

## A Hospital-Based Retrospective Assessment of the Factors Associated with Conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy: A Retrospective Study

Manoj Kumar Jayaswal<sup>1</sup>, OK Maurya<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of Surgery, Nalanda Medical College and Hospital, Patna, Bihar, India

<sup>2</sup>Associate Professor, Department of Surgery, Nalanda Medical College and Hospital, Patna, Bihar, India

Received: 30-11-2022 / Revised: 25-12-2022 / Accepted: 26-01-2023

Corresponding author: Dr. Manoj Kumar Jayaswal

Conflict of interest: Nil

### Abstract

**Aim:** To determine factors of conversion of laparoscopic to open cholecystectomy in tertiary care center.

**Material & Methods:** This is a retrospective observational study conducted on 120 admitted patients in Department of Surgery, Nalanda Medical College and Hospital, Patna, Bihar, India, during the period June 2017 to June 2020. The hospital records of all patients exhibited symptomatic gallbladder disease and scheduled for laparoscopic cholecystectomy. Study was conducted after taking ethical clearance.

**Results:** Out of 120 participants, 66 were males and 54 were females. Max no. of patients (N=82) between 30 to 60 years. A total of 11 conversions were obtained. Gender wise distribution showed increased incidence of conversion in male 62% patients compare to female 38% patients. Patients having age group of 30-60 years had more conversion rate 74%. the most common reason for conversion was intraoperative adhesions which was found in 9 patients. CBD injury and bleeding from cystic artery was found in 2 patients each.

**Conclusion:** Laparoscopic cholecystectomy is a safe and minimally invasive technique, with only low conversion rate and the commonest cause of conversion in this study was the presence of dense adhesions at Calot's triangle.

**Keywords:** Cholelithiasis, Cholecystectomy, Adhesions, Conversion, Calot's triangle.

This is an Open Access article that uses a funding model which does not charge readers or their institutions for access and distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>) and the Budapest Open Access Initiative (<http://www.budapestopenaccessinitiative.org/read>), which permit unrestricted use, distribution, and reproduction in any medium, provided original work is properly credited.

### Introduction

Laparoscopic cholecystectomy (LC) represents the "gold-standard" for the treatment of symptomatic gallstones disease, being the most common intra-abdominal operation performed in Western nations [1].

A conversion rate 5% to 10% has been reported on a nationwide basis [2]. Depending on specific circumstances, a conversion can be characterized as either

elective, which is defined as the surgeon's decision to resort a laparotomy (because of obscure anatomy or lack of progress of the laparoscopic procedure) before being forced to do so as a result of a major intraoperative complication or as enforced, when an intraoperative emergency such as uncontrollable bleeding or bile duct injury, occurs [3].

The most recognizable causes for conversion are: obscure biliary anatomy, presence of dense pericholecystic adhesions, intraoperative bleeding, and failure of the progression and suspicion of choledocholithiasis [4-5].

Conversion of laparoscopic to open surgery should not be regarded as a complication but as an attempt to prevent complications. [5] Factors usually responsible for conversion from laparoscopic cholecystectomy to open cholecystectomy are: Pericholecystic adhesions, Intra-operative bleeding, common bile duct injury, visceral injury, instrumentation failure, empyema of gall bladder, spillage of gall stones, impacted large stone, liver bed injury, unclear biliary anatomy, surgeon's knowledge, laparoscopic fellowship training, operative experience and skill in laparoscopic surgery plays an important role. Identification of these risk factors before the procedure can prevent possible conversion to open cholecystectomy and this would be beneficial for both surgeon and patient. [5]

Thus, we aim to determine factors of conversion of laparoscopic to open cholecystectomy in tertiary care center.

### Material & Methods

This is a retrospective observational study conducted on 120 admitted patients in Department of Surgery, Nalanda Medical College and Hospital, Patna, Bihar, India, during the period June 2017 to June 2020, The hospital records of all patients exhibited symptomatic gallbladder disease and scheduled for laparoscopic cholecystectomy during the study period were studied. Study was conducted after taking ethical clearance.

### Inclusion criteria:

Patients of both genders aged 18 years and above with gall bladder disease

Patients got converted from laparoscopic to open cholecystectomy

### Exclusion criteria:

Patients with clinical features of obstructive jaundice, palpable gall bladder lump, pregnant females, perforated gall bladder and carcinoma of gall bladder or any other malignancy were excluded from study.

### Methodology

In all patients a detailed clinical history, previous treatment record was obtained from the hospital data center. Data regarding preoperative investigations including CBC, BT/CT, RBS, LFT, RFT, S. amylase, S. lipase, urine routine, HIV, HBsAg, HCV, ECG, chest x-ray (PA view) was also obtained.

