**Journal of Neonatal Surgery**
***ISSN(Online): 2226-0439***
***Vol. 14, Issue 32s (2025)***
*https://www.jneonatalsurg.com*

OPEN ACCESS

# Risk Factors for Converting from Laparoscopic to Open Cholecystectomy Procedures

**Dr. Harish Nandagopal J.[1], Dr. H. B. Janugade[2], Dr. Rabbna I. Mulla[3]**

[1]M.B.B.S. Department of General Surgery, Krishna Institute Medical Sciences, KVV, Karad, Maharashtra, India

[2]M.S. Associate Professor, General Surgery, KVVDU Karad, Maharashtra, India

[3]PhD Biostatistics Department of Community Medicine, KVVDU Karad, Maharashtra, India

Cite this paper as: Dr. Harish Nandagopal J, Dr. H. B. Janugade, Dr. Rabbna I. Mulla, (2025) Risk Factors for Converting from Laparoscopic to Open Cholecystectomy Procedures. *Journal of Neonatal Surgery*, 14 (32s), 907-911.

**ABSTRACT**

**Background:** For symptomatic gallstones, laparoscopic cholecystectomy (LC) has emerged as the preferred treatment; nevertheless, conversion to open cholecystectomy (OC) is still an option. Unfortunately, it's unknown whether preoperative indicators indicate conversion risk.

**Methods:** The records of 64 patients who underwent cholecystectomy from March 2023 to September 2024 were reviewed retrospectively. The demographics and preoperative data of patients who required conversion to laparotomy were compared to those with successful laparoscopic cholecystectomy.

**Results:** Around 62.5%, a significant conversion rate was noted. Male advanced age (>50 years), obesity, previous abdominal surgery, high leukocyte counts, and hyperglycemia were all significant risk factors for conversion. The main causes of conversion were intraoperative difficulties such thick adhesions, blurred anatomy, and impaired vision. Longer hospital stays, longer operating times, and more treatment expenses were experienced by patients undergoing conversion.

**Conclusions:** Patient demographics, comorbidities, and intraoperative findings all play a role in the multifactorial decision to convert from LC to OC. Preoperatively identifying high-risk patients can help with better planning, minimize unanticipated conversions, and guarantee optimal resource allocation during surgery. Conversion should not be viewed as a failure but rather as a safety measure to ensure better outcomes.

**Keywords:** *Open cholecystectomy, Laparoscopic cholecystectomy, conversion, risk factors, gallbladder disease, intraoperative complications, obesity, prior abdominal surgery, hospital stay, operative time.*

## 1. INTRODUCTION

Laparoscopic cholecystectomy has rapidly become the treatment of choice for symptomatic cholelithiasis. Advantages of laparoscopic cholecystectomy over traditional open cholecystectomy include reduced postoperative recovery time, shorter hospitalization, reduced pain, improved cosmesis, and rapid return to normal activities[1,2,4]. However, cholecystectomy cannot be completed laparoscopically in all patients and conversion to open cholecystectomy is then required. Conversion rates for both acute and chronic cholecystitis have been reported in many series and range from 2 to 20% with an average of 5%[2-6]. Inability to delineate the anatomy secondary to adhesions or inflammation, unexpected operative findings, and iatrogenic injuries are the most common criteria for conversion to an open procedure[2].

Unfortunately, factors indicating a risk for conversion of laparoscopic to open cholecystectomy are un- clear. If risk factors could be reliably identified preoperatively, these factors would aid surgeons in preoperative patient counseling, informed consent, and operative strategy. We aimed to identify risk factors associated with conversion of laparoscopic cholecystectomy to open cholecystectomy in unselected patients.

The availability of intraoperative adjuncts such as cholangiography and laparoscopic ultrasound can sometimes aid in reducing conversion rates by providing better visualization of the biliary anatomy. However, in cases where these tools do not provide sufficient clarity, conversion remains a necessary alternative. The decision-making process is guided by the principle of patient safety, and conversion should not be viewed as a complication but rather as a strategic move to ensure the best possible surgical outcome[6].

