

# Incidence of difficult laparoscopic cholecystectomy at a tertiary care hospital in eastern Nepal

Bhattarai A,<sup>1</sup> Adhikari D,<sup>2</sup> Yadav DK,<sup>3</sup> Poudel S,<sup>4</sup> Parajuli B,<sup>5</sup> Koirala A,<sup>6</sup> Yadav RP<sup>7</sup>

<sup>1</sup>Amit Bhattarai; <sup>2</sup>Dinesh Adhikari, Lecturer; <sup>3</sup>Dipak Kumar Yadav, Postgraduate resident, Department of General and Laparoscopic Surgery; <sup>4</sup>Saurav Poudel; <sup>5</sup>Bivusha Parajuli, Medical Student; <sup>6</sup>Ashok Koirala, Associate Professor, Department of General and Laparoscopic Surgery, Nobel Medical College Teaching Hospital; <sup>7</sup>Rohit Prasad Yadav, Associate Professor, Birat Medical College Teaching Hospital, Biratnagar, Morang, Nepal.

## Abstract

**Background:** Laparoscopic cholecystectomy (LC) is the gold standard modality for the treatment of gall bladder diseases. Sometimes LC needs to be converted to open due to intraoperative complications. A few factors like age, body weight, comorbidities, ASA score, and surgeons' experience will warn about the possible complications and need for conversion to open. Prior prediction of the difficulties will warn the surgeon to prepare accordingly. The patient's family will also be counseled regarding it.

**Objectives:** To identify the possible factors for predicting difficult LC.

**Methods:** This was a descriptive cross-sectional study conducted in the general and laparoscopic surgery department at Nobel Medical College Teaching Hospital, Biratnagar, Nepal. Simple random sampling technique was utilised in this retrospective analysis. Data were taken from 2021 May to 2022 May after institutional ethical clearance. Descriptive statistics were assessed done using SPSS v.26.

**Results:** A total of 230 cases were included and analysed in the study. The incidence of difficult LC was 17.8%. An overall conversion rate of LC to open cholecystectomy in difficult LC was seen in 1.3% of the cases. Intraoperative complications were not seen in 87.8% of the patients. The mean duration of hospital stay in difficult LC cases was five days.

**Conclusion:** Predicting difficult LC will not only warn surgeons to be prepared for the possible difficulties but will also help in counseling patients' families regarding the intraoperative complications and the possible need for the conversion to open.

**Key words:** Cholecystectomy; Cholecystitis; Gall bladder Disease; Laparoscopy.

## Access this article online

**Website:** www.jkmc.com.np

**DOI:** <https://doi.org/10.3126/jkmc.v12i1.56692>

## HOW TO CITE

Bhattarai A, Adhikari D, Yadav DK, Poudel S, Parajuli B, Koirala A, et al. Incidence of difficult laparoscopic cholecystectomy at a tertiary care hospital in eastern Nepal. J Kathmandu Med Coll. 2023;12(1):49-52.

**Submitted:** Dec 13, 2022

**Accepted:** Mar 19, 2023

**Published:** Mar 31, 2023

## Address for correspondence

Dr. Amit Bhattarai  
Lecturer,  
Department of General and Laparoscopic Surgery,  
Nobel Medical College Teaching Hospital,  
Biratnagar, Morang, Nepal.  
E-mail: amitbhattarai25@gmail.com

Copyright © 2023 Journal of Kathmandu Medical College (JKMC)

ISSN: 2019-1785 (Print), 2091-1793 (Online)

## INTRODUCTION

Philip Mouret from France performed the first human laparoscopic cholecystectomy (LC) in 1987.<sup>1</sup> The LC is gold standard modality for the treatment of gall bladder diseases.<sup>2</sup> LC is associated with fewer complications as compared to the open method and also lesser hospital stay.<sup>3,4</sup> Sometimes LC needs to be converted to open due to intraoperative complications. Conversion from LC to open is seen in 2%-10%<sup>5</sup> of the cases. Due to the advancement in laparoscopic skills and technology, previously absolute contraindications of LC have now become relative. Some of those relative contraindications of LC are previous abdominal surgery in the epigastrium or right upper quadrant, end-stage



This work is licensed under a Creative Commons Attribution-Non Commercial 4.0 International License.

liver disease, cholecystoenteric fistula (e.g. gallstone ileus), Mirizzi's syndrome (Type II), calcified gall bladder wall (e.g. porcelain gall bladder). It is difficult to estimate the level of difficulties. A few factors like age, body weight, comorbidities, ASA score, and surgeons' experience will warn about the possible complications and need for conversion to open.<sup>6,7</sup> A surgeon's skill and experience are the most important factors in getting fewer post-operative complications.<sup>1</sup> Prior prediction of the difficulties will warn the surgeon to prepare accordingly, while the patient's families will also be counseled properly regarding them. Thus, this study is aimed to identify the possible factors for predicting difficult LC.

