

# Outcomes of Laparoscopic Cholecystectomy in a Tertiary Hospital in Nepal

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## ABSTRACT

### Background

Laparoscopic Cholecystectomy (LC) is the gold-standard surgery for symptomatic cholelithiasis with low mortality and morbidity.

### Objective

The main objective of this study is to study the outcomes of laparoscopic cholecystectomy in Dhulikhel Hospital over the period of seven years.

### Method

The records of all the patients who underwent laparoscopic cholecystectomy in Dhulikhel Hospital from January 1, 2015, to December 31, 2021 were reviewed. Patient demographics, indication of surgery, hospital stay, and number of conversions to open cholecystectomy were collected. The percentage, mean and median were calculated for socio-demographic information and Chi-square test was performed to measure the association between socio-demographic characteristics, duration of hospital stay, and operative procedure.

### Result

Out of 2106 patients who underwent laparoscopic cholecystectomy from January 1, 2015, to December 31, 2021, 584 (27.73%) were male, and 1522 (72.27%) were female. The female-to-male ratio was 2.6:1. The median age of the patients was 40 years (IQR=52-30). Most common indications for surgery were symptomatic cholelithiasis in 1740 (82.62%) patients along with chronic cholecystitis in 268 (12.73%) patients, and Post ERCP Cholecystectomy in 92 (4.37%) patients. Median hospital stay was three days. Out of 2106 cases, 24 cases were converted to open cholecystectomy.

### Conclusion

Laparoscopic cholecystectomy is the gold standard treatment for benign diseases of the gallbladder and can be performed safely as day care surgery to reduce the cost, length of hospital stay, and long waiting list in low and middle-income countries.

## KEY WORDS

*Cholecystectomy, Cholecystitis, Gallstone, Laparoscopy, Post-ERCP*

## INTRODUCTION

Laparoscopic Cholecystectomy was introduced by Prof. Dr. Erich Mühe of Germany in 1985.<sup>1,2</sup> It marked the beginning of minimally invasive (laparoscopic) surgery. Though it was initially recommended in uncomplicated cases, it has now replaced open cholecystectomy as the gold standard in the treatment of gallbladder disease.<sup>3,4</sup>

It is associated with less intraoperative bleeding and postoperative pain, better cosmesis, lesser costs, and offers a shorter postoperative hospital stay with lesser postoperative morbidities, faster and easier return to work as well as decreased mortality.<sup>2,5</sup> However, a conversion rate of 1% to 15% to open cholecystectomy has been reported.<sup>6</sup>

Our hospital is a tertiary care referral center for benign biliary disease with a long waiting list for elective cholecystectomy. This study aims to describe the outcomes of Laparoscopic Cholecystectomy and the feasibility of daycare surgery in a tertiary hospital in Nepal.

## METHODS

This retrospective study was conducted on 2106 patients who underwent laparoscopic cholecystectomy (LC) in our hospital from January 1, 2015 to December 31, 2021. Laparoscopic Cholecystectomy was performed by trained surgeons with the standard four-port technique. The total enumeration method was used and consequently, the records of all the patients who underwent laparoscopic cholecystectomy were reviewed from the inpatient surgical ward, and data on patient characteristics, indication of surgery, hospital stay, and number of conversions to open cholecystectomy were collected. All cases of cholelithiasis who underwent laparoscopic cholecystectomy were included in the study. Reviewed data included preoperatively, the patient's demographics (age, sex) and presentation, intraoperatively, conversion to open cholecystectomy and postoperatively, length of hospital stay, histopathology results, and mortality. The collected data was entered into Statistical Package for Social Sciences (SPSS) and then transferred to Microsoft Excel. After data cleaning it was imported to Stata-13 for analysis. The normality test for age was performed and it was not normally distributed. The descriptive analysis (mean, median, and percentage) was calculated on this basis. After this, the data were categorized and a Chi-square test was performed to find the association between independent and dependent variables.

