A Same Day Approach for Choledocholithiasis Using Endoscopic Stone Removal Followed by Laparoscopic Cholecystectomy: A Retrospective Study

Thawatchai Akaraviputh MD*, Thitipong Rattanapan MD*,
Varut Lohsiriwat MD*, Asada Methasate MD, PhD*,
Somkiat Aroonpruksakul MD**, Darin Lohsiriwat MD*

** Department of Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*
*** Department of Anesthesiology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand*

Objective: *The timing of minimally invasive approach of choledocholithiasis, using endoscopic retrograde cholangiopancreatography (ERCP) and laparoscopic cholecystectomy (LC), is challenging. The aim of the present retrospective study was to assess the feasibility and safety of endoscopic stone removal for choledocholithiasis followed by same-day LC.*
Material and Method: *Between October 2005 and February 2007, 27 patients diagnosed with choledocholithiasis were treated with this approach. Of these patients, nine (33%) had either pancreatitis or cholangitis. The mean age of the patients was 56 years (range, 29-78). ERCP was performed in the endoscopic unit, whereas LC was performed in the theater. Success rate and clinical outcome were analyzed.*
Results: *Ninety-three percent clinical success was achieved. Two patients required conversion to opened cholecystectomy because of uncertain anatomy. There was no 30-day postoperative mortality. Two patients (7%) had postoperative complications (post-ERCP pancreatitis and superficial surgical site infection). The mean interval between the two procedures was 122 minutes (28-325). The mean operative time of ERCP was 25 minutes (15-30) and of LC was 83 minutes (30-140). The mean length of hospital stay was four days (range, 3-6).*
Conclusion: *The management of choledocholithiasis using endoscopic stone removal, followed by same day laparoscopic cholecystectomy, is safe and has good clinical outcomes.*

Keywords: *Choledocholithiasis, ERCP, Laparoscopic cholecystectomy*

J Med Assoc Thai 2009; 92 (1): 8-11
Full text. e-Journal: *http://www.mat.or.th/journal*

The timing of endoscopic retrograde chonlangiopancreaticography (ERCP) for management of patients with diagnosed of choledocholithiasis remains controversial. A number of options exist, including the following: (1) Preoperative ERCP following with elective laparoscopic cholecystectomy (LC), (2) LC and intraoperative cholangiography (IOC) following with postoperative ERCP (two-stage approach) and (3) intraoperative ERCP during LC (one-stage approach).

Correspondence to: Akaraviputh T, Division of General Surgery, Department of Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok 10700, Thailand. Phone: 0-2419-8005, Fax: 0-2412-1370, E-mail: sitak@mahidol.ac.th

Preoperative ERCP identifies persisting common bile duct (CBD) stones but carries risks of complications[1]. Some surgeons request a couple of days for clinical observation of post-ERCP complications before performing LC. This makes the patients require longer hospitalization[2]. Endoscopic stone removal after LC (two-stage approach) had a failure rate of approximately 5%. In those cases, a further procedure to remove CBD stone was necessary[3]. Intraoperative ERCP during LC needed specialized endoscopic instruments and a longer operating time[4]. Therefore, the authors prepared to perform preoperative ERCP with complete stone removal in an endoscopic unit (under Total Intravenous Anesthesia;

TIVA). Following ERCP results, if the patients met three inclusion criteria, 1) complete stone removal, 2) ERCP time less than 30 min. and 3) no immediate post-ERCP complications, they will undergo LC within 6 hours (same day approach) in the operating theater.

The objective of the present study was to assess the safety and clinical outcomes of this approach in these patients.

Material and Method

The authors carried out a retrospective study of patients who underwent same-day ERCP and LC for choledocholithiasis between October 2005 and February 2007 in the Department of Surgery, Faculty of Medicine Siriraj Hospital, Bangkok, Thailand. The present study was approved by the Institutional Ethics Committee.

Twenty-seven patients were included in the present study. There were 14 males. The mean age was 56 years (range 29-78). All patients were in ASA class I-II.