## METHODOLOGY

This descriptive cross-sectional study conducted at Nobel Medical College Teaching Hospital in Biratnagar, Morang Nepal, is a retrospective analysis of hospital patient records from 2021 May to 2022 May collected by simple random sampling technique after institutional ethical clearance (Ref. 633/2022). The research focussed on patients who underwent elective laparoscopic cholecystectomy, with exclusion criteria being concurrent surgeries and patients who left treatment against medical advice. Difficult laparoscopic cholecystectomy (DLC) was defined based on various criteria such as operative duration, haemorrhage, vascular injury, and more. The study analysed patient demographics, risk factors, clinical and radiological findings, intraoperative findings, complications, and duration of hospital stay. The required sample size for

the study was calculated to be 207 based on a minimum expected proportion of 16% of the population having a difficult laparoscopic cholecystectomy, with 5% absolute precision and 95% confidence. The analysis of data was performed using IBM SPSS Statistics for Windows, version 26 (IBM Corp., Armonk, N.Y., USA), with mean and proportion calculations carried out. The laparoscopic cholecystectomy technique used in the study involved using four standard ports.

## RESULTS

Over one year, 938 laparoscopic cholecystectomies (LC) were performed at this hospital. After applying a simple random sampling technique, 230 cases were included in the study. Among the included cases, 41 (17.8%) had difficult LC whereas 189 cases had non-difficult LC. Thus making the incidence of difficult laparoscopic cholecystectomy as 17.8%. Patient demographic details are tabulated. Male patients comprised 13 (31.7%) of difficult LC (Table 1). Radiological findings (Table 2), Indications of LC in cases with DLC (Table 3), and intraoperative findings of difficult LC (Table 4) have been tabulated. The overall conversion rate of LC to open cholecystectomy in difficult LC was seen at 1.3% (Table 4).

Intraoperative complications were not seen in 87.8% of the patients, whereas 0.8% had bleeding (Table 5). Spillage of gallstone was seen in 7.8%. The mean duration of hospital stay in difficult LC cases was 5 days, whereas the mean duration of hospital stay in non-difficult LC cases was three days.

**Table 1: Patient demographic**

Variables		Difficult LC (N = 41)	Non-difficult LC (N = 189)
Mean age	Overall	45.7	40.52
	Male	48.61	40.87
	Female	44.35	40.45
Gender	Male	13	32
	Female	28	157
BMI	Obese	9	3
	Non-obese	32	186
Past history of cholecystitis	Yes	14	9
	No	27	180
Comorbidities	Diabetes mellitus	10	6
	Hypertension	4	3
	Cardiovascular	1	0
	Renal	2	0
	None	24	180

**Table 2: Radiological findings**

Variables	Difficult LC	Non-difficult LC
GB wall thickness (≥4mm)	34	7
Fibrotic changes	22	4
Single large impacted stone	8	2

**Table 3: Indication of LC in cases with DLC**

Indications	Difficult LC
Biliary colic	2
Chronic calculous cholecystitis	8
Acute calculous cholecystitis	11
Mucocele of gall bladder	4
Empyema gall bladder	11
Acute biliary pancreatitis	3
Polyp with gallstone	1
Carcinoma gall bladder	1

**Table 4: Intraoperative findings of difficult LC**

Variables	Difficult LC	
Access	>2 veress needle	4
	Alternative method	-
Identification of GB	GB covered with omentum	2
	GB covered with bowel loop	-
	GB adhesion with	3
Grasping of GB	Need of special instruments	-
	Aspiration of GB	2
Adhenolysis	Yes	2
	No	1
Calot's triangle dissection time	>20 minutes	12
	Larger clip	2
Duct clipping	Suture	4
	Tie	2
	Conversion to open	3

