

## Quality of Life After Laparoscopic Common Bile Duct Exploration versus ERCP for Common Bile Duct Stones

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**Abstract:**

**Background:** Management of patients with choledocholithiasis comprises endoscopic retrograde cholangiopancreatography and laparoscopic cholecystectomy or laparoscopic cholecystectomy with common bile duct exploration at the same session. Assessment of the quality of life after two stages endoscopic retrograde cholangiopancreatography and laparoscopic cholecystectomy or single stage laparoscopic cholecystectomy with common bile duct exploration may play a role in decision making. **Patients and methods:** Eighty patients were included in the study. Patients were divided into two groups, group A where patients had undergone laparoscopic common bile duct exploration and group B for which ERCP will be followed by interval laparoscopic cholecystectomy. **Result:** single stage common bile duct exploration (group A) was associated with less hospital stay than group B in which ERCP with interval laparoscopic cholecystectomy. Group A showed better outcome in all eight aspects of quality of life. **Conclusion:** the standard operation for common bile duct stones which is Endoscopic retrograde cholangiopancreatography followed by laparoscopic cholecystectomy is associated with low quality of life in relation to single stage laparoscopic cholecystectomy in concomitant with common bile duct exploration.

**Keywords:** Common bile duct stones; Laparoscopic common bile duct exploration; endoscopic retrograde cholangiopancreato--graphy.

## Introduction

Gallstone disease occurs in 3–20% of the population worldwide. About 15% of people with gallstone develop stones in the common bile duct <sup>[1]</sup>.

Common bile duct stones can cause complications such as obstructive jaundice, cholangitis, liver abscess, pancreatitis, and secondary biliary cirrhosis <sup>[2]</sup>.

The clinical manifestations of common bile duct stones are complex which may be upper abdominal pain, jaundice, chills, and high fever are usually present during the attack period, which is known as the Charcot triad. Septic shock is considered as a serious clinical consequence caused by common bile duct stones. Once Common bile duct stones is discovered, it should be actively treated, regardless of whether there are related symptoms or not <sup>[3]</sup>.

Treatment of common bile duct stone and cholecystitis can be either by one stage laparoscopic cholecystectomy and common bile duct exploration (LCBDE) or two stages by ERCP followed by laparoscopic cholecystectomy <sup>[4]</sup>.

Endoscopic retrograde cholangiopancreatography (ERCP) has been widely used in the diagnosis and treatment of biliary and pancreatic diseases. ERCP can help to explore, locate the location, size, and number of stones in patients with cholelithiasis. It has a significant effect and effectively removes the stones in the affected part and reduce the damage of adjacent tissue <sup>[5]</sup>.

ERCP is associated with certain complications as it is an invasive procedure. It can lead to bleeding, perforation, pancreatitis, and late

complications such as ampullary stenosis, cholangitis, and recurrence of stones <sup>[6]</sup>.

Laparoscopic approach to cholelithiasis and choledocholithiasis is an attempt to decrease the need for the excessive number of negative ERCPs and their associated morbidity and mortality; to avoid damaging the ampulla of Vater, the physiological consequences of which are of legitimate concern and to spare the patients multiple hospital admissions to shorten the hospital stay which has a positive impact in the cost <sup>[7,8]</sup>.

T-tube drainage has many drawbacks, such as fluid and electrolyte disturbance, sepsis, premature dislodgement, bile leakage, prolonged biliary fistula, late bile duct stricture, and possible peritonitis after removal. These complications demand close follow-up cholangiography, prolonged hospital stay and increase in cost <sup>[9,10]</sup>.

However, primary closure following laparoscopic common bile duct exploration is still a technical demanding operation and with a relative high risk of bile leakage <sup>[11,12]</sup>.

The disease and its treatment affect the patient's physical functions. It also influences their psychical and social well-being. Quality of life data may assist by providing evidence about expected outcome, side effects, and functional limitations in activities. Thus, quality of life results may become the deciding factor in the patient and clinician's decision-making regarding the preferred treatment approach. It may act as a prognostic indicator and help in resource allocation and health care policy. Each intervention has its own complications, and no intervention is superior to the other. So, the study of the quality of life may play a role in making the decision <sup>[13]</sup>.

