

POST-ERCP CHOLECYSTECTOMY: CHALLENGES AND OUTCOMES IN A TERTIARY CARE CENTRE

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Abstract

Background: Cholelithiasis with concomitant choledocholithiasis is common, and Endoscopic Retrograde Cholangiopancreatography (ERCP) plays a crucial role in its management. However, post-ERCP cholecystectomy presents unique challenges and potential complications. This study aimed to analyse the intraoperative and postoperative complications of cholecystectomy in patients undergoing ERCP. **Materials and Methods:** This retrospective study included 190 patients with cholelithiasis and common bile duct stones who underwent ERCP and subsequent cholecystectomy at the Surgical Gastroenterology Department of Coimbatore Medical College Hospital between 2018 and 2024. Demographic details, clinical history, laboratory investigations, imaging findings, procedural details, and outcome parameters were collected and analysed. **Results:** The mean age of the patients was 49±10 years, with a male predominance of 53.7%. The most common indication for ERCP was choledocholithiasis (63.2% of cases). Eight (4.2%) patients required conversion to open cholecystectomy due to intraoperative difficulties, while two (1.05%) patients underwent initial open cholecystectomy. Operative time was significantly prolonged in stented patients (144±30 min) than in non-stented patients (68±30 min), indicating increased surgical complexity. Intraoperative complications were notably higher in the stented group than in the non-stented group, including adhesions (35.7% vs. 4.2%), gallbladder perforation (6.3% vs. 1%), and bile duct injury (3.15% vs. 0%). Postoperative complications, such as wound infection (12.6% vs. 1.5%), bile leak (6.8% vs. 1%), and respiratory complications (8.4% vs. 2.1%), were also significantly more frequent in patients with stents. **Conclusion:** Post-ERCP cholecystectomy, particularly in patients with stents, is associated with higher intraoperative and postoperative complications, prolonged operative times, and longer hospital stays. Comprehensive preoperative planning and advanced surgical expertise are essential for minimising risks and improving outcomes, need more technical challenges, post-op follow-up interventions; additional facilities, longer hospital stays; and costlier than non-stented patients.

INTRODUCTION

Cholelithiasis with concomitant choledocholithiasis and cholangitis is a common condition affecting 10-25% of patients with gallstones.^[1] Diagnosis involves various modalities, including laboratory tests, imaging techniques, and intraoperative cholangiography.^[2] Management options include Endoscopic Retrograde Cholangiopancreatography (ERCP), laparoscopy, and open surgery. ERCP, initially developed as a diagnostic tool for biliary and

pancreatic diseases, has evolved into a primarily therapeutic procedure. It plays a crucial role in managing choledocholithiasis and investigating biliary malignancies, with experienced endoscopists achieving high success rates in biliary cannulation. Although ERCP offers benefits over surgical treatments, it carries risks such as pancreatitis, bleeding, and perforation, which are influenced by patient selection, operator skill, and procedural complexity.^[3,4]

ERCP is indicated for cholangitis, biliary leaks, bile duct injuries, and abnormal intraoperative cholangiograms and is particularly recommended before laparoscopic cholecystectomy in cases of recurrent biliary colic or biliary pancreatitis.^[5,6] For cases of moderate to severe cholangitis, biliary drainage is recommended within 24 hours, while early ERCP is advised for gallstone pancreatitis with impacted stones in the papilla.^[7] Laparoscopic cholecystectomy (LC) remains the preferred approach post-ERCP cholecystectomy due to its lower morbidity, mortality, and shorter hospital stay.^[8]

Cholelithiasis with choledocholithiasis can be treated using a one- or two-stage method. Single-stage treatment with laparoscopic common bile duct exploration and cholecystectomy has demonstrated improved stone clearance and reduced hospital stay compared with the two-stage strategy of ERCP followed by laparoscopic cholecystectomy.^[9] Cholecystectomy following ERCP is complicated by changes in fibroinflammatory anatomy and complications of previous procedures, with longer hospital stays and increased rates of conversion to open surgery.^[10,11] These difficulties require modified endoscopes and specialist techniques, which add to procedural complexity over traditional techniques.^[11]

