy in elderly patients at a tertiary care centre: A descriptive study

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ABSTRACT

Introduction: Gallstone disease is increasingly prevalent in the elderly population and often requires surgical intervention. Laparoscopic cholecystectomy (LC) is the standard treatment; however, concerns persist regarding perioperative risk in elderly patients due to comorbidities and reduced physiological reserve.

Objectives: This study aimed to evaluate the perioperative outcomes of Laparoscopic Cholecystectomy in elderly patients.

Methodology: A prospective observational descriptive study was conducted between January 2021 and July 2023 at a tertiary care centre. Patients aged ≥65 years undergoing elective or emergency Laparoscopic Cholecystectomy were included. Data on demographics, comorbidities, American Society of Anesthesiologists classification, indications for surgery, postoperative complications graded using the Clavien–Dindo system, length of hospital stay, readmissions, and histopathological findings were collected and analysed.

Results: A total of 334 elderly patients were included, with a mean age of 68.9 ± 4.7 years. Most patients were classified as ASA grade I–II 322 (96.41%). Uncomplicated cholelithiasis was the most common indication for surgery 233 (69.76%). Postoperative complications occurred in 44 (13.17%) of patients. Complications ranged from Clavien–Dindo Grade I to Grade IIIb, with no Grade IV or V complications and no mortality. Fourteen patients (4.19%) required readmission. The mean duration of total hospital stay was 3.57 ± 2.05 days.

Conclusion: Laparoscopic cholecystectomy in elderly patients demonstrated perioperative outcomes and complication profiles comparable within the range reported in the literature for younger populations. These findings support the continued use of laparoscopic cholecystectomy in elderly patients when guided by appropriate patient selection, perioperative optimization, and routine histopathological assessment.

Keywords: Elderly; Gallstone Disease; Laparoscopic Cholecystectomy; Perioperative Outcomes

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INTRODUCTION

Gallstone disease is increasingly prevalent in the elderly population, with reported incidences ranging from 20% to 30%.[1] Laparoscopic cholecystectomy (LC) is widely regarded as the gold standard for the surgical management of gallstone disease, offering advantages such as reduced postoperative pain, shorter hospital stays, and faster recovery. With aging, the likelihood of cholelithiasis rises, leading to a higher surgical burden in geriatric patients.[2,3] Elderly individuals are also more prone to present with acute complications, including acute cholecystitis, gallstone pancreatitis, and choledocholithiasis, which may increase the complexity and risk profile of LC.[3] Despite these concerns, evidence suggests that LC can be performed safely in the elderly population, with outcomes comparable to those in younger cohorts.[4,5] This study aims to evaluate the perioperative outcomes and safety profile of laparoscopic cholecystectomy in elderly patients.

METHODOLOGY

A prospective observational descriptive study was conducted on elderly patients undergoing laparoscopic cholecystectomy at the department of GI and General Surgery, KMCTH over a period from January 1, 2021, to July 30, 2023. Ethical clearance was obtained from the Institutional Review Committee of KMCTH (reference number: 0403202005) prior to the start of the study, ensuring that all ethical guidelines for conducting research involving human subjects were strictly followed. Patients aged ≥65 years, diagnosed with gallstone disease or related indications undergoing elective or emergency laparoscopic cholecystectomy were included in the study whereas patients with pre-diagnosed gallbladder malignancy and extensive intraoperative adhesions or associated conditions altering standard LC outcomes were excluded. The sample size was calculated using the following formula as follows:

$N = z^2p (1-p) / e^2$
z = confidence level at 95% (standard value of 1.96)
p = estimated prevalence = 30% (according to previous study)[1]
e = margin of error = 5%
z =1.96, p=0.30, e=0.05
$N = 1.96^2 \times 0.30 \times (1-0.30)/ 0.05^2$
N = 0.8359/0.0025= 322

By substituting these values, the minimum sample size calculated was 322; however, we included all patients who met the inclusion criteria during the defined study period, resulting in a final sample size of 334.