## Patients and methods

This a prospective study conducted from January 2020 to October 2022 in the Department of general Surgery and Department of Gastroenterology at Al-Azhar University Hospital, Assiut Branch. The study is approved by the organizational ethical committee of Faculty of Medicine-Benha University under the number 15-1-23-48-81.

A total of 80 patients were included in the study. All patients suffering from acute cholecystitis or chronic cholecystitis with common bile duct stones were diagnosed in the outpatient clinic or at the emergency department or referred to the department of internal medicine.

All patients with combined gallbladder stones and common bile duct stones between the age of 18 to 65 were included in the study. Patients' consents were mandatory in all of them, patients understood the risk of each procedure and patient confidentiality was respected. Patients with previous hepatobiliary surgery, unfit for general anesthesia, active cholangitis, pancreatitis, significant comorbidities and patients with malignancy were excluded from the study. Patients was divided into two groups by covariates adaptive randomization, group A where patients had laparoscopic common bile duct exploration and group B in which ERCP were done followed by interval laparoscopic cholecystectomy.

Baseline investigations, which included blood test, renal function tests, chest radiography, ECG, serum bilirubin, serum alkaline phosphatase, serum glutamic pyruvic transaminase (AST), and abdominal ultrasonography. When the location and cause of obstruction could not be

diagnosed with ultrasonography a magnetic resonance cholangiopancreatography was performed. Contrast-enhanced computerized tomography was performed in selected cases.

### Technique of ERCP

Introduction of side opening endoscopy through the duodenum. cannulation involves passage of the cannulation device tip into the papillary orifice, followed by injection of contrast material to confirm the inertance of CBD. Sphincterotomy is done by cutting the biliary sphincter with the use of electrocautery to create an incision through the musculature of the biliary portion of the sphincter of Oddi thereby. Eliminating the principal anatomic barrier impeding stone passage and facilitating stone extraction. The use of basket is generally indicated when the duct is dilated or multiple large stones are present, the use of balloon is warranted when the duct is not dilated or if there is a single free-floating stone, also balloons are useful when multiple small stones are present or when a larger stone has been crushed. Once a stone has been grasped within a basket or a balloon has been advanced proximal to the stone, pulling the stone/balloon or stone/basket apparatus is often sufficient to extract the stone. Stenting of the CBD is done after complete bile duct clearance.

### Operative technique of laparoscopic common bile duct exploration

Laparoscopic cholecystectomy was performed with a standard four-port technique using a 5-mm 30° laparoscope. Patients with filling defects and a CBD diameter greater than 8 mm underwent laparoscopic common bile duct exploration via the transcholedochal route. A longitudinal supraduodenal

choledochotomy was done using micro scissors. CBD stones were extracted under vision using a flexible choledochoscope and a wire basket. Following complete ductal clearance confirmation of duct clearance done via intraoperative cholangiography.

the CBD was closed with interrupted 3/0 Vicryl sutures in thin-walled ducts and continuous sutures in thick-walled ducts. A drain tube was left in the gallbladder

bed and was removed the following days if there was no bile leak.

**Result**

Between January 2020 and October 2022, 80 patients with common bile duct stone were managed in our institution. Forty of them had laparoscopic common bile duct exploration and 40 had ERCP then laparoscopic cholecystectomy was performed.

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**Result:**

**Table (1)** Patients' presentations and Patients' demography.

Type of intervention	ERCP and lap chole	LC and LCBDE
Age (years)	43ys	46ys
Gender	28 ♀/12♂	23♀/17♂
Upper abdominal pain	38 95 %	35 87.5 %
Nausea and vomiting	24 60%	27 62.5%
Recurrent Biliary colic	35 87.5%	33 82.5%
Jaundice	37 92.5%	35 87.5%
Fever	12 30%	15 37.5
Tachycardia	18 45%	16 40%
WBC mean	10100	11000
Bilirubin level mean	5.4	4.6
ALT mean	176	234
AST mean	245	286
Dilated CBD	36 90%	38 95%
Stone in CBD	40 100%	40 100%

**Table (2)** patients management and procedure.

Type of intervention	ERCP and lap chole	LC and LCBDE
CBD detected	40 100%	40 100%
CBD extracted	37 92.5 %	35 87.5%
Time (mean)	85	68
Conversion to other procedure	3 7.5%	1 2.5%
Conversion to open surgery	0 0%	2 5%
Other procedure done (choledochojunostomy)	1 2.5%	3 7.5 %