## RESULTS

A total of 2106 patients underwent Laparoscopic Cholecystectomy in Dhulikhel Hospital from January 1, 2015, to December 31, 2021. There were 584 (27.73%)

male and 1522 (72.27%) female patients. The female to male ratio was 2.6. The median age of the case was 40 years with an age range of 30 to 52 years. Less than half participants, n=1006 (47.77%), were < 40 years old and more than half participants, n=1100 (52.23%), were ≥ 40 years old.

The indications for LC among participants were symptomatic cholelithiasis (n=1740; 82.62%), chronic cholecystitis (n=268; 12.73%), Post Endoscopic Retrograde Cholangiopancreatography (ERCP) Cholecystectomy (n=92; 4.37%), and others symptoms (n= 6; 0.28%). Out of this, 80.48% of males were operated on after showing symptoms of Cholelithiasis, 15.75% were chronic cases and 3.77% were after post-ERCP respectively, whereas, 83.44% females were operated on after the presentation of symptoms of cholelithiasis, 11.56% were chronic cases and 4.6% were after post-ERCP (Table 1).

**Table 1. Different conditions undergoing laparoscopic cholecystectomy**

Operative Finding	Number (%)
Symptomatic Cholelithiasis	1740 (82.62)
Chronic Cholecystitis	268 (12.73)
Post ERCP Cholecystectomy	92 (4.37)
Other:	6 (0.28)
GB Polyp	3
Biliary Pancreatitis	1
Carcinoma Gall Bladder	2
Total	2106 (100)

The median length of hospital stay following LC was 3 days with a range of 1 day to 34 days. 980 (46.53%) patients stayed for < 3 days, with 191 (9.07%) patients who stayed for 1 day and 789 (37.46%) patients who stayed for 2 days. 1126 (53.47%) patients stayed for ≥ 3 days. Length of stay (LOS) was similar for both sexes (p= 0.213). 50.10% of patients < 40 years had an average LOS of ≥ 3 days compared to 56.55% for patients ≥ 40 years (p < 0.05) (Table 2).

**Table 2. Relationship between Age and Hospital stay**

Age-group	Duration of hospital stay		p-value
	< 3 days	≥ 3 days	
< 40 years	502 (49.90%)	504(50.10%)	0.003
≥40 years	478 (43.45%)	622(56.55%)	

Out of 2106 cases, 24 (1.14%) cases were converted to Open Cholecystectomy. Out of these, 10 (0.99%) patients were < 40 years, and 14 (1.2%) patients were ≥ 40 years (p= 0.547). Furthermore, 14 (2.40%) male patients were converted to open cholecystectomy and 10 (0.66%) female patients were converted to open cholecystectomy (p < 0.005) (Table 3). There was minimal or no spillage of bile and stone.

**Table 3. Relationship between Gender and Conversion rate**

Gender	Operative procedure		p-value
	Laparoscopic Cholecystectomy	Conversion to Open Cholecystectomy	
Male	570 (97.60%)	14 (2.40%)	0.001
Female	1512 (99.34%)	10 (0.66)	

## DISCUSSION

Since the advent of laparoscopic cholecystectomy, it has replaced open cholecystectomy as the gold standard in the treatment of gallbladder disease.<sup>7</sup> It is performed in over 90% of elective cholecystectomies in the world.<sup>7</sup>

Gallstone disease is predominant in females.<sup>8</sup> This is seen in our study with 27.73% males and 72.27% females, and a female-to-male ratio of 2.6:1. This was similar to national data from Shrestha et al. study with 74.2% females and 25.7% males and Bajracharya et al. study with 82.4% females and 17.6% males.<sup>9,10</sup> Similarly, data from Sulaimankulov et al. study in Biratnagar showed a female: male ratio of 3.9:1.<sup>11</sup> Our results also corresponded with global data as a female: male ratio was 9:2 in India, 4.7:1 in Afghanistan, and 3.6:1 in Saudi Arabia.<sup>12-14</sup> This corresponds to the age-old dictum of “fertile female” as females are thought to be at greater risk due to pregnancies and the sex hormone estrogen which increases biliary cholesterol secretion and causes bile super saturation.<sup>8</sup>