After obtaining informed consent, data were collected using a structured proforma. Data collected encompassed demographic details, comorbidities, American Society of Anesthesiologists (ASA) physical status classification, indications for surgery, operative details (including duration and any conversion to open surgery), postoperative complications, length of hospital stay, and histopathological findings. Postoperative assessments recorded complications such as bile leaks, cardiac events, respiratory distress, and readmissions. Patients with choledocholithiasis were managed with preoperative ERCP followed by laparoscopic cholecystectomy. All laparoscopic cholecystectomies were performed either by consultant surgeons or under their close supervision, utilizing a standard 4-trocar technique depending on intraoperative requirements.

Data analysis was performed using statistical package for social sciences, IBM SPSS Statistics for Windows version 21 (IBM Corp., Armonk, N.Y., USA). Categorical variables were expressed as absolute counts and percentages, while continuous variables were presented as mean ± standard deviation.

RESULTS

A total of 334 elderly patients (≥65 years) underwent laparoscopic cholecystectomy during the study period. The mean age was 68.9 ± 4.7 years, with 227 (67.96%) females and 107 (32.04%) males. Most patients were classified as American Society of Anesthesiologists (ASA) grade I–II, accounting for 322 (96.41%) patients, while 12 (3.59%) were ASA grade III (Table 1).

The most common comorbidities were hypertension 111 (33.23%) and diabetes mellitus 60 (17.96%, Table 2).

The most frequent indication for laparoscopic cholecystectomy was uncomplicated cholelithiasis in 233 (69.76%), followed by complicated cholecystitis in 43 (12.87% , Table 3).

Overall postoperative complications occurred in 44(13.17%) patients. When classified according to the Clavien–Dindo system, complications ranged from Grade I to Grade IIIb, with no Grade IV or Grade V complications. Grade I complications were the most common and occurred in 30 patients (8.98%). These included low-grade postoperative fever, shoulder-tip pain, postoperative ileus, urinary retention, electrolyte imbalance, and vomiting, all of which were managed conservatively with supportive care. Grade II complications were observed in seven (2.10%) patients, all of whom required pharmacological treatment such as intravenous fluids, antiemetics, or antibiotics but did not require procedural intervention. Grade IIIa complication were observed in five (1.50%) patients which were all wound related requiring intervention under local anesthesia, whereas 2(0.6%) patients presented with persistent post-operative bile leak in drain, who required endoscopic retrograde cholangiopancreatography (ERCP) under general anesthesia, classified as Grade IIIb. No major bile duct injuries were encountered in this study.

Some patients experienced more than one postoperative event; such patients were classified according to the highest Clavien–Dindo grade observed (Table 4).

Drain placement was performed in 25 patients (7.49%), which were all placed during surgery based on intraoperative findings such as difficult dissection, bile spillage, or bleeding .A total of 14 (4.19%) patients required readmission during the postoperative

period. Of these, 7 (2.10%) patients were readmitted due to pain abdomen and were managed conservatively with medications alone, two were readmitted for persistent bile leak who later required ERCP stenting, remaining five were readmitted for wound related complication and post-operative pulmonary complications.

Table 1: Classification of patients according to ASA Physical Status

ASA Grade	n (%)
ASA I	155 (46.41)
ASA II	167 (50.00)
ASA III	12 (3.59)

Table 2: Comorbidity Profile of the Patients

Comorbidity	n (%)
Hypertension	111 (33.23)
Diabetes Mellitus	60 (17.96)
Chronic Obstructive Pulmonary Disease	20 (5.99)
Hypothyroidism	16 (4.79)
Hyperthyroidism	8 (2.40)
Others (SVT, TB, Pancreatitis)	8 (2.40)

Table 3: Indications for Laparoscopic Cholecystectomy

Indication	n (%)
Uncomplicated cholelithiasis	233 (69.76)
Complicated cholecystitis	43 (12.87)
Chronic calculous cholecystitis	18 (5.39)
Cholelithiasis with polyp	9 (2.69)
Choledocholithiasis	8 (2.40)
Mucocele	7 (2.10)
Adenomyomatosis	7 (2.10)
Acute mild biliary pancreatitis	5 (1.50)
Type I Mirizzi syndrome	4 (1.20)

