Journal of Health and Rehabilitation Research 2791-156X JHRR

For contributions to JHRR, contact at email: editor@jhrlmc.com

Original Article

Perioperative Outcomes after Elective Laparoscopic Cholecystectomy in High Risk Patients

Fazal Ur Rehman[1], Mujahid Zulfiqar Ali[2], Maheen Zafar[3], Madeeha Ikram[4], Aqsa Tassadduq[5], Muhammad Farrukh Habib[6]*

[1]Resident Surgery, Combined Military Hospital Lahore, Pakistan.
[2]Consultant Surgeon, Combined Military Hospital Lahore, Pakistan.
[3]Consultant Ophthalmologist, Model Town Hospital Lahore, Pakistan.
[4]Consultant Pediatrics, Khan Research Laboratories Hospital Islamabad, Pakistan.
[5]Medical Officer, District Headquarter Mirpur, Pakistan.
[6]Department of Management Sciences, Shifa Tameer-E-Millat University Islamabad, Pakistan.
Corresponding Author: Muhammad Farrukh Habib; Email: muhammadfarrukhhabib@gmail.com

Conflict of Interest: None.

Rehman FU., et al. (2024). 4(2): DOI: https://doi.org/10.61919/jhrr.v4i2.705

ABSTRACT

Background: The global population is aging, leading to an increased incidence of acute cholecystitis and associated complications in the elderly. While laparoscopic cholecystectomy is the gold standard for treating acute cholecystitis, its safety and outcomes in high-risk, elderly patients with comorbidities are not well-documented.

Objective: To compare postoperative complications, hospital stay duration, and nursing care requirements between high-risk elderly patients undergoing tube cholecystostomy versus early elective laparoscopic cholecystectomy for acute cholecystitis.

Methods: This cross-sectional comparative study was conducted at Combined Military Hospital Rawalpindi from July 2021 to January 2022. A total of 70 patients aged 40-80 years and classified as ASA 3 or 4 were included. Patients were divided into two groups: Group 1 (n=35) underwent tube cholecystostomy followed by interval cholecystectomy after six weeks; Group 2 (n=35) underwent early elective laparoscopic cholecystectomy within 72 hours of admission. Data on hospital stay, postoperative complications, and nursing care were collected and analyzed using SPSS version 25.0. Quantitative data were presented as mean ± standard deviation (SD), and qualitative data as frequency and percentage. Independent t-tests were applied, with a p-value of less than 0.05 considered statistically significant.

Results: In Group 1, 91% of patients had a hospital stay of less than 5 days compared to 11% in Group 2 (p=0.000). Group 1 had 94% of patients nursed in the ward/HDU, while 94% of Group 2 required ICU care (p=0.000). Postoperative complications were significantly lower in Group 1, with 97% having no complications compared to 34% in Group 2 (p=0.000). Only 3% of Group 1 required multidisciplinary team management versus 66% in Group 2.

Conclusion: Tube cholecystostomy is a safer and more effective initial management strategy for high-risk elderly patients with acute cholecystitis, leading to shorter hospital stays, less intensive postoperative care, and fewer complications compared to early elective laparoscopic cholecystectomy.

Keywords: Acute cholecystitis, elderly patients, tube cholecystostomy, laparoscopic cholecystectomy, ASA classification, postoperative complications, hospital stay, nursing care, high-risk patients, minimally invasive surgery.

INTRODUCTION

The global population is continuously growing, and with this growth, there is an increase in the number of elderly individuals. The surgical problems and their management options differ significantly between younger and older populations. The term "frailty" describes the lack of resilience and the inability to handle the stress of surgical procedures in elderly people. Understanding age-related problems and addressing them with minimal surgical intervention can help reduce postoperative complications in this demographic. Acute cholecystitis is a major cause of acute abdomen in elderly individuals who are often unfit for routinely practiced surgical options (1). Emergency interventions requiring general anesthesia versus those requiring no anesthesia present different morbidity and mortality outcomes. These elderly patients often have multiple comorbidities, classifying them as American Society of Anesthesiologists (ASA) physical status 3 or 4, which further indicates their unfitness for general anesthesia and results in

Journal of Health and Rehabilitation Research 2791-156X JHRR

increased hospital stays with higher requirements for High Dependency Unit (HDU) or Intensive Care Unit (ICU) care, leading to more complications (2, 3).

