

## Original Research Article

# Two-stages using endoscopic retrograde cholangio-pancreatography procedures versus single stage laparoscopic management for concomitant gallstones and common bile duct stones

Ahmed Abdel Kahaar Aldardeer\*, Alaa A. Redwan

Department of General Surgery, Sohag University Hospital, Sohag, Egypt

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### \*Correspondence:

Dr. Ahmed Abdel Kahaar Aldardeer,  
E-mail: [ashour2003@gmail.com](mailto:ashour2003@gmail.com)

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## ABSTRACT

**Background:** Laparoscopic common bile duct exploration (LECBD) has been proven to be a safe, reliable, and effective treatment for common bile duct (CBD) stones and has gained wider acceptance. Endoscopic retrograde cholangio-pancreatography (ERCP) followed by laparoscopic cholecystectomy (LC) is safe and efficient method that has been usually used for the treatment of bile duct stones. The aim of this study is to compare the outcome of management of concomitant gallstones and common bile duct by two stage (ERCP+LC) versus one stage (LECBD+LC).

**Methods:** This study included 150 patients with concomitant gallstones and CBD stones who were treated at sohag university hospital from July 2017 to December 2018. Results were statistically analysed.

**Results:** The success rates of laparoscopic CBD exploration and ERCP for clearance of CBD were similar (Group A 96% vs. Group B 97.3%). The mean operative time was significantly longer in-group A (125.7±36.6 min) vs. in-group B (82.4±27.6 min), Group A as regard intraoperative complications (one patient had hemorrhage) vs. group B (2 patients hemorrhage during lap. cholecystectomy). As for conversion to other procedure 2 patients for group A vs. 3 patients for group B (conversion of LC to open).

**Conclusions:** Single and two-stage management for uncomplicated concomitant gallbladder and CBD stones had similar success and complication rates, but the single stage strategy was better in terms of shorter hospital stay, need for fewer procedures, less morbidity, and allows earlier recovery with a reduced period of short-term disability.

**Keywords:** CBD stones, Gallstones, Laparoscopic CBD exploration, ERCP, Laparoscopic cholecystectomy

## INTRODUCTION

About 10-15% of patients with gallstones present with concomitant common bile duct stones. Of more concern is the management of these common bile duct (CBD) stones, which had been debated for years since the introduction of laparoscopic cholecystectomy in the late 1980s.<sup>1</sup>

Management strategy of common duct stones involves either endoscopic common duct clearance followed by removal of the gallbladder surgically or surgical

exploration and clearance of the CBD. Surgical exploration can be done by open choledocholithotomy or laparoscopically.<sup>2</sup>

Endoscopic retrograde cholangio-pancreatography (ERCP) followed by laparoscopic cholecystectomy (LC) was the standard of care for patients with gall stones and CBD stones.<sup>3</sup>

However, with increasing expertise in laparoscopic procedures, more and more surgeons have started

offering a single-stage laparoscopic CBD exploration and cholecystectomy (LCBDE) to patients.<sup>4</sup>

At present, it is really equivocal with the handful evidence that whether or not two-stage management is preferable to or otherwise comparable to the one-stage operative procedure for CBD stones.<sup>5</sup>

The aim of this study is to compare between the outcome of management of concomitant gallstones and common bile duct by two stage (ERCP+LC) versus one stage (LECBD+LC).

## METHODS

This study included 150 patients with concomitant gallstones and CBD stones who were treated at Sohag University hospital from July 2017 to December 2018.

Agreement of ethical committee and consents from patients was obtained. A total of 150 patients based on inclusion criteria were selected for the study. Patients divided into two groups; each of them included 75 patients. Group A was subjected to LCBDE+LC, while group B was subjected to ERCP followed by laparoscopic cholecystectomy.

### Inclusion criteria

Inclusion criteria were age 16 to 70 years; patients with or without jaundice; patients with gallbladder stones and

concomitant stones in the CBD and patients with CBD diameter  $\geq 1$  cm.

### Exclusion criteria

Exclusion criteria were acute cholecystitis, acute pancreatitis, uncorrectable coagulopathy, liver cirrhosis, intrahepatic gallbladder, liver mass or abscess, neoplasm; recurrent CBD stones, malignant pancreatic or biliary tumors.

The data were analysed by SPSS data base with application of Chi - square test and test of comparison of proportions,  $p < 0.01-0.05$ .

## RESULTS

This study included 150 patients with concomitant gallstones and CBD stones, Patients with divided into two parallel groups; each of them included 75 patients.

Group A (75 patients) underwent single-stage LCBDE and (LC (Table 1), Group B (75 patients) underwent a two-stage procedure ERCP for endoscopic extraction of CBD stones followed by LC (ERCP + LC) within the same hospital admission.

The success rates of laparoscopic CBD exploration and ERCP for clearance of CBD were similar (Group A 96% vs. Group B 97.3%).