All ERCP were performed by one experienced endoscopist (> 1,000 career ERCPs, with an ongoing workload of > 200 ERCPs each annually: Thawatchai Akaraviputh). The patients were in left lateral position under TIVA. This consisted of a combination of propofol or fentanyl and midazolam. Intravenous buscopan was administrated to minimize duodenal contraction. All patients underwent continuous cardiopulmonary monitoring throughout the procedure by an anesthesiologist.

Exclusion criteria were prior intra-abdominal operation, incomplete stone removal, high risk of cardiovascular complications, ERCP finding of suspected sclerosing cholangitis, and periampullary carcinoma.

LC was performed with four-trocar technique by the same surgical team, which performed over 1,000 LC procedures.

Postoperatively, all patients fasted overnight. Normal oral intake was resumed once the patients demonstrated normal GI functions. All patients were reviewed within 2-3 weeks from discharge, and follow-up was performed at 6-month intervals. An investigation, including MRCP and ERCP, was performed in the patients having any symptoms or laboratory results suggestive of recurrent choledocholithiasis.

Data were prospectively recorded, including patients' demographic, endoscopic and operative details, success rate, postoperative complication (ERCP & LC), overall operative time, and length of hospital stay. Data were compiled using an SPSS computer program (version 10.0 for Windows). All values were expressed as mean and range.

Results

Twenty-seven patients diagnosed with choledocholithiasis were treated with this approach. Provisional diagnosis of choledocholithiasis was based on symptoms and signs, together with diagnostic imaging study criteria (Ultrasonography or CT scan) and an abnormal liver function test. Of these patients, nine (33%) had either acute GS pancreatitis or ascending cholangitis.

Ninety-three percent clinical success was achieved. Two patients required conversion to opened cholecystectomy because of uncertain anatomy. There was no 30-day postoperative mortality. Two patients (7%) had postoperative complications (mild post-ERCP pancreatitis and superficial surgical site infection). The mean interval between the two procedures was 122 minutes (28-325). The mean operative time of ERCP was 25 minutes (15-30) and of LC was 83 minutes (30-140). The mean length of hospital stay was four days (range, 3-6) (Table1).

Discussion

In the laparoscopic era, approaches to the management of choledocholithiasis range from laparoscopic treatment alone[5,6], with transcystic common

Table 1. The results of same day approach for patients diagnosed with choledocholithiasis (n = 27)

Variales	No. (%)	Range
Age (yr)		56 (29-78)
Gender (M/F)	14/13	
ASA class		
I	11 (40.7)	
II	16 (59.3)	
Imaging study		
US	25 (92.6)	
mal-alignment column		
MRCP	1 (3.7)	
ERCP finding		
Passing stones	16 (59.3)	
CBD stone: 1	6 (22.2)	
= 2	3 (11.1)	
> 2	2 (7.4)	
operative time (min)		
ERCP		25 (15-30)
Laparoscopic cholecystectomy		83 (30-140)
Interval between two procedures		122 (28-325)

bile duct exploration or laparoscopic choledochotomy[6] to pre- or postoperative, combined ERCP/Laparoscopic management[7]. The use of these new treatment options depends more on the technical skills and experience of the endoscopic or surgical teams than on a clearly established and accepted consensus[8].

Preoperative ERCP can be effectively used to confirm the presence of stones and treat patients with unequivocal signs of CBD stone. However, preoperative ERCP during admission for LC still requires two separate procedures, which could add additional cost and hospital stay. The present study introduced a new approach, same-day approach, possibly leading to a shorter hospital stay and a smaller number of overall complications.

The major preoperative ERCP complication is post-ERCP pancreatitis, although it is generally of a mild grade. This is related to inadvertent cannulation of the pancreatic duct, and only rarely associated with cannulation of the papilla. More difficult procedures, where there are difficulties in gaining access to the bile duct, are clearly related to the development of complications[9]. Up to now, there is no definitive management to prevent post-ERCP pancreatitis. From the present study, these inclusion criteria may enable the selection of patients who are free from post-ERCP pancreatitis.