**Table 5: Intraoperative complications of LC**

Intraoperative complications	Frequency N=230
Bleeding from cystic artery	1
Common bile duct injury	3
Iatrogenic perforation of GB	21
Spilled gallstone	18
Bleeding from ligaments of liver	1
Lesion of the omentum	6
<b>Total</b>	<b>28 (12.17%)</b>

## DISCUSSION

In the present study, 17.8% of the patient had difficult LC whereas in a study by Nidoni et al. 24.44% had difficult LC which is higher than this study.<sup>8</sup> The mean age of the patients with difficult LC was 45.7 years. Males accounted for 46.42% of patients. Among difficult LC, male accounts for 31.7% of the cases.

There is no specific gender ratio for difficult laparoscopic cholecystectomy. The difficulty of the surgery is not solely determined by the patient's gender but by various factors such as the size and condition of the gall bladder, the patient's overall health, and the surgeon's skill and experience. However, some studies have suggested that male patients have a higher propensity for difficult laparoscopic cholecystectomy, and the risk increased with the increase in the prevalence of comorbidities in such individuals<sup>9</sup>. Nonetheless, it is essential to discuss any concerns regarding the procedure with a qualified healthcare provider.

Gall bladder wall thickness of <2mm is seen in 97% of the population.<sup>8</sup> On ultrasonography, a thickened gall bladder wall is a sign of inflammation or fibrosis due to cholecystitis.<sup>6</sup> In this study, 17.8% of the patients had a GB wall thickness of >4mm, and 82.9% of patients with a GB wall thickness of >4mm had difficult LC. In a study by Jantsch et al., 84% of patients with thickened GB walls >4 mm, were observed to have difficult LC.<sup>10</sup> In this study, 5.2% were obese and 75% of obese had difficult LC. Nachnani et al.,<sup>11</sup> and Hussain et al.,<sup>12</sup> have found obesity to be significantly associated with difficulty in umbilical port entry and creating pneumoperitoneum.

In the present study, 12 were obese and out of them, nine had difficulty in while performing LC. Whereas the cholecystectomy itself is no more difficult in obese patients, and a number of authors have suggested that the laparoscopic approach is better suited to patients with high BMIs than the open approach.<sup>13,14</sup>

In a study by Shivam et. al., aged ≥50 years, history of hospitalization for acute cholecystitis (AC), body mass index of 25 kg/m<sup>2</sup> and above, abdominal scar, palpable GB, GB wall thickness ≥4 mm, pericholecystic collection and impacted stone were found to be significant factors to predict difficult LC preoperatively.<sup>15</sup>

Two of the patients needed aspiration of the GB as there was difficulty in grasping the GB. Singh et al.,<sup>1</sup> in their study have also found a significant association between gall bladder grasping difficulty with distended gall bladder and pericholecystic inflammation. Lal et

al.,<sup>16</sup> have identified that the presence of large stones in the gall bladder neck leads to distention and difficulty in grasping. In this study, the conversion rate of LC to open cholecystectomy was 1.3%. In a study by Amin et al. overall conversion rate was 7.7%.<sup>11</sup> In the current study, 87.8% had no intraoperative complications, which is similar to the study by Mohammed et.al.<sup>17</sup> where 94% had no intraoperative complications. In Mohammed's study, bleeding was seen in 2.2% which is similar (0.8%) to this study.

## CONCLUSION

Good preoperative assessment with clinical and radiological parameters predicts difficult laparoscopic cholecystectomy. Predicting difficult LC will not only warn surgeons to be prepared for the possible difficulties but also it will help in counseling patients' families regarding the intraoperative complications and the possible need for the conversion to open.