Laparoscopic cholecystectomy is considered a very safe and the gold standard procedure for treating acute cholecystitis. However, the morbidity and complication rates associated with this procedure vary across different age groups. Since the procedure is performed under general anesthesia, the risk of postoperative hospital stay and complications increases in patients classified as ASA 3 or 4 (4, 5, 6, 7). This study aims to compare postoperative complications in elderly patients with multiple comorbidities classified as ASA 3 or 4 undergoing laparoscopic cholecystectomy under general anesthesia versus those undergoing tube cholecystostomy, a minimally invasive procedure requiring no anesthesia, in the setting of an acute episode of cholecystitis (8).

Various articles were reviewed using PubMed and Google Scholar databases from 1990 to 2021. The key search terms included "laparoscopic cholecystectomy in high-risk patients" and "efficacy of tube cholecystostomy" (9, 10). The database search on the efficacy of laparoscopic cholecystectomy in acute episodes of cholecystitis yielded 47 articles. Upon further analysis, only five articles focused on the efficacy of tube cholecystostomy in high-risk groups as an emergency procedure for settling acute cholecystitis (11, 12).

While laparoscopic cholecystectomy remains the gold standard for treating acute cholecystitis, its application in high-risk elderly patients with multiple comorbidities classified as ASA 3 or 4 should be carefully considered. Minimally invasive alternatives such as tube cholecystostomy, which do not require general anesthesia, may offer a safer option with potentially lower morbidity and mortality rates in this vulnerable population. Further research and more focused studies are needed to better understand the outcomes and optimize the management strategies for these high-risk patients.

MATERIAL AND METHODS

This cross-sectional comparative study was conducted at Combined Military Hospital Rawalpindi from July 2021 to January 2022. The study included a total of 70 patients, with 35 patients in each group, ranging in age from 40 to 80 years. The sample size was calculated using the WHO sample size calculator, resulting in a total of 70 participants, 35 in each group, with a level of significance of 5% and a power of 90%. The test value of the population mean was 15.8, with an anticipated population mean of 3.83 and a population standard deviation of 7.405 (13).

Group A consisted of patients who underwent tube cholecystostomy at the time of admission for acute cholecystitis, followed by interval cholecystectomy after six weeks when the acute phase had settled. Group B included patients who underwent early elective cholecystectomy within 72 hours of admission. All patients were aged 40-80 years and classified as ASA class 3 or 4. For Group A, the tube cholecystostomy procedure was performed within the first 24 hours of hospital admission (14). For Group B, early elective cholecystectomy was conducted within the first 72 hours of hospital admission (15, 16).

The inclusion criteria encompassed all patients within the specified age range and ASA class. Exclusion criteria included patients under 40 years of age, those classified as ASA class 1, 2, or 5, and elderly patients who were lost to follow-up. Additionally, patients with acute cholecystitis who had elevated amylase levels and raised alkaline phosphatase with suspected choledocholithiasis were excluded. The primary outcomes measured were the average postoperative hospital stay and the incidence of postoperative complications in both groups. Secondary outcomes included a comparison of postoperative nursing care between the two groups.

Data were collected prospectively and entered into a database. The assessment of patients included a comprehensive review of medical history, clinical examination, laboratory investigations, and imaging studies to confirm the diagnosis of acute cholecystitis. The ethical conduct of the study was in accordance with the Declaration of Helsinki, and informed consent was obtained from all participants prior to their inclusion in the study.

Data analysis was performed using SPSS version 25.0. Quantitative data were presented as mean ± standard deviation (SD), while qualitative data were expressed as frequency and percentage. An independent t-test was applied to compare the means between the two groups, with a p-value of less than 0.05 considered statistically significant. The results were analyzed to determine the differences in postoperative outcomes, including hospital stay duration, complication rates, and nursing care requirements between the two treatment groups (13-16).