The aim of this study was to evaluate the factors determining the conversion from laparoscopic cholecystectomy to open cholecystectomy

## 2. MATERIALS AND METHODS

We reviewed the medical records of all patients admitted to Krishna Hospital, Karad with acute or chronic cholecystitis who underwent cholecystectomy during the same admission in the period from May 2023 to December 2024. Data used in the analysis included patient demographics, admitting history and physical examination, laboratory and radiological data, operative note, pathology report, and hospital course. Records of 64 patients were identified and reviewed. duration was selected to ensure an adequate number of cases for statistical analysis while also allowing for proper follow-up and observation of outcomes. Initial preparatory work including ethical clearance, research design finalization, and staff training was conducted in the first month, after which recruitment and data collection were started. The last three months of the duration were allocated for data analysis, interpretation, and report writing Data are expressed as means standard deviation. Statistical analysis was performed using Student's t test for numeric data and analysis for qualitative data. Probabilities (P value) less than 0.05 were considered significant.

## 3. RESULTS

64 patients underwent attempted laparoscopic cholecystectomy at Krishna Hospital, Karad Maharashtra.

**Table 1. Demographical representation of the respondents.**

| Age Group | Demographical Variables | n | % |
|---|---|---|---|
| | 20–30 | 19 | 29.69 |
| | 30–40 | 14 | 14.06 |
| | 40–50 | 14 | 21.88 |
| | Above 50 | 22 | 34.38 |
| **Gender** | Female | 29 | 45.3 |
| | Male | 35 | 54.7 |
| **Previous Surgery** | No | 18 | 28.1 |
| | Yes | 46 | 71.9 |
| **Obesity** | No | 23 | 35.9 |
| | Yes | 41 | 64.1 |
| **Hospital stay** | 5 days | 11 | 17.2 |
| | 6 days | 13 | 20.3 |
| | 7 days | 11 | 17.2 |
| | 8 days | 9 | 14.1 |
| | 9 days | 9 | 14.1 |
| | 10 days | 11 | 17.2 |
| **Operation Time** | 1 hour | 21 | 32.8 |
| | 2 hours | 19 | 29.7 |
| | 3 hours | 15 | 23.4 |
| | 4 hours | 9 | 14.1 |
| **Open Cholecystectomy** | No | 24 | 37.5 |
| | Yes | 40 | 62.5 |

The age distribution of respondents reveals a relatively balanced representation across different age groups, with a slight skew toward older participants. The largest group falls in the "above 50" category, making up 34.38% of the sample, suggesting that a significant portion of the respondents are in the later stages of their professional or personal lives. The second-largest group is the 20–30 age range, comprising 29.69% of the total, indicating a strong presence of younger adults as well. The 40–50 age group accounts for 21.88%, while the 30–40 range has the smallest representation at 14.06%. The gender composition of the sample indicates a relatively balanced distribution between male and female participants, with a slight predominance of males. Out of the total 64 respondents, 54.7% identified as male, while 45.3% were female. This minor disparity suggests that both genders were fairly well-represented in the study, which enhances the generalizability of the findings across gender lines. The near-equal representation also implies that the data can provide insights into gender-related trends or preferences without significant bias. A significant majority of the respondents (71.9%) reported having undergone surgery in the past, while 28.1% had no history of surgical procedures. This high proportion of individuals with previous surgical experiences may have implications for the study, particularly if it relates to post-operative outcomes, health awareness, or medical history relevance.

Obesity was reported in 64.1% of the sample, making it the most prevalent health condition among those measured. Only 35.9% of respondents were not obese. This high rate underscores the significance of obesity as a potential risk factor or outcome in the study and may be relevant to various health-related or behavioral variables. Hospital stays durations varied, with the most common durations being 5, 7, and 10 days—each at 17.2%. Six-day stays were the most reported (20.3%). The overall distribution indicates that most patients stayed within a 5–10 day range, reflecting a standard postoperative recovery timeline for the procedures involved. Operative times were varied, with the most common being 1 hour (32.8%), followed by 2 hours (29.7%). Longer durations of 3 and 4 hours were reported by 23.4% and 14.1% of respondents, respectively. This distribution shows that the majority of procedures were completed within 1–2 hours, suggesting standardized operative efficiency in most cases.

Open cholecystectomy was performed in 62.5% of respondents, while 37.5% did not undergo the procedure. This high percentage reflects a significant portion of the study population undergoing surgical intervention, indicating its central relevance to the research objectives.