Table 4: Postoperative Complications Classified According to the Clavien–Dindo Classification

Clavien–Dindo Grade	n (%)
Grade I	30 (8.98)
Grade II	7 (2.10)
Grade IIIa	5 (1.50)
Grade IIIb	2 (0.60)

The mean duration of total hospital stay was 3.57 ± 2.05 days, with a mean postoperative hospital stay of 2.13 ± 1.45 days (Table 5)

Histopathological examination was available for all specimens. Chronic cholecystitis was the most common diagnosis, identified in 270 patients (80.84%, Table 6).

Table 5: Length of Hospital Stay

Parameter	Mean ± SD (days)
Preoperative hospital stay	1.44 ± 1.15
Postoperative hospital stay	2.13 ± 1.45
Total hospital stay	3.57 ± 2.05

Table 6: Histopathological Findings

Histopathological Diagnosis	n (%)
Chronic cholecystitis	270 (80.84)
Acute cholecystitis	40 (11.98)
Chronic cholecystitis with focal dysplasia	8 (2.40)
Incidental gallbladder carcinoma	2 (0.60)
Adenomyomatosis	7 (2.10)
Mucocele	7 (2.10)

DISCUSSION

Laparoscopic cholecystectomy (LC) is well established as the standard treatment for gallstone disease, offering reduced postoperative pain, shorter hospital stay, and faster functional recovery compared with open surgery.[6] In elderly patients, these benefits are particularly important, as age-related physiological decline and comorbidity burden may increase susceptibility to postoperative morbidity.[7] Despite these concerns, several studies have demonstrated that LC can be performed safely in elderly patients, with outcomes comparable within the range reported in the literature for younger populations when appropriate perioperative strategies are applied.[6,8]

The present study describes perioperative outcomes of LC in an elderly cohort, with emphasis on age-sensitive outcomes that may differ from those reported in younger patients. Although a direct comparison with a younger cohort was not undertaken, our findings can be interpreted in the context of published literature involving younger and mixed-age populations. Overall, the results support the safety and feasibility of LC in elderly patients when careful patient selection, preoperative optimization, and vigilant postoperative care are ensured.

In this study, postoperative complications occurred in 13.17% of patients, with the majority experiencing an uncomplicated recovery. When graded using the Clavien–Dindo classification, complications ranged from Grade I to Grade IIIb, with no life-threatening (Grade IV) complications and no postoperative mortality. These findings are consistent with reports in younger populations, where overall complication rates following LC generally range between 8% and 15%, with most complications being minor.[6,7]

Elderly patients typically present with higher anesthetic risk profiles and a greater burden of comorbidities compared with younger individuals.[9] In the present study, however, the majority of patients were classified as ASA grade I or II, with only a small proportion classified as ASA grade III. This favorable risk distribution likely contributed to the acceptable perioperative outcomes observed.

Low-grade complications such as postoperative fever, shoulder-tip pain, ileus, urinary retention, electrolyte imbalance, and vomiting constituted the majority of events in our elderly cohort and were managed conservatively. Similar symptoms are often transient and less frequently emphasized in studies involving younger patients, likely reflecting differences in physiological reserve and tolerance to postoperative stress rather than technical failure of surgery.[10,11,12]

Bile leak was the most clinically significant surgical complication observed. These cases were successfully managed with ERCP, and no patient required surgical re-exploration. In younger cohorts, bile leak rates following LC are typically low and are usually managed non-operatively.[6,7] Importantly, the absence of reoperation or mortality underscores the safety of LC in a carefully selected elderly population.

The mean total hospital stay in the present study was 3.57 ± 2.05 days, with a postoperative stay of 2.13 ± 1.45 days. In contrast, younger patients undergoing LC are often discharged within one to two days, particularly in ambulatory or short-stay settings.[6,10,13] The longer hospital stay observed in elderly patients is likely multifactorial, influenced by slower mobilization, higher prevalence of comorbidities, and more conservative discharge thresholds.