In the present study, the authors selected the patients who had ERCP-time less than 30 minutes. This might induce less traumatized ampulla and pancreatic orifices, which lead to the low rate of post-ERCP complications that occurred in the present study.

The causes for failure of LC in two patients (7.7%) were bleeding from cystic artery and doubtful anatomy. The high failure rate in other reports was mainly due to severe adhesion and not from hyperinflated bowels.

The same day approach has several advantages:

1. Selecting patients for LC only eliminates unnecessary IOC.

2. It reduces patient discomfort and total cost by avoiding separate procedures with separate hospital admissions.

3. If ERCP failed to remove the stone, the surgeon can schedule this patient for repeated ERCP or an elective operation to clear CBD.

Contrary to the authors' approach, postoperative ERCP and stone extraction after LC required an additional procedure with its associated morbidity and mortality. Furthermore, the failure rate for postoperative ERCP ranges from 7% to 14%[10,11]. These failures necessitate another procedure for stone extraction and represent more unnecessary risk and cost to the patient. Meanwhile, intraoperative ERCP (one-stage approach) had the disadvantages of prolonged of operation time and the logistic problems of organizing the procedure.

A larger prospective randomized controlled trial is needed before a definite conclusion can be drawn about using this as a standard approach for patients' suspected choledocholithiasis.

Conclusion

The management of choledocholithiasis using endoscopic stone removal, followed by same day LC, is safe and has good clinical outcomes in selected patients.

References

1. Allen NL, Leeth RR, Finan KR, Tishler DS, Vickers SM, Wilcox CM, et al. Outcomes of cholecystectomy after endoscopic sphincterotomy for choledocholithiasis. J Gastrointest Surg 2006; 10: 292-6.
2. Rabago LR, Vicente C, Soler F, Delgado M, Moral I, Guerra I, et al. Two-stage treatment with preoperative endoscopic retrograde cholangiopancreatography (ERCP) compared with single-stage treatment with intraoperative ERCP for patients with symptomatic cholelithiasis with possible choledocholithiasis. Endoscopy 2006; 38: 779-86.
3. Chang L, Lo S, Stabile BE, Lewis RJ, Toosie K, de Virgilio C. Preoperative versus postoperative endoscopic retrograde cholangiopancreatography in mild to moderate gallstone pancreatitis: a prospective randomized trial. Ann Surg 2000; 231: 82-7.
4. Enochsson L, Lindberg B, Swahn F, Arnelo U. Intraoperative endoscopic retrograde cholangiopancreatography (ERCP) to remove common bile duct stones during routine laparoscopic cholecystectomy does not prolong hospitalization: a 2-year experience. Surg Endosc 2004; 18: 367-71.
5. Lezoche E, Paganini AM, Carlei F, Feliciotti F, Lomanto D, Guerrieri M. Laparoscopic treatment of gallbladder and common bile duct stones: a prospective study. World J Surg 1996; 20: 535-41.
6. Lilly MC, Arregui ME. A balanced approach to choledocholithiasis. Surg Endosc 2001; 15: 467-72.
7. Neuhaus H, Feussner H, Ungeheuer A, Hoffmann

W, Siewert JR, Classen M. Prospective evaluation of the use of endoscopic retrograde cholangiography prior to laparoscopic cholecystectomy. Endoscopy 1992; 24: 745-9.
8. Kozarek RA. Laparoscopic cholecystectomy: who does what, when and to whom? Endoscopy 1992; 24: 785-7.
9. Freeman ML, Nelson DB, Sherman S, Haber GB, Herman ME, Dorsher PJ, et al. Complications of endoscopic biliary sphincterotomy. N Engl J Med 1996; 335: 909-18.
10. Kent AL, Cox MR, Wilson TG, Padbury RT, Toouli J. Endoscopic retrograde cholangiopancreatography following laparoscopic cholecystectomy. Aust N Z J Surg 1994; 64: 407-12.
11. Wilson TG, Hall JC, Watts JM. Is operative cholangiography always necessary? Br J Surg 1986; 73: 637-40.

