

### Comparative Study of Laparoscopic Common Bile Duct Exploration vs Open Method for the Treatment of CBD Stone

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**Purpose:** To compare a laparoscopic common bile duct (CBD) exploration with the open method with regards to the clinical outcome in the treatment of a CBD stone.

**Methods:** A comparative study was performed on 88 patients who underwent surgical treatment for a CBD stone at Ewha Womans University Mbkdong Hbspital from February 1997 to December 2001. The patients were divided into three groups; a group treated by a laparoscopic CBD exploration (group L, n=59), a group treated by open surgery (group O, n=22), and a group converted to open surgery during laparoscopic treatment (group C, n=7). The medical records were reviewed, and the follow-ups study of the quality of life was assessed with a questionnaire on the symptoms associated with cholangitis.

**Results:** Among the 3 groups, there was no difference in the preoperative status of the patients (age, sex, preoperative comorbidity and previous abdominal operation history). The mean operating time were 230.7 minutes in group L, 182.0 minutes in group O, and 247.9 minutes in group C (P>0.05). The time to diet and hospital stay was longer in group C than the others (P<0.05). The postoperative complications were 10.5% in group L, 40.9% in group O and 14.3% in group C. The symptoms of cholangitis by the questionnaire during the follow-up period were 2.7% in group L, 33.3% in group O, and 66.7% in group C.

**Conclusion:** Laparoscopic CBD exploration has acceptable

operative difficulties, less morbidity, and good follow-up quality of life compared to the open method in treating CBD stones. (J Korean Surg Soc 2002;63:416-422)

**Key Words:** CBD stone, Laparoscopic surgery, CBD exploration, Quality of life

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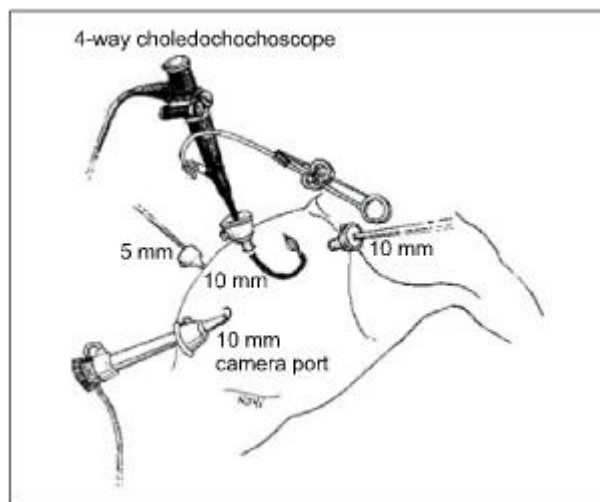


Fig. 1. Four-port technique for laparoscopic CBD exploration.

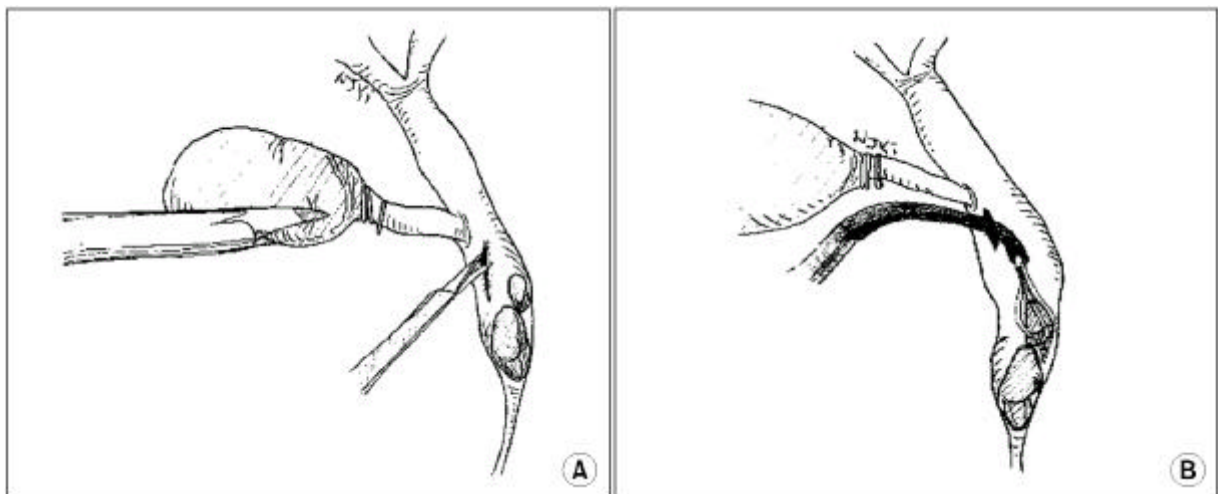
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 65.9 ± 13.4 (21 82),  
 65.0 ± 11.9 (44 81), 66.4 ± 11.6 (53 86) 가  
 L (34 : 25) 가 O (11 : 11),  
 C (4 : 3) 가  
 가 L 51.5% (34/59), O  
 64.5% (12/22), C 57.1% (4/7)  
 가 (P > 0.05).  
 가 C 57.1% (4/7) L 22.0% (13/59)