Despite this difference, the length of stay in our cohort remains clinically acceptable and comparable to other studies involving elderly patients.[6,11,13] Importantly, a modestly prolonged hospital stay in elderly patients should not be interpreted as an adverse outcome but rather as a reflection of cautious perioperative management aimed at ensuring patient safety and preventing complications.

A small proportion of elderly patients in this study required additional postoperative interventions. Selective drain placement was used in 7.49% of patients, primarily in cases with difficult dissection. In younger populations, routine drain placement after LC is generally discouraged, as evidence suggests no benefit in uncomplicated cases.[10] However, selective drainage remains an accepted and prudent strategy in elderly patients with advanced inflammation or distorted anatomy, particularly in settings where delayed presentation is common.

ERCP was required in a limited number of patients for bile leak management. In younger cohorts, post-LC ERCP is typically required for retained stones or cystic duct leaks and occurs infrequently.[6,7] In elderly patients, the threshold for intervention may be lower due to reduced physiological reserve and the need to prevent progression to sepsis or organ dysfunction.[11]

Readmission occurred in 4.19% of patients, with half of these cases attributed to pain abdomen managed conservatively. Readmission rates in younger populations are generally lower, often reported below 2%, particularly in ambulatory LC settings.[6] The higher readmission rate observed in elderly patients likely reflects increased sensitivity to postoperative symptoms and the need for closer monitoring rather than increased surgical failure.

Hypertension and diabetes mellitus were the most common comorbidities, consistent with patterns reported in both elderly and younger surgical populations.[9] Despite this comorbidity burden, complication severity remained low, and no patient developed complications beyond Clavien–Dindo grade IIIb. Studies comparing elderly and younger patients have demonstrated that with adequate preoperative optimization, ASA grade and comorbidity burden are more predictive of outcomes than chronological age alone.[6,14]

Recent literature emphasizes the importance of frailty assessment as a predictor of postoperative outcomes, often outperforming traditional risk stratification tools such as ASA grading.[14] Incorporating frailty and functional

status assessments into preoperative evaluation may further enhance patient selection and improve outcomes in elderly patients undergoing LC.

The findings of this study support the continued use of laparoscopic cholecystectomy as a safe and effective treatment for gallstone disease in elderly patients. Although elderly patients may exhibit different patterns of postoperative morbidity and may require more cautious postoperative management compared with younger patients reported in the literature, major complications and severe morbidity remain uncommon when appropriate perioperative strategies are employed.[6,7,11]

The identification of incidental gallbladder carcinoma in 0.60% of patients highlights the importance of routine histopathological examination of cholecystectomy specimens in elderly populations.[15] Overall, these findings reinforce that chronological age alone should not preclude laparoscopic intervention; instead, individualized assessment of physiological reserve, comorbidities, and functional status should guide surgical decision-making.

This study is limited by its single-center design which may limit generalizability. Future multicenter studies incorporating frailty indices and direct age-group comparisons would further clarify differences in outcomes between elderly and younger populations undergoing laparoscopic cholecystectomy.

The study has some limitations, first, the single-center design may limit generalizability. Second, the use of consecutive sampling without inclusion of higher-risk patients (ASA IV and V) may have introduced selection bias limiting the applicability of the findings to higher-risk or frail elderly populations. Third, exclusion of patients with extensive intraoperative adhesions may have led to underestimation of operative complexity and complication rates. Fourth, frailty assessment was not performed, limiting risk stratification.

CONCLUSION

Laparoscopic cholecystectomy remains an appropriate treatment option for gallstone disease in elderly patients when guided by careful patient selection and perioperative optimization. In this study, perioperative outcomes and complication profiles in elderly patients were comparable to those within the range reported in the literature for younger populations, with predominantly low-grade morbidity and no life-threatening complications or mortality. Although elderly patients may require more cautious postoperative management, major complications were uncommon, supporting decision-making based on individualized clinical assessment rather than chronological age alone.