**Table 2. Clinical representation of the respondents.**

| | **Clinical Parameters** | **n** | **%** |
|---|---|---|---|
| **TLC (×10³/mm³)** | 4 | 9 | 14.1 |
| | 5 | 9 | 14.1 |
| | 6 | 10 | 15.6 |
| | 7 | 10 | 15.6 |
| | 8 | 11 | 17.2 |
| | 9 | 6 | 9.4 |
| | 10 | 4 | 6.3 |
| | 11 | 5 | 7.8 |
| **RBS level** | <200 | 31 | 48.4 |
| | >200 | 33 | 51.6 |
| **X ray findings** | Abnormal | 29 | 45.3 |
| | Normal | 35 | 54.7 |
| **HIV status** | Negative | 64 | 100 |
| **HbsAg status** | Negative | 62 | 96.8 |
| | Positive | 2 | 3.12 |
| **HCV status** | Negative | 64 | 100 |

The distribution of total leukocyte count (TLC) among respondents indicates a normal bell-curve pattern, with most values concentrated between 4,000 and 8,000 cells/mm³. The most frequently observed TLC was 8,000 (17.2%), followed by both 6,000 and 7,000 (15.6% each). The lowest and highest ends—4,000 and 11,000—were reported in 14.1% and 7.8% of cases, respectively. The random blood sugar (RBS) levels were nearly evenly divided, with 51.6% of respondents having RBS levels above 200 mg/dL and 48.4% below that threshold. This suggests a high prevalence of hyperglycemia within the population, which could indicate undiagnosed diabetes or stress-induced glycemic changes. X-ray analysis revealed normal findings in 54.7% of respondents, while 45.3% had abnormalities. This indicates that nearly half of the study population presented radiological signs suggestive of underlying clinical conditions.

All respondents tested negative for HIV, indicating a 100% HIV-negative status in the study population. This eliminates HIV as a confounding factor in this study and suggests limited risk of related immunosuppression within the sample. The HbsAg test revealed that 3.12% of respondents were positive, while 96.8% tested negative. The relatively high prevalence of positive cases underscores the importance of hepatitis B screening in surgical and clinical settings, given its implications for both patient and healthcare provider safety. HCV positivity was noted in 0 % of respondents, while 100% tested negative. This considerable rate of HCV presence is clinically significant, especially in surgical settings, where preoperative viral screening is essential for infection control and patient management.

## 4. DISCUSSION

A significant majority (62.5%) of the 64 respondents had OC, which suggests a high conversion rate in comparison to a number of benchmark studies in the literature. According to demographic statistics, there was a slight male predominance and the majority of patients were over 50. Respondents frequently had inflammatory symptoms, prior abdominal operations, and obesity, all of which are known risk factors for conversion. The purpose of this study was to determine and assess the variables influencing the switch from laparoscopic to open cholecystectomy (LC to OC).

The study sample showed a high prevalence of risk factors commonly associated with conversion. These included advanced age, obesity (present in 64.1% of respondents), previous surgeries (reported by 71.9%), and clinical signs of inflammation such as pain, pallor, and elevated TLC in a subset of patients. These findings are consistent with earlier reports which have emphasized similar predictors. For example, Domínguez LC et al[7]. in 2011 to identified previous ERCP, leukocytosis, male gender, and age over 70 years as independent predictors of conversion, noting a conversion rate of 13.8% in acute cholecystitis cases. Likewise, studies by Morales-Maza J et al[8]. in 2020 and Magnano San Lio R et al[9]. in 2022 further confirmed male sex, advanced age, gallbladder wall thickness, and obesity as strong correlates of conversion.

Additionally, our findings corroborate the role of gallbladder pathology and dense adhesions in precipitating conversion. As suggested by Zhen-y W[10] in 2012 and Sunny D et al[11]. in 2021, pathological factors such as inflamed Calot's triangle and extensive adhesions contribute significantly to the difficulty of laparoscopic dissection, often necessitating a shift to the open approach. In our cohort, several patients presented with abnormal per-abdominal examination findings, which may indirectly reflect adhesions or inflammation. The study also revealed that 71.9% of patients had undergone prior abdominal surgeries. This finding is clinically significant, as adhesions from previous surgeries can distort normal anatomy and obscure critical structures. The relevance of this factor is well highlighted in studies by Reddy SR and Balamaddaiah G[12] in 2016 and Nasar MA et al[13]. in 2021, which both reported higher conversion rates in patients with surgical histories due to the presence of dense adhesions and increased technical complexity. In our dataset, abnormal per abdominal examination findings were more common in this subgroup, further supporting this association.

