

Comparative Analysis of Early versus Late Laparoscopic Cholecystectomy Following Endoscopic Retrograde Cholangiopancreatography in Cases of Cholelithiasis with Choledocholithiasis

Apoorv Goel¹, Shyam Kothari², Roli Bansal³

ABSTRACT

Introduction: A preferred treatment for cholelithiasis with choledocholithiasis is endoscopic retrograde cholangiopancreatography (ERCP) followed by laparoscopic cholecystectomy (LC), which can be performed early (within 72 hours) or can be delayed for 6 to 8 weeks. This study is conducted to compare and analyze the outcome of early versus late LC following common bile duct (CBD) clearance by ERCP and determine the optimum timing for performing LC post-ERCP.

Materials and methods: This comparative analysis was conducted at St Joseph Hospital, Ghaziabad, from September 2019 to March 2021 on 89 cases of cholelithiasis with choledocholithiasis. Patients were divided into two groups. Group I ($n = 45$) patients underwent early LC within 72 hours post-ERCP and group II ($n = 44$) patients underwent late LC after an interval of 8 weeks. Various preoperative, perioperative, and postoperative clinical parameters like operative difficulty, complications, surgery duration, hospital stay, and conversion to open cholecystectomy were analyzed.

Results: There was no significant difference in demographic and laboratory findings in both groups. Group I patients had significantly shorter hospital stay and less operative difficulty. The duration of surgery was significantly low in group I. There was no significant difference in rate of conversion to open cholecystectomy.

Conclusion: Early LC post-ERCP is associated with short hospital stay and duration of surgery and less operative difficulty and complications. Therefore, we recommend that LC can be safely performed within 48 to 72 hours after ERCP.

Keywords: Choledocholithiasis, Cholelithiasis, Endoscopic retrograde cholangiopancreatography

Euroasian Journal of Hepato-Gastroenterology (2021): 10.5005/jp-journals-10018-1338

INTRODUCTION

Cholelithiasis is commonly seen in middle-aged females. Choledocholithiasis is defined as the presence of a stone in the common bile duct (CBD), and it often coexists with cholelithiasis. Laparoscopic cholecystectomy (LC) is the gold standard treatment for symptomatic cholelithiasis, and the preferred treatment for coexisting choledocholithiasis is endoscopic retrograde cholangiopancreatography (ERCP) followed by LC.¹⁻³ However, the debate on the timing of surgery post-ERCP is still on. Many studies had recommended early LC post-ERCP and others favor late LC after an interval of 6 to 8 weeks. Post-ERCP pancreatitis is not uncommon and is considered one of the relative contraindications for early LC.⁴⁻⁶ Many recent studies have shown that an interval of 6 to 8 weeks post-ERCP has shown increased operative difficulty as well as increased rate of conversion to open cholecystectomy.⁷⁻¹⁰ It is important to reduce morbidity and complications for the patients. The aim of this study was to compare and analyze the various parameters like operative difficulty, duration of surgery, hospital stay, complications, and conversion to open cholecystectomy among the patients undergoing LC immediately following the CBD stone extraction by ERCP with those undergoing LC after an interval of 8 weeks.

MATERIALS AND METHODS

This study is a comparative analysis conducted at St Joseph Hospital, Ghaziabad, a tertiary care hospital, from September

^{1,2}Department of General Surgery, St Joseph Hospital, Ghaziabad, Uttar Pradesh, India

³Department of Medicine, Division of Nephrology, UCMS & GTB Hospital, New Delhi, India

Corresponding Author: Apoorv Goel, Department of General Surgery, St Joseph Hospital, Ghaziabad, Uttar Pradesh, India, e-mail: drapurvgoel@gmail.com

How to cite this article: Goel A, Kothari S, Bansal R. Comparative Analysis of Early versus Late Laparoscopic Cholecystectomy Following Endoscopic Retrograde Cholangiopancreatography in Cases of Cholelithiasis with Choledocholithiasis. *Euroasian J Hepato-Gastroenterol* 2021;11(1):11-13.