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REFERENCES

1. Loozen, C. S., van Ramshorst, B., van Santvoort, H. C., & Boerma, D. (2017). Early cholecystectomy for acute cholecystitis in the elderly population: a systematic review and meta-analysis. Digestive surgery, 34(5), 371-379. [PubMed | Full Text | DOI]
2. Taki-Eldin A, Badawy AE. Outcome of Laparoscopic Cholecystectomy in Patients With Gallstone Disease at a Secondary Level Care Hospital. Arq Bras Cir Dig. 2018 Jun 21;31(1):e1347. [PubMed | Full Text | DOI]
3. Magnuson TH, Ratner LE, Zenilman ME, Bender JS. Laparoscopic Cholecystectomy: Applicability in the Geriatric Population. Am Surg. 1997 Jan;63(1):91-6. [PubMed | Full Text]
4. Annamaneni RK, Moraitis D, Cayten CG. Laparoscopic Cholecystectomy in the Elderly. JSLS. 2005 Oct-Dec;9(4):408-10.[PubMed | Full Text]
5. Coelho JCU, Dalledone GO, Domingos MF, Nassif LT, de-Freitas ACT, Matias JEF. Results of Laparoscopic Cholecystectomy in the Elderly. Rev Col Bras Cir. 2018 Nov 14;45(5):e2020. [PubMed | Full Text | DOI]
6. Yetkin G, Uludag M, Oba S, Citgez B, Paksoy I. Laparoscopic Cholecystectomy in Elderly Patients. JSLS. 2009 Oct-Dec;13(4):587-91. [PubMed | Full Text | DOI]
7. Tambyraja AL, Kumar S, Nixon SJ. Outcome of Laparoscopic Cholecystectomy in Patients 80 Years and Older. World J Surg. 2004 Aug;28(8):745-8. [PubMed | Full Text | DOI]
8. Pak M, Lindseth G. Risk Factors for Cholelithiasis. Gastroenterol Nurs. 2016 Jul-Aug;39(4):297-309. [PubMed | Full Text | DOI]
9. Chawan, A. P., Rathore, Y. S., Chumber, S., & Kataria, K. (2020). Surgical Diseases and Surgical Outcomes in Geriatric Patients. International Surgery Journal, 7(10), 3315–3320. [Full Text | DOI]
10. Zhu H, Liu D, Zhou D, Wu J, Yu Y, Jin Y, et al. Effectiveness of No Drainage After Elective Day-

Case Laparoscopic Cholecystectomy, Even With Intraoperative Gallbladder Perforation: A Randomized Controlled Trial. Langenbecks Arch Surg. 2023 Mar 1;408(1):112. [PubMed | Full Text | DOI]

11. Mayol J, Martinez-Sarmiento J, Tamayo FJ, Fernández-Represa JA. Complications of Laparoscopic Cholecystectomy in the Ageing Patient. Age Ageing. 1997 Mar;26(2):77-81. [PubMed | Full Text | DOI]
12. Montenegro DM, Chukwu M, Ehsan P, Aburumman RN, Muthanna SI, Menon SR, Vithani V, Sutariya B, Yu AK. The Safety of Minimally Invasive and Open Cholecystectomy in Elderly Patients With Acute Cholecystitis: A Systematic Review. Cureus. 2022 Nov 6;14(11):e31170. [PubMed | Full Text | DOI]
13. Rubert CP, Higa RA, Farias FVB. Comparison Between Open and Laparoscopic Elective Cholecystectomy in Elderly, in a Teaching Hospital. Rev Col Bras Cir. 2016 Jan 1;43(1):02–5. [PubMed | Full Text | DOI]
14. Bagnall NM, Malietzis G, Kennedy RH, Athanasiou T, Faiz O, Darzi A. A Systematic Review of Enhanced Recovery Care After Colorectal Surgery in Elderly Patients. Colorectal Dis. 2014 Dec;16(12):947-56. [PubMed | Full Text | DOI]
15. Panebianco A, Volpi A, Lozito C, Prestera A, Ialongo P, Palasciano N. Incidental Gallbladder Carcinoma: Our Experience. G Chir. 2013 May-Jun;34(5-6):167-9. [PubMed | Full Text | DOI]