In our study, the median age of the patients was 40 years of age. This was comparable to other studies in different parts of Nepal with mean age of 41 years in both the medical colleges of Kathmandu and Biratnagar respectively.<sup>9,11</sup> Median age of 43.35 ± 8.61 in India, 45.77 ± 13.45 in Afghanistan and 47 in European countries were also similar to our results.<sup>12,13,15</sup> The older age distribution can be attributed to a sedentary lifestyle, chronic exposure to risk factors and comorbidities, and the aging effect.<sup>8,16</sup>

Laparoscopic cholecystectomy was most commonly performed for symptomatic cholelithiasis (82.62%) followed by chronic cholecystitis (12.73%). Post-ERCP Cholecystectomy was performed in 92 (4.37%) patients. As our hospital is one of the referral centers for ERCP in Nepal, patients from all over Nepal are referred to our center prior to cholecystectomy, if they show features of choledocholithiasis on ultrasonography of the abdomen. This is reflected in the high Post-ERCP Cholecystectomy rate. However, Laparoscopic Cholecystectomy is usually performed six weeks after ERCP in our institution due to the long waiting list. Though delayed cholecystectomy

following ERCP is not associated with worse outcomes, most surgeons prefer early cholecystectomy (within 3 days; and up to 6 days) following ERCP. Owing to this, many patients are lost to follow-up in our institution.<sup>17</sup>

A total of 24 (1.14%) cases were converted to Open Cholecystectomy. This is lower than in national and international studies. This can be attributed to the surgeons' experience of performing a large number of biliary surgeries following the same protocol as well as the use of bail-out cholecystectomy (subtotal cholecystectomy) in difficult cases.<sup>18</sup> The rate of conversion was significantly greater in males with a p value of 0.001. Though this is in contrast to international studies, it conforms to the knowledge that the male gender is an independent risk factor for conversion.<sup>19-24</sup>

The median length of hospital stay following LC was 3 days. This is greater than in India, Afghanistan, and the Middle East.<sup>12-14</sup> However, it was similar to the mean length in other parts of Nepal.<sup>11</sup> Many patients who come from remote and distant parts of the country request to stay for longer. Laparoscopic Cholecystectomy is safe to perform as day-case surgery.<sup>25,26</sup> However, only 191 (9.07%) patients had LOS of one day. This highlights the importance of devising a protocol for Laparoscopic Cholecystectomy in view of conducting it as a day-care surgery and strengthening the Enhanced Recovery after Surgery (ERAS) pathway and Ambulatory Surgery Protocol. This would serve to increase turnover and decrease bed occupancy and long waiting periods for surgery.

The findings may be limited to data available as the study has a retrospective design. Likewise, it is a single center based study and may not provide outcomes of laparoscopic cholecystectomy at national and international level.

## CONCLUSION

Laparoscopic Cholecystectomy is the gold standard for the treatment of gallstones. It is a safe procedure, can be performed as day-care surgery, and offers several benefits over open cholecystectomy. As surgical experience increases, the surgical risks, perioperative complications, length of stay, and the rate of conversion to open cholecystectomy decrease.