Source of support: Nil

Conflict of interest: None

2019 to March 2021. During this period, around 105 patients with choledocholithiasis were seen and 89 out of them were enrolled for the study. All patients above 18 years of age suffering from cholelithiasis and choledocholithiasis were included in the study. Patients with severe cardiorespiratory illness, acute cholangitis, multiorgan failure, acute kidney injury, post-ERCP pancreatitis, jaundice (S. bilirubin > 2.5), biliary injury post-ERCP, and malignancy were excluded from the study. Enrolled participants were divided into two groups: group I ($n = 45$) underwent LC within 48 hours

prior to ERCP in the same hospitalization and group II ($n = 44$) underwent LC after an interval of 8 weeks. Various preoperative and intraoperative parameters were analyzed. The two groups were compared statistically in terms of gender, age, body mass index (BMI), operation time, adhesion level (grade), operative difficulty, postoperative length of hospital stay, conversion rate to open surgery, biliary duct injury, deep and superficial site infections, and other factors. Severity of adhesions was based on a scoring system based on the study by Ercan et al.⁶ and operative difficulty scoring (Table 1) was based on the study by Sugrue et al.⁷

All patients of choledocholithiasis underwent ERCP with CBD stenting followed by the standard four-port LC. A complete hemogram, liver function test, and serum amylase/lipase were repeated 24 hours prior to the surgery. Laparoscopic cholecystectomy was done under general anesthesia by the same team of surgeons with more than 10 years of experience in laparoscopic surgery.

Statistical analysis was performed using SPSS (Statistical Package for the Social Sciences) for Windows (version 24.0). Categorical variables were described as frequency (percentage); mean \pm standard deviation was used for continuous parameters. Differences between the two groups were compared by the Student's t-test. For all analyses, a two-tailed p -value of <0.05 was considered statistically significant.

OBSERVATION AND RESULTS

A total of 89 patients were enrolled in this study, of which 71 females and 18 males were there. Mean age was 45 ± 1.23 and 43 ± 0.93 in group I and group II, respectively. There was no significant difference in BMI and other comorbid conditions in both the groups. On ultrasonography (USG), pericholecystic edema was seen significantly more in group I and increased wall thickness was seen more in group II. Mean duration of surgery was significantly

higher in patients undergoing surgery later. The length of hospital stay was significantly reduced for group I (Table 2).

It was observed that group II patients had more severe adhesions during surgery as compared to group I in which only mild adhesions were noticed. Even operative difficulty grade and cholecystitis severity score were significantly high for patients in group II. The majority of the cases in group II had severe score, whereas in group I, the score was mild and moderate. The requirement of the drain was seen more in group II cases. There was no difference in bile duct injury, conversion to open cholecystectomy, laparoscopic subtotal cholecystectomy, bleeding, wound infection, and readmission between both the groups (Table 3).

DISCUSSION

Cholelithiasis and choledocholithiasis are seen more frequently in middle-aged females. It has been a matter of debate and discussion about the timing of LC after ERCP and CBD stone extraction. In this study, there was no significant difference seen among demographic findings that correlate with the previous studies.^{9,10} However, significant preoperative ultrasound finding was increased wall thickness in group II.¹⁰ It was clearly observed that and seen consistent with our studies that the duration of surgery and hospital stay was significantly more in patients undergoing LC after an interval of 8 weeks.⁹⁻¹¹ Operative difficulty and grade of adhesions were significantly higher in cases undergoing surgery after a delayed period, and this observation is clearly supported by many studies.⁸⁻¹¹ Many studies have shown a significant difference in conversion to open cholecystectomy, but in our study, however,