The ideal timing for laparoscopic cholecystectomy (LC) following endoscopic retrograde cholangiopancreatography (ERCP) remains unclear. Early LC at 24-72 hours after ERCP has been reported to result in less time spent in the hospital, fewer complications, and reduced costs. Parameters such as serum bilirubin, WBC count, and gallbladder features may affect the difficulty of surgery.^[12] This study was conducted to assess the effect of previous ERCP procedures on surgical outcomes by comparing intraoperative and postoperative complications in stented and non-stented patients. Knowledge of these complications will enable better surgical decision-making, reduce perioperative complications, and maximise patient management.

Aim

This study aimed to analyse the intraoperative and postoperative complications of cholecystectomy in patients undergoing ERCP.

MATERIALS AND METHODS

This retrospective study included 190 patients with cholelithiasis and common bile duct stones who underwent ERCP and subsequent cholecystectomy at a tertiary care centre, the Surgical Gastroenterology Department at Coimbatore Medical College Hospital, between 2018 and 2024.

Inclusion Criteria

Patients aged 18–80 years with imaging-confirmed gallstone disease who underwent laparoscopic cholecystectomy were included.

Exclusion Criteria

Patients aged <18 and >80 years with a history of previous laparotomy undergoing emergency cholecystectomy for a perforated gallbladder or those who were pregnant and had gallstone disease with suspected malignancy or cholecystitis with liver disease and were unfit for general anaesthesia due to cardiac complications were excluded.

Methods

Demographic details, clinical history, laboratory investigations, imaging findings, and procedural details were obtained from hospital records. Outcome parameters and intra- and postoperative assessments were recorded, including the duration of the surgical procedure, adhesions, gallbladder perforation, bile duct injury, wound infection, bile leakage, respiratory complications, and postoperative hospital stay. These parameters were analysed by comparing stented and non-stented patients. The results are presented as mean, standard deviation, frequency, and percentage.

RESULTS

The mean age of the patients was 49 ± 10 years, and the mean BMI was 28.4 ± 3.2 kg/m². Regarding gender, males were predominant with 102(53.7%) patients, compared to females with 88(46.3%) patients. Regarding comorbidities, diabetes mellitus was present in 62(32.6%) patients, hypertension in 68(35.7%) patients, and cardiovascular diseases in 26(13.6%) patients, chronic renal failure, and parenchymal liver disease. [Table 1]

Table 1: Patient demographics and prevalence of comorbidities

		N (%)
Mean age (years)		49 ± 10
Mean BMI (Kg/m ²)		28.4 ± 3.2
Gender	Males	102(53.7%)
	Females	88(46.3%)
Comorbidity	Diabetes Mellitus	62(32.6%)
	Hypertension	68(35.7%)
	Cardiovascular Diseases	26(13.6%)

Among the ERCP indications, choledocholithiasis was the most common in 120(63.2%) patients, followed by biliary stricture in 37(19.4%) patients and cholangitis in 33(17.3%) patients. For the cholecystectomy approach, 180(94.7%) patients

underwent laparoscopic cholecystectomy. However, 8(4.2%) patients required conversion to open cholecystectomy due to intraoperative difficulties, while 2(1.05%) patients underwent initial open cholecystectomy. [Table 2]

Table 2: ERCP Indications, complications, and cholecystectomy approach

ERCP	Indication	N (%)	
		Cholechololithiasis	120 (63.2%)
		Biliary stricture	37 (19.4%)
		Cholangitis	33 (17.3%)
Cholecystectomy approach	Laparoscopic	180 (94.7%)	
	Conversion to Open	8 (4.2%)	
	Initial Open	2 (1.05%)	