**Table (3)** complications related to ERCP and laparoscopic cholecystectomy and laparoscopic cholecystectomy.

Type of intervention	ERCP and lap chole	LC and LCBDE
Intraoperative complications	1	2
Postoperative complications	5	9
Major bile leak	0	1
Minor bile duct leak	0	2
Wound infection	1	3
ileus	1	2
Pancreatitis	2	0
Bleeding	1	1

**Table (4)** distribution of patients according to the quality of life.

Type of intervention	ERCP and lap chole	LC and LCBDE
Physical functioning	33 82.5	35 87.5 %
Physical health	24 60%	25 75%
Emotional problems	29 72.5%	33 82.5%
Emotional well being	33 82.5 %	34 85%
Energy and fatigue	28 70%	33 82.5%
Social functioning	31 77.5%	30 75%
Pain	33 82.5%	31 77.5%
General health	24 60%	29 72.5%

## Discussion

Endoscopic retrograde cholangiopancreatography with sphincterotomy has been available and practiced in most major medical centers around the world for common bile duct diseases <sup>[14,15]</sup>.

Endoscopic retrograde cholangiopancreatography (ERCP) and its related procedures are established techniques in the diagnosis and treatment of Common bile duct stones. However, these procedures are associated with a high risk of complications, and caution is needed as the complications may occasionally have a fatal course <sup>[16]</sup>.

Laparoscopic CBDE has been developed over the past 2 decades as a method of treating common bile stones some of them discovered accidentally during LC and the other done as elective procedure. <sup>[17]</sup>

Laparoscopic biliary surgery has become safe, efficient, and cost effective <sup>[18]</sup>. There is an increasing trend to clear the bile duct during LC and with increasing experience more surgeons are preferring LCBDE. LCBDE along with LC is being accepted as an appropriate treatment for CBD stone, because it has the advantage of being a single procedure, with fewer complications, and lesser hospital stay. It has the advantage of clearing retained and impacted stones in case of unsuccessful endoscopic extraction <sup>[18]</sup>.

Studying the quality of life has become a marker of success of any procedure in recent years. There have been many studies comparing a single-stage with the 2-stage procedure for management of concomitant gallstones and CBD stones <sup>[19,20]</sup>. However, there has been no published literature in Egypt comparing quality of life of patients undergoing LC+LCBDE versus ERCP and LC. Therefore, to the best of our knowledge, this study is the first of its kind to assess the outcomes and quality of life in patients undergoing single- stage versus 2-stage management (LC+LCBDE vs. ERCP and LC of concomitant gallstones and CBD stones.

We perform primary closure of the CBD in patients of our series, after assurance intraoperatively by cholangiography or choledochoscopy the absence of residual lithiasis and the good passage of contrast medium through the CBD.

Many studies demonstrated that primary closure of the CBD is a safe technique and has fewer complications compared to the use of stents or the placement of a T-tube. <sup>[19]</sup>

LCBDE can be achieved with successful CBD clearance with low morbidity and mortality rates, as well as good postoperative quality of life.

Physical functioning was comparable between the 2 groups before the intervention. After the intervention, the physical function improved significantly in both groups. However, there was little difference between the 2 groups with better improvement in single stage group A.

The patients showed remarkable improvement after the procedures in both groups with remarkable difference in LC and LCBDE. There was significant improvement in physical, emotional, and role functioning in both the groups with better results in LC and LCBDE.

The occurrence of complications increases the patient's pain and prolongs their hospital stay. Complications such as pancreatitis are caused by injury to the pancreatic duct and the appearance of edema [20]. In our study pancreatitis occurred in 2 patients and postoperative bleeding was detected in one patient which led to delayed discharge.

A good quality of life was reported by CBDS patients after being discharged after ERCP. A better result was detected in LCBDE regarding the relation of quality of life to ERCP and laparoscopic cholecystectomy.

### Study limitations.

This study has some shortcomings that should be noted. The study is a single-center study with a small sample size. Secondly, the quality of life of patients may be affected by other socioeconomic factors, such as marital status and family income.

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### Conclusion

A single-stage LC with concomitant LCBDE versus two-stage ERCP followed by LC in the treatment of concomitant CBD and gallstone disease has been

shown to be equivalent in terms of clinical complications. The single-stage approach has been shown to carry greater cost-effectiveness with reduced length of hospital stay as well as postoperative quality of life.

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