Table 1: Operative grading system for cholecystitis severity

<i>Gallbladder (GB) appearance</i>	
Adhesions <50% of GB	1
Adhesions burying GB	3
	Max 3
Distension/contraction	
Distended GB (or contracted shriveled GB)	1
Unable to grasp with atraumatic laparoscopic forceps	1
Stone ≥ 1 cm impacted in Hartmann's pouch	1
Access	
BMI >30	1
Adhesions from previous surgery limiting access	1
Severe sepsis/complications	
Bile or pus outside GB	1
Time to identify cystic artery and duct >90 min	1
	Total Max 10
Degree of difficulty	
A. Mild	<2
B. Moderate	2-4
C. Severe	5-7
D. Extreme	8-10

Table 2: Characteristics of the patients

	Group I (n = 45)	Group II (n = 44)	p-value
Age (years)	45 \pm 1.23	43 \pm 0.93	0.78
Sex			
Male	10 (22.22%)	8 (18.18%)	0.93
Female	35 (77.78%)	36 (81.82%)	0.87
BMI (kg/m ²)	25 \pm 0.53	24 \pm 0.67	0.76
HT	7 (15.55%)	8 (18.18%)	1.01
DM	8 (17.77%)	10 (22.72%)	0.98
CAD	1 (2.22%)	2 (4.57%)	1.23
COPD	2 (4.44%)	1 (2.27%)	1.11
Preop laparotomy/ laparoscopy	2 (4.44%)	2 (4.57%)	1.21
Preop gallbladder USG			
Pericholecystic edema			
Increased wall thickness	5 (11.11%)	1 (2.27%)	0.03
Mucocele gallbladder	10 (22.5%)	25 (56.81%)	0.02
	4 (8.88%)	2 (4.57%)	0.76
Post-ERCP pancreatitis/recurrent biliary symptoms	3 (6.67)	5 (11.56)	0.78
Duration of surgery (min)	55 \pm 3.56	78 \pm 2.45	0.002
Hospitalization (days)	2.8 \pm 0.57	4.2 \pm 1.01	0.011

BMI, body mass index; HT, hypertension; DM, diabetes mellitus; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease; preop, preoperative; USG, ultrasonography

Table 3: Intraoperative and postoperative factors

	Early group (n = 45)	Delayed group (n = 44)	p-value
Intraoperative adhesion			
grade 1	4 (8.88%)	2 (4.54%)	0.77
grade 2	28 (62.22%)	10 (22.72%)	0.002
grade 3	8 (17.78%)	20 (45.46%)	0.012
grade 4	5 (11.11%)	12 (27.27%)	0.023
Intraoperative grading and cholecystitis severity score (out of 10)			
Mild (<2)	23 (51.11%)	8 (18.18%)	0.002
Moderate (2–4)	15 (33.33%)	10 (22.73%)	0.54
Severe (5–7)	6 (13.33%)	21 (47.73%)	0.001
Extreme (8–10)	1 (2.22%)	5 (11.36%)	0.034
Conversion to open cholecystectomy	2 (4.44%)	3 (6.82%)	0.76
Laparoscopic subtotal cholecystectomy	2 (4.44%)	4 (9.10%)	0.65
Biliary tract injury	1 (2.22%)	2 (4.54%)	0.88
Bleeding requiring blood transfusion	0	1 (2.27%)	0.70
Drain placement	13 (28.89%)	24 (54.55%)	0.041
Superficial wound infection	1 (2.22%)	2 (4.54%)	0.98
Deep wound infection	0	1 (2.27%)	0.72
Hospital readmission	1 (2.22%)	2 (4.54%)	0.84

cases of conversion were more in delayed group but statistically insignificant.^{9,10}

Many studies have supported early LC post-ERCP. On the same day, LC post-ERCP and simultaneous laparoendoscopic management are also being popularized.^{12–14} We too suggest that LC performed early within 48 hours post-ERCP is beneficial in terms of surgery duration, hospital stay, and operative difficulty.

CONCLUSION

Early LC performed within 48 to 72 hours post-ERCP is associated with shorter hospital stay, less operative difficulty, and shorter duration of surgery. Results are consistent with lesser complications and morbidity. Therefore, it is recommended to go for early LC post-ERCP in the cases of choledocholithiasis.