**Table 1: Group A (LCBDE).**

The item	Number	Percentage (%)
Trans-cystic approach	4	5.33
Trans-choledochotomy approach	34	45.3
Choledochoscopic technique	22	29.3
Cholangiogram	11	14.66
Direct access	4	5.33
Total	75	100

**Table 2: Comparison between both groups.**

Variable	Group A (LCBDE)	Group B (ERCP+LC)
Success rates for clearance of CBD	97.3%	98.7%
Intraoperative complications	1.3% hemorrhage 1 patient	2.6% hemorrhage during LC 2 patients
Conversion to other procedure	2.6% 2 patients	4% (conversion of LC to open) 3 patients
Total operative time	115.7 $\pm$ 36.6 min	82.4 $\pm$ 27.6 min
Postoperative pain	24 h: 3.4 $\pm$ 1.7 (range 1-7) 3 days: 0.6 $\pm$ 0.9 (range 0-2)	24 h 4.8 $\pm$ 1.8 (range 2-7) 3 days 0.7 $\pm$ 0.8 (range 0-3)
Postoperative complications	Transient bile leak 6.6% 12 patients	Transient bile leak 2 patients and acute pancreatitis 4 patients
Postoperative mortality	Nil	Nil
Retained CBD stones	2 patients	Nil
Length of hospital stay	4.6 $\pm$ 2.4 days	5.3 $\pm$ 6.2 days
Patient satisfaction	1.62 $\pm$ 0.3(range 1-5)	1.94 $\pm$ 0.7(range 1-7)

The mean operative time was significantly longer in-group A ( $125.7 \pm 36.6$  min) vs. in-group B ( $82.4 \pm 27.6$  min), but the overall hospital stay was significantly shorter (Group A  $4.6 \pm 2.4$  days vs. Group B  $5.3 \pm 6.2$  days).

As regard intraoperative complications Group A (one patient (1.3%) hemorrhage) vs. Group B (two patients (2.6%) hemorrhage during LC) (Table 2).

As for conversion to other procedure 2 patients for group A vs. 3 patients for Group B (conversion of LC to open).

Post-operative pain recorded in group A (24h  $3.4 \pm 1.7$  (rang 1-7) and 3 days  $0.6 \pm 0.9$  (rang 0-2)) vs. group B (24h  $4.8 \pm 1.8$  (range 2-7) and 3 days  $0.7 \pm 0.8$  (range 0-3)).

Postoperative complications rates between the two groups were comparable, Group A showed (transient bile leak (16%) 12 patients) vs Group B (transient bile leak in 2 patients, acute pancreatitis in 4 patients).

We had no mortality among our cases. Two patients (2.6%) in-group A had a diagnosis of retained stones determined during follow up.

The patients in-group A had higher satisfaction scores than the patients in-group B ( $1.62 \pm 0.3$  (range 1-5) vs.  $1.94 \pm 0.7$  (range 1-7)).

## DISCUSSION

Bile duct stones are found in 10-15% of patients with symptomatic gallstones. The nearness of common bile duct stones essentially increases the morbidity, mortality, and expenses of patients with gallstones.<sup>6</sup>

The management of CBD stones has experienced different phases of advancement and development, and LCBDE is currently viewed as a better procedure compared with endoscopic extraction of stones, with comparable morbidity and mortality and a shorter hospital stay in fit patients.<sup>7</sup>

For a long time this strategy offered successful treatment and was related with a morbidity rate of 10- 15%, a death rate of number of normal ERCP's performed, up to 86% when ERCP is performed routinely for all patients and division of the choledochal sphincter in young adults, leading to loss of the normal physiologic barrier, with long term complications such as ampullary stenosis, duodenobiliary reflux, and recurrent stone formation.<sup>8</sup>

In our study as atrial to compare the two methods of treatment, we divided our patients into two groups; each of them included 75 patients. Group A was subjected to LCBDE+LC, while group B was subjected to ERCP followed by laparoscopic cholecystectomy.

Comparing the two techniques in management as regard group A (LCBDE+LC) we had no mortality among patients, as regard postoperative complications one patient (1.3%) haemorrhage, 2 patients converted to other procedure and transient bile leak found in (16%) 12 patients. As regard group B two patients (2.6%) haemorrhage, 3 patients converted to other procedure, transient bile leak in 2 patients and acute pancreatitis in 4 patients.

It was reported that one stage operations have some benefits, as compared to two stage operations. Morbidity after one-stage operations was only 7.5% (2 times lower). The reported results of LCBDE when compared to data obtained after the two-stage procedure, show at least identical, rather improved safety for the patient and partial reduction of costs.<sup>9</sup>

In our study, two patients (2.6%) in-group A had a diagnosis of retained stones determined during follow up, postoperative complications rates between the two groups were comparable, Group A showed (transient bile leak (16%) 12 patients ) vs. Group B (transient bile leak in 2 patients, acute pancreatitis in 4 patients)

A study conducted by Elgeidie et al showed that pre-ERCP+LC was associated with a higher success rate of CBD stone clearance.<sup>10</sup> There was only one case suffered from retained common bile duct stones among patients belonged group A (4.5%). This was in contrary to 12% of studied patients in the study carried out by Stanley et al.<sup>11</sup> In the study by Ding et al, the authors reported that LCBDE+LC stones had a lower recurrence rate.<sup>10,11</sup>

As regard our series, the success rates of laparoscopic CBD exploration and ERCP for clearance of CBD were similar (Group A 96% vs. Group B 97.3%).

A study carried out by Salem et al, mentioned that (LCBDE+LC) had longer mean operative time and shorter overall hospital stay than (ERCP) followed by laparoscopic cholecystectomy.<sup>12</sup>

In our study, we had almost the same results, the mean operative time was significantly longer in-group A ( $125.7 \pm 36.6$  min) vs. in-group B ( $82.4 \pm 27.6$  min), but the overall hospital stay was significantly shorter (Group A  $4.6 \pm 2.4$  days vs. Group B  $5.3 \pm 6.2$  days).

According to a recent meta-analysis, primary closure might be as effective as T-tube drainage in the prevention of postoperative complications after choledochotomy. Consequently, it seems that LCBDE is a commendable alternative to the use of ERCP/EST.<sup>13</sup>

## CONCLUSION

Single and two-stage management for uncomplicated concomitant gallbladder and CBD stones had similar success and complication rates, but the single stage

strategy was better in terms of shorter hospital stay, need for fewer procedures, less morbidity, and allows earlier recovery with a reduced period of short-term disability.

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