**Conflict of interest:** None

**Source(s) of support:** None

## REFERENCES

1. Singh K, Ohri A. Difficult laparoscopic cholecystectomy: A large series from north India. *Indian J Surg* 2006;68:205-08. [[Full Text](#)]
2. Agresta F, Campanile FC, Vettoretto N, Silecchia G, Bergamini C, Maida P, et al. Laparoscopic cholecystectomy: Consensus conference-based guidelines. *Langenbecks Arch Surg*. 2015;400(4):429-53. [[PubMed](#) | [Full Text](#) | [DOI](#)]
3. National Institutes of Health Consensus Development Conference Statement on Gallstones and Laparoscopic Cholecystectomy. *Am J Surg*. 1993;165(4):390-6. [[PubMed](#) | [Full Text](#) | [DOI](#)]
4. Zacks SL, Sandler RS, Rutledge R, Brown RS. A population-based cohort study comparing laparoscopic cholecystectomy and open cholecystectomy. *Am J Gastroenterol*. 2002;97(2):334-40. [[PubMed](#) | [Full Text](#) | [DOI](#)]
5. Livingston EH, Rege RV. A nationwide study of conversion from laparoscopic to open cholecystectomy. *Am J Surg*. 2004;188(3):205-11. [[PubMed](#) | [Full Text](#) | [DOI](#)]
6. Giger UF, Michel JM, Opitz I, Inderbitzin DT, Kocher T, Krähenbühl L. Risk factors for perioperative complications in patients undergoing laparoscopic cholecystectomy: Analysis of 22,953 consecutive cases from the swiss association of laparoscopic and thoracoscopic surgery database. *J Am Coll Surg*. 2006;203(5):723-8. [[PubMed](#) | [Full Text](#) | [DOI](#)]
7. Ghadhban BR. Assessment of the difficulties in laparoscopic cholecystectomy among patients at Baghdad province. *Ann Med Surg (Lond)*. 2019;41:16-9. [[PubMed](#) | [Full Text](#) | [DOI](#)]
8. Nidoni R, Vudachan T, Sasnur P, Baloorkar R, Sindgikar V, Narasangi B. Predicting difficult laparoscopic cholecystectomy based on clinico-radiological assessment. *J Clin Diagn Res*. 2015;9(12):9-12. [[PubMed](#) | [Full Text](#) | [DOI](#)]
9. Kanakala V, Bowowski DW, Pellen MGC, Dronamraju SS, Woodcock SAA, Seymour K, et al. Risk factors in laparoscopic cholecystectomy: A multivariate analysis. *International Journal of Surgery*. 2011;9(4):318-23. [[PubMed](#) | [Full Text](#) | [DOI](#)]
10. Engel JM, Deitch EA, Sikkema W. Gall bladder wall thickness: Sonographic accuracy and relation to disease. *AJR Am J Roentgenol*. 1980;134(5):907-9. [[PubMed](#) | [Full Text](#) | [DOI](#)]
11. Amin A, Haider MI, Aamir IS, Khan MS, Choudry UK, Amir M, et al. Preoperative and operative risk factors for conversion of laparoscopic cholecystectomy to open cholecystectomy in Pakistan. *Cureus*. 2019;11(8). [[PubMed](#) | [Full Text](#) | [DOI](#)]
12. Hussien M, Appadurai IR, Delicata RJ, Carey PD. Laparoscopic cholecystectomy in the grossly obese: 4 years experience and review of literature. *HPB*. 2002;4(4):157-61. [[PubMed](#) | [Full Text](#) | [DOI](#)]
13. Chang WT, Lee KT, Huang MC, Chen JS, Chiang HC, Kuo KK, et al. The impact of body mass index on laparoscopic cholecystectomy in Taiwan: an oriental experience. *J Hepatobiliary Pancreat Surg*. 2009;16(5):648-54. [[PubMed](#) | [Full Text](#) | [DOI](#)]
14. Ammori BJ, Vezakis A, Davides D, Martin IG, Larvin M, McMahon MJ. Laparoscopic cholecystectomy in morbidly obese patients. *Surg Endosc*. 2001 Nov;15(11):1336-9. [[PubMed](#) | [Full Text](#) | [DOI](#)]
15. Karim ST, Chakravarti S, Jain A, Patel G, Dey S. Difficult laparoscopic cholecystectomy predictors and its significance: This experience. *J West Afr Coll Surg*. 2022 Oct-Dec;12(4):56-63. [[PubMed](#) | [Full Text](#) | [DOI](#)]
16. Lal P, Agarwal PN, Malik VK, Chakravarti AL. A difficult laparoscopic cholecystectomy that requires conversion to open procedure can be predicted by preoperative ultrasonography. *JSLs*. 2002;6(1):59-63. [[PubMed](#) | [Full Text](#)]
17. Alhamid MA. Difficult laparoscopic cholecystectomy. *Glob J Health Sci*. 2019;11(9):102. [[Full Text](#) | [DOI](#)]