**Table 1.** Preoperative characteristics of the patient

	Group L* (n=59)	Group O† (n=22)	Group C‡ (n=7)
Age (years)	65.9 ± 13.4 (21 82)	65.0 ± 11.9 (44 81)	66.4 ± 11.6 (53 86)
Sex (M : F)	34 : 25	11 : 11	4 : 3
Comorbidity	34 (57.1%)	12 (54.5%)	4 (57.1%)
Previous operation	13 (22.0%)	6 (27.3%)	4 (57.1%)
Subtotal gastrectomy	4	1	1
Cholecystectomy	3	3	1
CBD exploration	5	2	-
Other operations	1	-	2

\*Group L = laparoscopic CBD exploration; †Group O = open CBD exploration; ‡Group C = open conversion.



**Fig. 2.** (A) Laparoscopic choledochotomy for stone extraction. Laparoscopic choledochotomy with a mezenbaum to the anterior wall of the CBD. (B) Stone extraction using a Dormia basket.

O 27.3% (6/22) (P < 0.05) (Table 1).

가 (n=83, 94.4%), ERCP (n=46, 52.3%), MRCP (n=30, 34.1%) (percutaneous transhepatic cholangiography, PTC) 가 7 (8.0%), 가 10 (11.4%) 가 4 , 가 1 , 5 . ERCP 46 MRCP 30 2 ERCP MRCP 28 EST , 46 가 10 , 가 6 , 가 13 .

2) L (n=59) T 45 (67.2%), T 가 9 (16.0%), 5 (8.3%), O (n=22) T 14 (63.6%), T 6 (27.3%), 2 (9.1%) . C (n=7) T 6 (85.7%), 1 (14.3%) . L 230.7 ± 89.3 (100 480) , O 182.0 ± 60.0 (105 295) , C 247.9 ± 71.9 (160 350) 가 (P > 0.05)(Table 2).

**Table 2.** Operative results

	Group L (n=59)	Group O (n=22)	Group C (n=7)
Operating time (minutes)	230.7 ± 89.3 (100 480)	182.0 ± 60.0 (105 295)	247.9 ± 71.9 (160 350)
Operative type			
CBDE* with TTI <sup>†</sup>	4	1	1
CBDE only	3	3	1
R-en-Y CJ <sup>‡</sup>	5	2	-

\*CBDE = CBD exploration; <sup>†</sup>TTI = T-tube insertion; <sup>‡</sup>CJ = choledochojunostomy.

3) L 3.9 ± 1.3 , O 5.4 ± 2.7 , C 9.5 ± 12.4 , L 13.4 ± 5.8 , O 14.6 ± 6.8 , C 42.8 ± 65.6 L O (P < 0.05). C L 6 (10.5%) 3 , 1 , 1 , 1 가 , O 9 (40.9%) 6 , 2 , 1 , 1 가 1 가 , C 1 (14.3%) . O 가 (P < 0.05)(Table 3).

4) T 1 T , L 2 (3.4%), O 1 (4.5%) 3 . C (P > 0.05). T 2 4 6 T , T 가 1 8 ERCP .

5) , 가 L 97.3% (36/37), O 66.7% (10/15), C 33.3% (2/6) (p < 0.05)(Table 4).

**Table 3.** Postoperative recovery

	Group L (n=59)	Group O (n=22)	Group C (n=7)
Time to diet (POD)*	3.9 ± 1.3 (2 7)	5.4 ± 2.7 (3 12)	9.5 ± 12.4 (2 28)
Hospital stay (POD)*	13.4 ± 5.8 (4 36)	14.6 ± 6.8 (1 31)	42.8 ± 65.6 (9 160)
Morbidity <sup>†</sup>	6 (10.5%)	9 (40.9%)	1 (14.3%)
Biliary fistula	3	-	-
Wound cx <sup>‡</sup>	-	6	-
Sepsis/MODS	-	-	1
Pulmonary cx <sup>‡</sup>	1	2	-
GI bleeding	1	1	-
Others	1	1	-
In-hospital Mortality	-	1 (4.5%)	-

\* POD = postoperative date; <sup>‡</sup>cx = complication; <sup>†</sup> p < 0.05.

**Table 4.** Postoperative long-term follow up

Request (mean F/U* 31 months)	Group L (37/59)	Group O (15/22)	Group O (6/7)
Symptom free <sup>†</sup>	36 (97.3%)	10 (66.7%)	2 (33.3%)
Wound problem	-	-	1
GI problem	-	2	-
Disturbance of daily life	1	1	-
Recurrent cholangitis	1	2	-
Reoperation	-	2	-
F/U* mortality	1 <sup>‡</sup>	2 <sup>‡</sup>	1 <sup>§</sup>

\*F/U = follow up; <sup>†</sup> P < 0.05; <sup>‡</sup> mortality cases related to recurrent cholangitis; <sup>§</sup> a mortality case related to pneumonia and sepsis.

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