ACKNOWLEDGMENTS

The protocol for this study was approved by the Ethical Committee of the institute. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. There is no conflict of interests to be declared.

REFERENCES

- Schirmer BD, Edge SB, Dix J, et al. Laparoscopic cholecystectomy. Treatment of choice for symptomatic cholelithiasis. *Ann Surg* 1991;213:665–676. DOI: 10.1097/0000658-199106000-00018.
- Reinders JSK, Gouma DJ, Heisterkamp J, et al. Laparoscopic cholecystectomy is more difficult after a previous endoscopic retrograde cholangiography. *HPB* 2013;15:230–234. DOI: 10.1111/j.1477-2574.2012.00582.x.
- Phillips MS, Marks JM. Endoscopic retrograde cholangiopancreatography: general principles. *SAGES Man* 2012;2012:411–425. Available at: <https://www.sages.org/publications/patient-information/patient-information-for-ercp-endoscopic-retrograde-cholangio-pancreatography-from-sages/>
- Mann K, Belgaumkar AP, Singh S. Post-endoscopic retrograde cholangiography laparoscopic cholecystectomy: challenging but safe. *JLS* 2013;17:371–375. DOI: 10.4293/108680813X13654754535511.
- Salman B, Yilmaz U, Kerem M, et al. The timing of laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreatography in cholelithiasis coexisting with choledocholithiasis. *J Hepatobiliary Pancreat Surg* 2009;16:832–836. DOI: 10.1007/s00534-009-0169-4.
- Ercan M, Bostancı EB, Teke Z, et al. Predictive factors for conversion to open surgery in patients undergoing elective laparoscopic cholecystectomy. *J Laparoendosc Adv Surg Tech A* 2010;20:427–434. DOI: 10.1089/lap.2009.0457.
- Sugrue M, Sahebally SM, Ansaloni L, et al. Grading operative findings at laparoscopic cholecystectomy- a new scoring system. *World J Emerg Surg* 2015;10:14. DOI: 10.1186/s13017-015-0005-x.
- Sahu D, Mathew MJ, Reddy PK. Outcome in patients undergoing laparoscopic cholecystectomy following ERCP; Does timing of surgery really matter? *J Minim Invasive Surg Sci* 2015;4:e25226. Available at: <https://sites.kowsarpub.com/minisurgery/articles/17816.html>
- Aziret M, Karaman K, Ercan M, et al. Early laparoscopic cholecystectomy is associated with less risk of complications after the removal of common bile duct stones by endoscopic retrograde cholangiopancreatography. *Turk J Gastroenterol* 2019;30(4):336–344. DOI: 10.5152/tjg.2018.18272.
- Sahoo R, Samal D, Pradhan A, et al. Optimal timing of laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreatography. *Int Surg J* 2017;4:3504–3506. DOI: 10.18203/2349-2902.isj20174101.
- Friis C, Rothman JP, Burcharth J, et al. Optimal timing for laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreatography: a systematic review. *Scand J Surg* 2018;107(2):99–106. DOI: 10.1177/1457496917748224.
- Morino M, Baracchi F, Miglietta C, et al. Preoperative endoscopic sphincterotomy versus laparoendoscopic rendezvous in patients with gallbladder and bile duct stones. *Ann Surg* 2006;244:889–896. DOI: 10.1097/01.sla.0000246913.74870.fc.
- Akaraviputh T, Rattanapan T, Lohsiriwat V, et al. A same day approach for choledocholithiasis using endoscopic stone removal followed by laparoscopic cholecystectomy: a retrospective study. *J Med Assoc Thai* 2009;92(1):8–11. Available at: <https://pubmed.ncbi.nlm.nih.gov/19260236/>
- Zang J, Zhang C, Zhou H. Early laparoscopic cholecystectomy after endoscopic common bile duct stone extraction: the experience from a developing country. *Surg Laparosc Endosc Percutan Tech* 2011;21(2):120–122. DOI: 10.1097/SLE.0b013e3181213c7b8.