In all cases, an abdominal ultrasound was performed. In some cases, magnetic resonance cholangiopancreatography (MRCP) and endoscopic retrograde cholangiopancreatography (ERCP) were also performed. The consultant surgeon performed the laparoscopic cholecystectomies. Data regarding operative findings and reason for conversion were recorded and carefully analyzed.

Descriptive analysis will be done using descriptive tools like-1) mean and 2) standard deviation.

### Results

Out of 120 participants, 66 were males and 54 were females. Max no. of patients (N=82) between 30 to 60 years, (N=33) patients were above 60 years of age and (N=5) patients were under 30 years of age. [Table 1]

**Table 1: Gender wise distribution of cases.**

Gender	N
Male	66
Female	54

Age (years)	
<30	5
30-60	82
>60	33
Total	120

A total of 11 conversions were obtained. Gender wise distribution showed increased incidence of conversion in male 62% patients compare to female 38% patients. Patients having age group of 30-60 years had more conversion rate 74%. [Table 2]

**Table 2: Distribution according to conversion (N=11)**

Gender	%
Male	62
Female	38
Age (years)	
<30	6
30-60	74
>60	20
Total	120

Out of the total 120 patients, duration of surgery was less than 57 minutes in 11% patients, between 60 minutes to 90 minutes in 51.3% patients and more than 90 minutes in 37.7% patients. Only 1 patient which were converted to open surgery had longer duration time for surgery and increased post-operative stay. [Table 3]

**Table 3: Duration of surgery and post-operative stay in laparoscopic and open converted cases.**

Duration	Total (N=120)	Open Conversion (N=11)	Laparoscopic (N=109)	P value
	Mean±SD			
Surgery (min)	91.63 ± 33.81	126.82 ± 29.02	87.91 ± 35.42	0.0736
Post-operative	1.96 ± 1.50	6.39 ± 1.21	1.66 ± 0.72	<0.001stay (days)

Out of total 11 patients who underwent conversion, the most common reason for conversion was intraoperative adhesions which was found in 9 patients. CBD injury and bleeding from cystic artery was found in 2 patients each. Only one patient each had bowel injury and unclear anatomy and spillage of gallstones. [Table 4]

**Table 4: Causes of conversion**

Variables	Open Conversion (N=11)	Laparoscopic (N=109)	P value
	N	N	
Adhesion	9	71	0.382
CBD injury	1	0	<0.001
Bowel injury	1	0	0.220
Cystic artery bleeding	2	0	0.439
Unclear anatomy	1	1	0.271
Spillage of gallstones	1	2	0.592

## Discussion

There is no obvious explanation as to why a higher age may lead to a higher conversion rate; however, the same result has also been shown for laparoscopic hysterectomy [6]. Also, the higher conversion rate in men is hard to explain. An explanation might be that men are more likely to delay seeking help [7-8], and thereby present themselves with a more severe disease when they are operated. Another study [8] revealed that men have a higher risk of getting acute cholecystitis. Acute cholecystitis is a severe inflammation accompanied by increased vascularity and dense adhesions that interfere with good visualization, whereas the thick-walled gallbladder is often shrunken and contracted. Therefore, the cystic duct becomes shortened and the gallbladder adherents to the CBD, making its grasp for retraction difficult and its dissection from the CBD unsafe [9]. Cholecystitis may progress to emphysematous, gangrenous, and perforated cholecystitis. Reports from national registries [10-12] disclosed that whenever any of the above happened, the conversion rate was increased by 3-fold, compared to the simple acute cholecystitis cases.

One of the factors found to affect the conversion rate, was the timing for cholecystectomy in acute cholecystitis cases. A Cochrane review [13], outlined the benefits of LC within 7 days from the onset of symptoms, others [14] addressed that the conversion rate was significantly lower in patients who underwent LC within 96 hours from the onset of symptoms, while others [15-16], advocated LC within the "golden 72 hours" of symptoms duration. Despite the obvious benefits, the feasibility of performing LC within 72 hours is often questioned due to a multitude of factors such as the possible attempts by patients to self-medicate with which may result in the late recognition of the condition, and that

in a substantial group of patients with significant co-morbidities is required time for adequate pre-operative assessment and optimization [17].

No age is said to be immune to gallbladder disease, however they were more common in the fourth, fifth and sixth decades of life as 72% of the cases belonged to these decades. [18] In our study minimum age of patient undergoing laparoscopic cholecystectomy was 19 years and the maximum age was 76 years.

A study conducted by Delal et al found in their study, the mean duration of operation in converted cases was 128 min and for successful laparoscopic cholecystectomy it was 48.3 minutes. [19] Similarly, Santhanalakshmi et al found that the average duration of surgery in their study was 75 minutes, the mean duration of surgery in converted cases was 101.2 minutes and successful laparoscopic surgery it was 79.4 minutes. [20,21]

## Conclusion

Laparoscopic cholecystectomy is a safe and minimally invasive technique, with only low conversion rate and the commonest cause of conversion in this study was the presence of dense adhesions at Calot's triangle.