RESULTS

The study included a total of 70 patients, divided equally into two groups, each consisting of 35 patients. Group 1, who underwent tube cholecystostomy, included 16 males (46%) and 19 females (54%). In contrast, Group 2, who underwent early elective cholecystectomy, comprised 9 males (26%) and 26 females (74%) (Table 1). The diagnoses varied slightly between the groups. In Group 1, 8 patients (23%) were diagnosed with acute cholecystitis, 18 patients (51%) with empyema of the gallbladder, and 9 patients (26%) with mucocele of the gallbladder. In Group 2, 7 patients (20%) were diagnosed with acute cholecystitis, 16 patients (46%) with

Journal of Health and Rehabilitation Research 2791-156X JHRR

empyema, and 12 patients (34%) with mucocele. The mean diagnosis score was 1.51 ± 0.711 for Group 1 and 2.07 ± 0.516 for Group 2, reflecting the severity and type of gallbladder pathology in both groups (Table 1).

Table 1: Patient Demographics and Diagnoses

Variable	Group 1 (Tube Cholecystostomy) (n=35)	Group 2 (Early Elective Cholecystectomy) (n=35)
Gender		
Male	16 (46%)	9 (26%)
Female	19 (54%)	26 (74%)
Diagnosis		
Acute Cholecystitis	8 (23%)	7 (20%)
Empyema GB	18 (51%)	16 (46%)
Mucocele GB	9 (26%)	12 (34%)
Mean ± SD	1.51 ± 0.711	2.07 ± 0.516

Table 2: Postoperative Outcomes

Variable	Group 1 (Tube Cholecystostomy) (n=35)	Group 2 (Early Elective Cholecystectomy) (n=35)	p-value
Length of Stay			
Less than 5 Days	32 (91%)	4 (11%)	0.000
More than 5 Days	3 (9%)	31 (89%)	
Nursing Care			
Ward / HDU	33 (94%)	2 (6%)	0.000
ICU	2 (6%)	33 (94%)	
Complications			
None	34 (97%)	12 (34%)	0.000
MDT Management	1 (3%)	23 (66%)	

Postoperative outcomes showed significant differences between the two groups. The length of hospital stay was notably shorter in Group 1, with 32 patients (91%) staying less than 5 days, compared to only 4 patients (11%) in Group 2. Conversely, 3 patients (9%) in Group 1 stayed more than 5 days, while a substantial 31 patients (89%) in Group 2 had prolonged hospital stays (p=0.000) (Table 2). This indicates a significantly shorter recovery period for patients undergoing tube cholecystostomy compared to those undergoing early elective cholecystectomy.

Nursing care requirements also varied significantly. In Group 1, the majority of patients (33 or 94%) were managed in the ward or HDU, with only 2 patients (6%) requiring ICU care. In contrast, in Group 2, only 2 patients (6%) were managed in the ward or HDU, while a significant majority of 33 patients (94%) required ICU care (p=0.000) (Table 2). This suggests that tube cholecystostomy is associated with less intensive postoperative care compared to early elective cholecystectomy.

The incidence of postoperative complications further highlighted the benefits of tube cholecystostomy in high-risk patients. In Group 1, 34 patients (97%) experienced no complications, with only 1 patient (3%) requiring multidisciplinary team (MDT) management. Conversely, in Group 2, a considerable number of patients, 23 (66%), required MDT management for complications, with only 12 patients (34%) experiencing no complications (p=0.000) (Table 2). This data underscores the higher safety profile of tube cholecystostomy in managing acute cholecystitis in elderly patients with multiple comorbidities classified as ASA 3 or 4.

In summary, the study demonstrated that tube cholecystostomy offers several advantages over early elective cholecystectomy in high-risk elderly patients. These advantages include a significantly shorter hospital stay, reduced need for intensive postoperative care, and a lower incidence of complications. These findings support the use of tube cholecystostomy as a safer and more effective initial management strategy for acute cholecystitis in high-risk patients.