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## REFERENCES

1. Reynolds W. The first laparoscopic cholecystectomy. *JLS* [Internet]. 2001 Jan [cited 2023 Jun 7];5(1). Available from: <https://pubmed.ncbi.nlm.nih.gov/11304004/>
2. Shukla A, Seth S, Ranjan A. A comparative study between laparoscopic and open cholecystectomy in cases of cholecystitis with cholelithiasis: one year experience in tertiary care center. *Int Surg J* [Internet]. 2017 Feb 25 [cited 2024 Mar 18];4(3):903-7. Available from: <https://www.ijurgery.com/index.php/ij/article/view/923>
3. Gadacz TR, Talamini MA. Traditional versus laparoscopic cholecystectomy. *Am J Surg* [Internet]. 1991 Mar;161(3):336-8. Available from: [http://dx.doi.org/10.1016/0002-9610\(91\)90591-z](http://dx.doi.org/10.1016/0002-9610(91)90591-z)
4. Kok KY, Mathew VV, Tan KK, Yapp SK. A prospective review of laparoscopic cholecystectomy in Brunei. *Surg Laparosc Endosc* [Internet]. 1998 Apr [cited 2023 Jun 7];8(2). Available from: <https://pubmed.ncbi.nlm.nih.gov/9566565/>
5. Bass EB, Pitt HA, Lillemoe KD. Cost-effectiveness of laparoscopic cholecystectomy versus open cholecystectomy. *Am J Surg* [Internet]. 1993 Apr;165(4):466-71. Available from: [http://dx.doi.org/10.1016/s0002-9610\(05\)80942-0](http://dx.doi.org/10.1016/s0002-9610(05)80942-0)
6. Hu ASY, Menon R, Gunnarsson R, de Costa A. Risk factors for conversion of laparoscopic cholecystectomy to open surgery - A systematic literature review of 30 studies. *Am J Surg* [Internet]. 2017 Nov [cited 2023 Jun 7];214(5). Available from: <https://pubmed.ncbi.nlm.nih.gov/28739121/>
7. Sheffield KM, Ramos KE, Djukom CD, Jimenez CJ, Mileski WJ, Kimbrough TD, et al. Implementation of a Critical Pathway for Complicated Gallstone Disease: Translation of Population-based Data into Clinical Practice. *J Am Coll Surg* [Internet]. 2011 May [cited 2023 Jun 7];212(5):835. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3350377/>
8. Shrestha S, Pradhan G, Bhoomi K, Dhital A, Bhattachan CL. Review of laparoscopic cholecystectomy in Nepal Medical College Teaching Hospital. *Nepal Med Coll J* [Internet]. 2007 Mar;9(1):32-5. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/17593675>
9. Hela AH, Khandhaw HM, Kumar R, Samad MA. Experience of Laparoscopic Cholecystectomies in a Tertiary Care Hospital: a Retrospective Study. *Galician Med J* [Internet]. 2020 Dec 26 [cited 2024 Mar 18];27(4):E202043–E202043. Available from: <https://ifnmujournal.com/gmj/article/view/E202043>
10. Farda W, Tani MK, Manning RG, Fahmi MS, Barai N. Laparoscopic cholecystectomy: review of 1430 cases in Cure International Hospital, Kabul, Afghanistan. *BMC Surg* [Internet]. 2021 Sep 17 [cited 2023 Jun 7];21(1):1–8. Available from: <https://bmcsurg.biomedcentral.com/articles/10.1186/s12893-021-01342-9>
11. Taki-Eldin A, Badawy AE. Outcome of laparoscopic cholecystectomy in patients with gallstone disease at a secondary level care hospital. *Arq Bras Cir Dig* [Internet]. 2018 Jun 21;31(1):e1347. Available from: <http://dx.doi.org/10.1590/0102-672020180001e1347>
12. Sulaimankulov R, Das C, Jolochieva G, Koirala A, Bhattarai R. Experience in laparoscopic cholecystectomy in Nobel Medical College, Nepal. *Heart, Vessels and Transplantation* [Internet]. 2019 Feb 24 [cited 2023 Jun 7];3(1):115. Available from: <http://www.hvt-journal.com/articles/art82>