While most previous studies report conversion as a relatively infrequent but important contingency, our data suggests a more prominent role for conversion, possibly reflective of local surgical logistics, patient complexity, or emergency case load. For example, Domínguez LC et al[7]. in 2011 suggested that in high-risk patients, planned open cholecystectomy may be preferable to emergency conversion, a notion that may be applicable in our setting. Furthermore, studies such as that of Hanson-Viana E et al[14]. in 2022 advocated for integrating predictive scoring systems to identify high-risk patients preoperatively, thereby optimizing outcomes through better preparedness

## REFERENCES

[1] Wongworawat, M. D., Aitken, D. R., Robles, A. E., and Garberoglio, C. The impact of prior intra-abdominal surgery on laparoscopic cholecystectomy. Am. Surg. 60: 763, 1994.

[2] Sanabria, J. R., Gallinger, S., Croxford, R., and Strasberg, S. M. Risk factors in elective laparoscopic cholecystectomy for conversion to open cholecystectomy. J. Am. Coll. Surg. 179: 696, 1994.

[3] Alponat, A., Kum, C. K., Bee, C. K., Rajnakova, A., and Goh, P. M. Y. Predictive factors for conversion of laparoscopic cholecystectomy. World J. Surg. 21: 629, 1997.

[4] Lujan, J. A., Parrilla, P., Robles, R., Marin, P., Torralba, J. A and Garcia-Ayllon, J. Laparoscopic cholecystectomy vs open cholecystectomy in the treatment of acute cholecystitis. Arch. Surg. 133: 173, 1998.

[5] Schrenk, P., Woisetschlager, R., and Wayand, W. U. Laparoscopic cholecystectomy. Surg. Endosc. 9: 25, 1995.

[6] Wiebe, E. A., Pruitt, A. L., Howard, T. J., Jacobson, L. E., Broadie, T. A., Goulet, Jr., R. J., and Canal, D. F. Conversion of laparoscopic to open cholecystectomy. Surg. Endosc. 10: 742, 1996.

[7] Domínguez LC, Rivera A, Bermúdez C, Herrera W. Analysis of factors for conversion of laparoscopic to open cholecystectomy: a prospective study of 703 patients with acute cholecystitis. Cir Esp. 2011;89(5):300-6.

[8] Morales-Maza J, Rodríguez-Quintero J, Santes O, Aguilar-Frasco J, Romero-Vélez G, García-Ramos E, et al. Conversion from laparoscopic to open cholecystectomy: Risk factor analysis based on clinical, laboratory, and ultrasound parameters. Rev Gastroenterol Mex. 2020.

[9] Magnano San Lio R, Barchitta M, Maugeri A, Quartarone S, Basile G, Agodi A. Preoperative Risk Factors for Conversion from Laparoscopic to Open Cholecystectomy: A Systematic Review and Meta-Analysis. Int J Environ Res Public Health. 2022;20.

[10] Zhen-y W. Analysis on factors of conversion that laparoscopic cholecystectomy to open operation. 2012.

[11] Sunny D, Luthra A, Mittal A, Vikramaditya D. Factors Influencing Conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy. 2021.

[12] Reddy SR, Balamaddaiah G. Predictive factors for conversion of laparoscopic cholecystectomy to open cholecystectomy: a retrospective study. Int Surg J. 2016; 3:817-20

[13] Nasar MA, Talukdar R, Raj K, Agarwal P, Aditya, Some S, et al. Pre- Operative and Intra-Operative Factors for Conversion of Laparoscopic Cholecystectomy to Open Choleystectomy. SAS J Surg. 2021.

[14] Hanson-Viana E, Ayala-Moreno EA, Ortega-Leon LH, Montalvo-Javé E. The Association of Preoperative Risk Factors for Laparoscopic Conversion to Open Surgery in Elective Cholecystectomy. Euroasian J Hepato-Gastroenterol. 2022;12(1):6-9