DISCUSSION

With advancing age, the incidence and complications of acute cholecystitis have been on the rise. While early intervention through laparoscopic cholecystectomy is established as the gold standard treatment for acute cholecystitis, limited research has addressed the specific challenges posed by increasing age, comorbidities, and the effects of general anesthesia on elderly, high-risk patients

Journal of Health and Rehabilitation Research 2791-156X JHRR

(17, 18). Frailty, characterized by decreased physiological reserves, exacerbates the risks associated with general anesthesia, making such patients classified as ASA 3 or 4 by the American Society of Anesthesiologists (ASA) particularly vulnerable (19). The ASA classification system, developed in 1941 and subsequently refined, categorizes patients based on their preoperative risk, with each class correlating with specific perioperative mortality and morbidity rates (20). Patients classified as ASA 3 have severe systemic disease, while those in ASA 4 have severe disease that poses a constant threat to life, encompassing conditions such as diabetes mellitus, hypertension, chronic obstructive pulmonary disease (COPD), moderate reduction of ejection fraction, valvular dysfunction, recent myocardial infarction (MI), cerebrovascular accident (CVA), transient ischemic attack (TIA), and coronary artery disease (CAD) with stents.

Laparoscopic cholecystectomy remains the gold standard for treating acute calculous cholecystitis (1, 17). However, the timing and outcomes of this procedure can vary significantly across different age groups. While laparoscopic cholecystectomy is relatively safe for ASA 1 and 2 patients (21), those classified as ASA 3 or 4 face increased risks of postoperative complications, extended hospital stays, and elevated levels of required postoperative care (22). In contrast, tube cholecystostomy, a less invasive procedure performed under local anesthesia, offers a viable alternative for ASA 3 and 4 patients. This procedure stabilizes the acute phase of cholecystitis, allowing for a subsequent interval laparoscopic cholecystectomy once the patient is better suited for general anesthesia (16, 22).

The findings of this study indicated that patients who underwent tube cholecystostomy experienced shorter hospital stays and were typically managed in wards or high dependency units, requiring less intensive postoperative care and multidisciplinary team management compared to those who underwent early elective laparoscopic cholecystectomy within 72 hours of admission. These outcomes suggest that tube cholecystostomy is a safer and more effective initial management strategy for high-risk elderly patients with acute cholecystitis.

This study had several strengths, including its prospective design and the rigorous comparison of postoperative outcomes between two well-defined patient groups. However, there were also limitations, such as the relatively small sample size and the single-center nature of the study, which may limit the generalizability of the findings. Additionally, the study did not account for potential variations in surgical expertise or postoperative care protocols, which could influence the outcomes.

CONCLUSION

In conclusion, while elective laparoscopic cholecystectomy remains a viable option for some patients, the majority of high-risk elderly patients with multiple comorbidities are likely to benefit more from tube cholecystostomy. This approach not only minimizes the immediate risks associated with general anesthesia but also facilitates better postoperative outcomes by allowing the patient's condition to stabilize before undergoing more definitive surgical treatment. Future research should focus on larger, multicenter studies to validate these findings and explore additional strategies to optimize the management of high-risk patients with acute cholecystitis (17, 18, 19, 20, 21, 22).