13. Cuschieri A, Dubois F, Mouiel J, Mouret P, Becker H, Buess G, et al. The European experience with laparoscopic cholecystectomy. *Am J Surg* [Internet]. 1991 Mar;161(3):385-7. Available from: [http://dx.doi.org/10.1016/0002-9610\(91\)90603-b](http://dx.doi.org/10.1016/0002-9610(91)90603-b)
14. Sun H, Tang H, Jiang S, Zeng L, Chen EQ, Zhou TY, et al. Gender and metabolic differences of gallstone diseases. *World J Gastroenterol* [Internet]. 2009 Apr 4 [cited 2023 Jun 7];15(15):1886. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2670418/>
15. Novacek G. Gender and Gallstone Disease. *Wien Med Wochenschr* [Internet]. 2006 Oct [cited 2023 Jun 7];156(19):527-33. Available from: <https://link.springer.com/article/10.1007/s10354-006-0346-x>
16. Abdalkoddus M, Franklyn J, Ibrahim R, Yao L, Zainudin N, Aroori S. Delayed cholecystectomy following endoscopic retrograde cholangiopancreatography is not associated with worse surgical outcomes. *Surg Endosc* [Internet]. 2022 May;36(5):2987-93. Available from: <http://dx.doi.org/10.1007/s00464-021-08593-w>
17. Nassar AHM, Zanati HE, Ng HJ, Khan KS, Wood C. Open conversion in laparoscopic cholecystectomy and bile duct exploration: subspecialisation safely reduces the conversion rates. *Surg Endosc* [Internet]. 2022 Jan;36(1):550-8. Available from: <http://dx.doi.org/10.1007/s00464-021-08316-1>
18. Bazoua G, Tilston MP. Male gender impact on the outcome of laparoscopic cholecystectomy. *JLS* [Internet]. 2014 Jan-Mar;18(1):50-4. Available from: <http://dx.doi.org/10.4293/108680813X13693422518830>
19. Ambe PC, Köhler L. Is the male gender an independent risk factor for complication in patients undergoing laparoscopic cholecystectomy for acute cholecystitis? *Int Surg* [Internet]. 2015 May;100(5):854-9. Available from: <http://dx.doi.org/10.9738/INTSURG-D-14-00151.1>
20. Kumar J, Kumar P, Meena K, Siddiqui A. Male gender as an independent risk factor for laparoscopic cholecystectomy: An outcome analysis at a teaching institute. *Saudi J Health Sci* [Internet]. 2017;6(2):104. Available from: <http://www.saudijhealthsci.org/text.asp?2017/6/2/104/214854>
21. Ballal M, David G, Willmott S, Corless DJ, Deakin M, Slavin JP. Conversion after laparoscopic cholecystectomy in England. *Surg Endosc* [Internet]. 2009 Oct;23(10):2338–44. Available from: <http://dx.doi.org/10.1007/s00464-009-0338-1>
22. Duncan CB, Riall TS. Evidence-based current surgical practice: calculous gallbladder disease. *J Gastrointest Surg* [Internet]. 2012 Nov;16(11):2011-25. Available from: <http://dx.doi.org/10.1007/s11605-012-2024-1>
23. Philip Rothman J, Burcharth J, Pommergaard HC, Viereck S, Rosenberg J. Preoperative Risk Factors for Conversion of Laparoscopic Cholecystectomy to Open Surgery - A Systematic Review and Meta-Analysis of Observational Studies. *Dig Surg* [Internet]. 2016 May 5;33(5):414-23. Available from: <http://dx.doi.org/10.1159/000445505>
24. Briggs CD, Irving GB, Mann CD, Cresswell A, Englert L, Peterson M, et al. Introduction of a Day-Case Laparoscopic Cholecystectomy Service in the UK: A Critical Analysis of Factors Influencing Same-Day Discharge and Contact with Primary Care Providers. *Ann R Coll Surg Engl* [Internet]. 2009 Oct [cited 2023 Jun 7];91(7):583. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2966163/>
25. Leeder PC, Matthews T, Krzeminska K, Dehn TCB. Routine day-case laparoscopic cholecystectomy. *Br J Surg* [Internet]. 2004 Feb 2 [cited 2023 Jun 7];91(3):312-6. Available from: <https://academic.oup.com/bjs/article-pdf/91/3/312/37055848/bjs4409.pdf>