The mean operative time was significantly longer in stented patients (144 ± 30 min) than in non-stented patients (68 ± 30 min). Similarly, the mean hospital

stay was prolonged in patients with prior stenting (8.2 ± 2.1 days) compared to non-stented patients (3.7 ± 2.5 days). [Table 3]

Table 3: Comparison of post-ERCP cholecystectomy outcomes between stented and non-stented patients

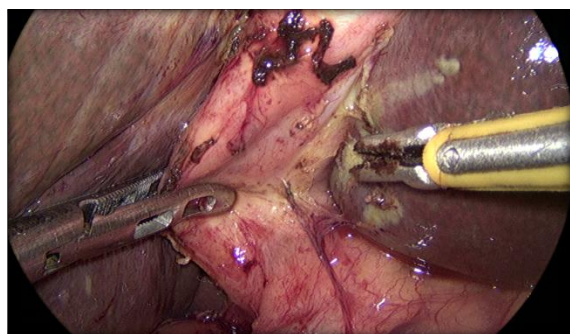
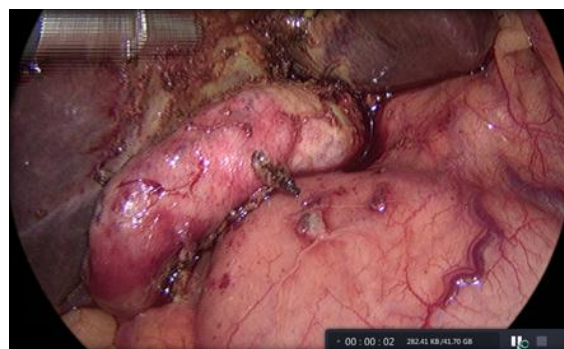
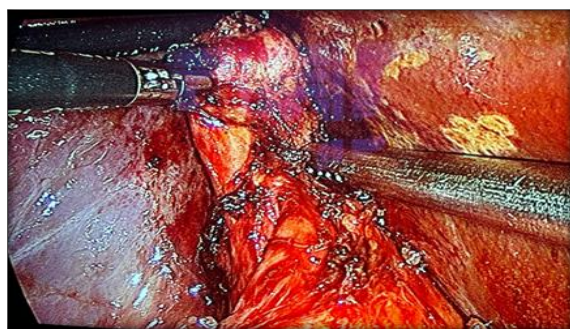
	Mean \pm SD	
	Stented	Non-Stented
Operative time (mins)	144 ± 30	68 ± 30
Hospital stays (days)	8.2 ± 2.1	3.7 ± 2.5

In terms of intraoperative complications of post-ERCP cholecystectomy, Difficult Calot's dissection was more common in stented patients (35.7%) than in non-stented patients (4.2%). Gallbladder perforation was common in 6.3% of stented patients compared to 1% in non-stented patients. Bile duct injury was reported in 3.15% of stented patients, whereas no cases were reported in non-stented patients.

Regarding postoperative complications, wound infection was reported in 12.6% of stented patients compared to 1.5% in non-stented patients, and bile leak was seen in 6.8% of stented patients, with only 1% of non-stented patients experiencing this complication. Respiratory complications were more frequent in patients with stents (8.4%) than in those without stents (2.1%). [Table 4]

Table 4: Comparison of intraoperative and postoperative complications in stented and non-stented patients

		N (%)	
		Stented	Non-Stented
Intraoperative complications	Difficult Calot's dissection	68 (35.7%)	8 (4.2%)
	Gallbladder perforation	12 (6.3%)	2 (1%)
	Bile duct injury	6 (3.15%)	0
Postoperative complications	Wound infection	24 (12.6%)	3 (1.5%)
	Bile leak	13 (6.8%)	2 (1%)
	Respiratory complications	16 (8.4%)	4 (2.1%)

**Figure 1: Post-ERCP with frozen Calot's triangle****Figure 3: Fundus first approach cholecystectomy done in ERCP stented patient****Figure 2: Severe adhesion in the Gallbladder bed in the stented patient**

DISCUSSION

In our study, males were more prevalent (53.7%) than females (46.3%). Common comorbidities included diabetes mellitus (32.6%), hypertension (35.7%), cardiovascular disease (13.6%), chronic renal failure, respiratory disease, and EPLD. Cholechololithiasis (63.2%) was the most frequent indication for ERCP, followed by biliary strictures (19.4%) and cholangitis (17.3%). The ERCP-related complications included

post-ERCP pancreatitis (7.9%), bleeding (4.2%), and perforation (1.6%).