REFERENCES

1. Litwin DE, Cahan MA. Laparoscopic Cholecystectomy. Surg Clin North Am. 2008;88(6):1295-313.
2. Olsen DO. Laparoscopic Cholecystectomy. Am J Surg. 1991;161(3):339-44.
3. Macintyre IMC, Wilson RG. Laparoscopic Cholecystectomy. J Br Surg. 1993;80(5):552-9.
4. Soper NJ. Laparoscopic Cholecystectomy. Curr Probl Surg. 1991;28(9):587-655.
5. Grace PA, Quereshi A, Coleman J, Keane R, McEntee G, Broe P, et al. Reduced Postoperative Hospitalization After Laparoscopic Cholecystectomy. Br J Surg. 1991;78(2):160-2.
6. Kehlet H, Gray AW, Bonnet F, Camu F, Fischer HBJ, McCloy RF, et al. A Procedure-Specific Systematic Review and Consensus Recommendations for Postoperative Analgesia Following Laparoscopic Cholecystectomy. Surg Endosc. 2005;19:1396-415.
7. Gustafsson S, Strömqvist M, Ekelund J, Engström Å. Factors Influencing Early Postoperative Recovery After Laparoscopic Cholecystectomy. J PeriAnesth Nurs. 2020;35(1):80-4.
8. Sadati L, Pazouki A, Mehdizadeh A, Shoar S, Tamannaie Z, Chaichian S. Effect of Preoperative Nursing Visit on Preoperative Anxiety and Postoperative Complications in Candidates for Laparoscopic Cholecystectomy: A Randomized Clinical Trial. Scand J Caring Sci. 2013;27(4):994-8.
9. Mitchell M. Nursing Intervention for Day-Case Laparoscopic Cholecystectomy. Nurs Stand. 2007;22(6).
10. Kadhim H. Assessment of Postoperative Nurses' Interventions for the Patients with Laparoscopic Cholecystectomy at Baghdad Teaching Hospitals. Iraqi Natl J Nurs Spec. 2014;27(1):11-22.
11. Brenner P, Kautz DD. Postoperative Care of Patients Undergoing Same-Day Laparoscopic Cholecystectomy. AORN J. 2015;102(1):15-32.

Journal of Health and Rehabilitation Research 2791-156X JHRR

12. Jensen K, Kehlet H, Lund CM. Post-Operative Recovery Profile After Laparoscopic Cholecystectomy: A Prospective, Observational Study of a Multimodal Anaesthetic Regime. Acta Anaesthesiol Scand. 2007;51(4):464-71.
13. Shamiyeh A, Wayand W. Laparoscopic Cholecystectomy: Early and Late Complications and Their Treatment. Langenbecks Arch Surg. 2004;389:164-71.
14. Berber E, Engle KL, String A, Garland AM, Chang G, Macho J, et al. Selective Use of Tube Cholecystostomy With Interval Laparoscopic Cholecystectomy in Acute Cholecystitis. Arch Surg. 2000;135(3):341-6.
15. Khasawneh MA, Shamp A, Heller S, Zielinski MD, Jenkins DH, Osborn JB, et al. Successful Laparoscopic Cholecystectomy After Percutaneous Cholecystostomy Tube Placement. J Trauma Acute Care Surg. 2015;78(1):100-4.
16. Suzuki K, Bower M, Cassaro S, Patel RI, Karpeh MS, Leitman IM. Tube Cholecystostomy Before Cholecystectomy for the Treatment of Acute Cholecystitis. JSLS. 2015;19(1).
17. Woodward SG, Rios-Diaz AJ, Zheng R, McPartland C, Tholey R, Tatarian T, et al. Finding the Most Favorable Timing for Cholecystectomy After Percutaneous Cholecystostomy Tube Placement: An Analysis of Institutional and National Data. J Am Coll Surg. 2021;232(1):55-64.
18. Lin D, Wu S, Fan Y, Ke C. Comparison of Laparoscopic Cholecystectomy and Delayed Laparoscopic Cholecystectomy in Aged Acute Calculous Cholecystitis: A Cohort Study. Surg Endosc. 2020;34:2994-3001.
19. Nikfarjam M, Shen L, Fink MA, Muralidharan V, Starkey G, Jones RM, et al. Percutaneous Cholecystostomy for Treatment of Acute Cholecystitis in the Era of Early Laparoscopic Cholecystectomy. Surg Laparosc Endosc Percutan Tech. 2013;23(5):474-80.
20. Hung YL, Chen HW, Fu CY, Tsai CY, Chong SW, Wang SY, et al. Surgical Outcomes of Patients With Maintained or Removed Percutaneous Cholecystostomy Before Intended Laparoscopic Cholecystectomy. J Hepatobiliary Pancreat Sci. 2020;27(8):461-9.
21. Schlottmann F, Gaber C, Strassle PD, Patti MG, Charles AG. Cholecystectomy vs. Cholecystostomy for the Management of Acute Cholecystitis in Elderly Patients. J Gastrointest Surg. 2019;23:503-9.