## References

1. Gaillard M, Tranchart H, Lainas P, et al. New minimally invasive approaches for cholecystectomy: review of the literature. *World J Gastrointest Surg* 2015;7:243-8.
2. Livingston EH, Rege RV. A nationwide study of conversion from laparoscopic to open cholecystectomy. *Am J Surg* 2004;188:205-11.
3. Tang B, Cuschieri A. Conversions during laparoscopic cholecystectomy: risk factors and effects on patient outcome. *J Gastrointest Surg* 2006;10: 1081-91.
4. Sultan AM, el Nakeeb A, Elsehawy T, et al. Risk factors for conversion

- during laparoscopic cholecystectomy: retrospective analysis of ten years' experience at a single tertiary referral centre. *Dig Surg* 2013;30:51-5.
5. Zhang WJ, Li JM, Wu GZ, et al. Risk factors affecting conversion in patients undergoing laparoscopic cholecystectomy. *ANZ J Surg* 2008; 78:973-6.
  6. Twijnstra AR, Blikkendaal MD, van Zwet EW, Jansen FW: Clinical relevance of conversion rate and its evaluation in laparoscopic hysterectomy. *J Minim Invasive Gynecol* 2013; 20: 64–72.
  7. Richards HM, Reid ME, Watt GC: Socioeconomic variations in responses to chest pain: qualitative study. *BMJ* 2002; 324: 1308.
  8. White AK, Johnson M: Men making sense of their chest pain – niggles, doubts and denials. *J ClinNurs* 2000; 9: 534–541.
  9. Thesbjerg SE, Harboe KM, Bardram L, Rosenberg J: Sex differences in laparoscopic cholecystectomy. *SurgEndosc* 2010; 24: 3068–3072.
  10. Kama NA, Doganay M, Dolapci M, et al. Risk factors resulting in conversion of laparoscopic cholecystectomy to open surgery. *SurgEndosc* 2001;15: 965-8.
  11. Ambe PC, Jansen S, Macher-Heidrich S, et al. Surgical management of emphysematous cholecystitis: a register study of over 12,000 cases from a regional quality control database in Germany. *SurgEndosc* 2016;30:5319-24.
  12. Jansen S, Doemer J, Macher-Heidrich S, et al. Outcome of acute perforated cholecystitis: a register study of over 5,000 cases from a quality control database in Germany. *SurgEndosc* 2016;31:1896-900.
  13. Gurusamy KS, Davidson C, Gluud C, et al. Early versus delayed laparoscopic cholecystectomy for people with acute cholecystitis. *Cochrane Database Syst Rev* 2013;6; CD005440.
  14. Inoue K, Ueno T, Douchi D, et al. Risk factors for difficulty of laparoscopic cholecystectomy in grade II acute cholecystitis according to the Tokyo guidelines 2013. *BMC Surg* 2016;17 :114.
  15. González-Rodríguez FJ, Paredes-Cotore JP, Ponton C, et al. Early or delayed laparoscopic cholecystectomy in acute cholecystitis? Conclusions of a controlled trial. *Hepatogastroenterology* 2009;56:11-6.
  16. Zhu B, Zhang Z, Wang Y, et al. Comparison of laparoscopic cholecystectomy for acute cholecystitis within and beyond 72h of symptom onset during emergency admissions. *World J Surg* 2012;36:2654-8.
  17. Tan JKH, Goh JCI, Lim JW, et al. Same admission laparoscopic cholecystectomy for acute cholecystitis: is the “golden 72 hours” rule still relevant? *HPB* 2016;19:47-51.
  18. Karigalan K, Haripriya R. A study on safety and efficacy of laparoscopic cholecystectomy in comparison to open cholecystectomy. *J Evolution Med Dental Sci.* 2014;3(17):4721-31.
  19. Dalal AS, Sharma VI, Mathur RK. Study of factors for conversion of laparoscopic cholecystectomy to open cholecystectomy. *Indian J Basic Applied Med Res.* 2016;6(2):24-30.
  20. Santhanalakshmi K, Vennila M. Observational study of cases subjected to cholecystectomylaparoscopicvs. open method under the guidance of predicted risk factors. 2010;2279-0853.
  21. Yadav S., Gupta D. K., Patil P. H., Tiwari A., & Soni P. To Study the Pharmacotherapy of Diabetes Mellitus Type 2 Patient in Echo Health Care & Research Centre, Indore. *Journal of Medical Research and Health Sciences,* 2023; 6(2): 2389–2397.