Javed et al. reported a mean participant age of 44.9 ± 14.8 years with female predominance (86.67%). The study identified common bile duct stones as the most prevalent pathology, with comorbidities including diabetes mellitus (6.67%), pancreatitis, hypertension, chronic renal failure, respiratory disease, and EPLD.¹³ Similarly, a study by Polat and Yozgat reported a mean age of 62.1 years with more females and comorbid conditions, including cardiac diseases, diabetes, chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), and neurological diseases.¹⁴ Liu et al. found gallstone pancreatitis in 44%, choledocholithiasis in 34%, and acute cholangitis in 21% of patients, without significantly impacting conversion rates.¹⁵

Operative time was significantly longer in stented patients (144 ± 30 min) than in non-stented patients (68 ± 30 min) because of adhesions from prior ERCP interventions. Hospital stay was also prolonged in patients with stents, indicating the impact of preoperative biliary manipulation on recovery. Intraoperative complications, such as extensive adhesions at Calot's triangle, duodenal and colonic adhesions (35.7% vs. 4.2%), gallbladder perforation (6.3% vs. 1%), and bile duct injury (3.15% vs. 0%), were more frequent in the stent group. These findings align with Nair and Kamble, who reported intraoperative bleeding and bile leaks due to dense adhesions following multiple ERCP sessions, increasing conversion to open surgery.¹⁶

Postoperative complications were more frequent in the stented patients, with higher rates of wound infection (12.6% vs. 1.5%), bile leak (6.8% vs. 1%), and respiratory complications (8.4% vs. 2.1%). These findings are consistent with Bakr et al., who reported intraoperative complications like severe cholecystitis (40%) and gallbladder adhesions (30%), with postoperative issues including ileus (5%) and wound sepsis (4%).¹⁷ Zendel et al. found postoperative biliary complications in 10.9% of geriatric patients, all managed conservatively.¹⁸ Similarly, Polat and Yozgat reported adverse events in 18.6% of patients, with post-ERCP pancreatitis most common (14.6%), influenced by previous cholecystectomy, difficult cannulation, and prolonged procedure time.¹⁴

Conversion to open surgery was necessary in select cases, primarily due to severe adhesions at Calot's triangle, as also noted by Javed et al., who reported a 15% conversion rate for similar reasons.¹³ Nair and Kamble highlighted those extensive adhesions from multiple ERCP sessions significantly increased conversion rate.¹⁶ El-Shamy et al. reported that cholecystectomy within 72 hours post-ERCP reduces inflammation and improves outcomes, supporting timely intervention.¹⁹

ERCP-stented patients require longer operating times, extended hospital stays, and prolonged postoperative follow-ups, increasing overall surgery costs compared to non-stented patients. Patients in advanced centres with comprehensive facilities will

benefit from this minimally invasive procedure. Informing patients about these factors before surgery ensures their acceptance and preparedness for potential complications.

CONCLUSION

Post-ERCP cholecystectomy presents challenges, particularly in patients with stents. The study showed greater operative complexity, increased operating time, and complications in stented patients compared to non-stented patients. Intraoperative complications, such as adhesions, gallbladder perforation, and bile duct injury, were more common in the stented group, resulting in longer hospital stays and increased conversion to open surgery. Postoperative complications, such as wound infection, bile leakage, and respiratory issues, were also more prevalent. Preoperative planning and surgical expertise are essential for minimising risks and improving outcomes, requiring more technical challenges and higher costs than non-stented patients.

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