แนวทางรักษาผู้ป่วยนิ่วในท่อทางเดินน้ำดีโดยการส่องกล้องคีบนิ่วร่วมกับการผ่าตัดถุงน้ำดีด้วยกล้องภายในวันเดียวกัน ประสบการณ์ในผู้ป่วย 27 ราย

ธวัชชัย อัครวิพุธ, ฐิติพงษ์ รัตนพรรณ์, วรุตม์ โล่ห์สิริวัฒน์, สมเกียรติ อรุณพฤกษากุล, อัษฎา เมธเศรษฐ, ดรินทร์ โล่ห์สิริวัฒน์

วัตถุประสงค์*: แนวทางการรักษาผู้ป่วยนิ่วในท่อทางเดินน้ำดีด้วยการส่องกล้องทางเดินน้ำดี (ERCP) ร่วมกับการผ่าตัด ถุงน้ำดีด้วยการส่องกล้อง (LC) มีหลายแนวทาง จุดประสงค์ของการศึกษานี้เพื่อประเมินความเป็นไปได้และความปลอดภัยของแนวทางการให้การรักษาด้วยการส่องกล้องทางเดินน้ำดี ต่อด้วยการผ่าตัดถุงน้ำดีด้วยการส่องกล้องภายในวันเดียวกัน (same-day approach)*

วัสดุและวิธีการ*: ผลการรักษาผู้ป่วยนิ่วในทางเดินน้ำดีด้วยแนวทางนี้ (same-day approach) ระหว่างเดือนตุลาคม พ.ศ. 2548 ถึงเดือนกุมภาพันธ์ พ.ศ. 2550 ทั้งหมดจำนวน 27 ราย พบว่า มีผู้ป่วยจำนวน 9 ราย ที่พบมาด้วยภาวะตับอ่อนอักเสบ หรือ ติดเชื้อทางเดินน้ำดีคิดเป็นร้อยละ 33 อายุเฉลี่ยของผู้ป่วยคือ 48 ปี (พิสัย 16 ถึง 74 ปี) การส่องกล้องทางเดิน น้ำดีทำในห้องส่องกล้อง หลังจากนั้นผู้ป่วยจะได้รับการทำผ่าตัดนิ่วในถุงน้ำดีภายในวันเดียวกัน โดยที่จะวิเคราะห์ถึงอัตราความสำเร็จและผลที่ได้*

ผลการศึกษา*: พบว่าประสบความสำเร็จในการให้การรักษาถึงร้อยละ 93 มีผู้ป่วยจำนวน 2 รายที่ต้องทำผ่าตัดแบบเปิดหน้าท้องเนื่องมาจากความผิดปกติทางกายวิภาคของทางเดินน้ำดี ไม่มีผู้เสียชีวิตภายหลังการผ่าตัด มีผู้ป่วย 2 ราย (ร้อยละ 7) ที่เกิดผลแทรกซ้อนข้างเคียงขึ้นได้แก่ ตับอ่อนอักเสบจากการส่องกล้องทางเดินน้ำดี และบาดแผลผ่าตัดติดเชื้อ ระยะเวลาเฉลี่ยระหว่างการส่องกล้องทางเดินน้ำดีและการผ่าตัดคือ 2 ชั่วโมง ระยะเวลาเฉลี่ยรวมของทั้งสองหัตถการคือ 108 นาที (พิสัย 60 ถึง 225 นาที) ระยะเวลาเฉลี่ยที่ผู้ป่วยต้องอยู่โรงพยาบาลคือ 4 วัน (พิสัย 3 ถึง 6 วัน)*

สรุป*: การรักษาผู้ป่วยนิ่วในท่อทางเดินน้ำดีด้วยการส่องกล้องทางเดินน้ำดี (ERCP) ร่วมกับการผ่าตัดถุงน้ำดีด้วยการส่องกล้อง (LC) ในวันเดียวกัน(same-day approach) นั้นปลอดภัยและได้ผลดีในผู้ป่วยที่มีข้อบ่งชี้ที่เหมาะสม*