ORIGINAL ARTICLE

OUTCOME OF LAPAROSCOPIC CHOLECYSTECTOMY FOLLOWING ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY-DOES TIME INTERVAL MATTER?

Samir A. Abd Elmeguid,[1] Hosam F. Abd Elhameed,[1] Asem Elsani M. Ali,[1] Magdy Khalil,[1] Hamdy S. Mohammed[2]

[1]Department of Surgery, Sohag University Hospital, [2]Department of Internal Medicine, Sohag University Hospital, Egypt

Correspondence to: Samir A. Abd Elmeguid Email: samersamar2000@yahoo.com

Abstract

Introduction: The ideal management of common bile duct (CBD) stones is preoperative endoscopic retrograde cholangiopancreatography (ERCP) and extraction of stones followed by laparoscopic cholecystectomy (LC) which should be safe and cost effective. The time interval between ERCP and LC is a matter of debate.

Aim: To evaluate the effect of time interval between ERCP and LC in patients with calcular obstructive jaundice as regard the operative time, conversion rate, hospital stay and post-operative morbidity and mortality.

Methods: This prospective randomized study was conducted at Surgery department, Sohag University Hospital from January 2010 to March 2012. It included 115 patients with calcular obstructive jaundice who were subjected to ERCP. Elective LC was performed within 48 hours (early group=60 patients) and after 4 weeks (delayed group=55 patients) following ERCP.

Results: Twenty (17.39%) patients needed conversion to open cholecystectomy; 5 (8.3%) in the early group and 15 (27.2%) in the delayed group. The mean operative time and the mean length of hospital stay were significantly shorter in the early group (45.5±10.6 Vs 75.4±16.8 minutes and 2.5±1.8 Vs 5.4±3.2 days respectively). More postoperative complications were found in the delayed group. No mortalities in both groups.

Conclusion: Early LC after ERCP had better outcome than delayed one.

Keywords: Early LC, calcular obstructive jaundice, gall stones.

INTRODUCTION

Ten to fifteen percent of all patients with gallstones have coexisting CBD stones. However CBD stones can also be formed in the absence of gallbladder stones.(1) ERCP is one of the modalities used in management of biliary tree stones.(2) Many studies revealed that this procedure is safe particularly prior to LC while other studies pointed out that ERCP followed by immediate LC could decrease the risk of cholangitis and recurrent pancreatitis.(3-5)

Endoscopic sphincterotomy (ES) has been widely accepted as the standard procedure for the treatment for CBD stones.[6,7] Several randomized studies have reported much higher incidence of biliary complications reaching 28% in those patients who were not undergoing cholecystectomy after ES.[8,9] The time interval between ERCP and LC is a matter of debate. Some retrospective[10-12] and other prospective[13] studies have investigated this issue without sharp clue or definite conclusion. The aim of this study was to evaluate the effect of time interval between ERCP and LC in patients with calcular obstructive jaundice as regard the operative time, conversion rate, hospital stay and post-operative morbidity and mortality.

MATERIAL AND METHODS

This prospective randomized study was carried out in the period from January 2010 to March 2012 at department of general surgery, Sohag university hospital, Egypt. It included 115 patients with cholelithiasis and a possibility of choledocholithiasis who underwent sequential LC after ERCP. Choledocholithiasis was suspected in patients who had one or more of the following criteria: history of obstructive jaundice, elevated serum bilirubin, serum gamma glutamyl transpeptidase (GGT) and alkaline phosphatase (ALP), dilated CBD (≥8mm) by ultrasonography (US) and CBD stone diagnosed by US and/or magnetic resonance cholangiopancreatography (MRCP). Our exclusion criteria were patients with evidence of inflammation (cholangitis, pancreatitis, and cholecystitis), known allergy to contrast media, possible intra-abdominal adhesions or failed ERCP. The study design was approved by the research ethical committee of our institution and a written informed consent was obtained from all patients.

All patients were subjected to complete evaluation through detailed history, complete physical examination, laboratory investigations (CBC, LFTs and KFTs) and imaging study (US and/or MRCP). Randomization was done using computer-generated random number sequences in concealed envelopes with block randomization design.

ERCP was performed to all patients under general anesthesia. If CBD stones were found on endoscopic cholangiography, ES was performed and the stones were extracted using either Dormia basket or balloon catheter (Figs. 1a,b). Mechanical lithotripsy was done in cases of large stones. Occlusion cholangiography was done at the end of every ERCP to ensure that no missed stones.

After ERCP patients were classified into two groups, early group in whom LC was done within 48 hours and late group in whom LC was done after 4 weeks. LC was done in both groups by the same surgical team using the standard 4 port technique (Fig. 2). The operative time was calculated from the start of the incision until placement of the last suture. The outcome and complications of ERCP and LC, the rate of conversion to an open procedure, operative time, hospital stay and mortality were recorded. Hospital stay included all periods of admission for ERCP, LC and recurrent biliary symptoms. All patients were followed up at 3 and 6 months and were instructed to notify the surgeon if there were any biliary symptoms.

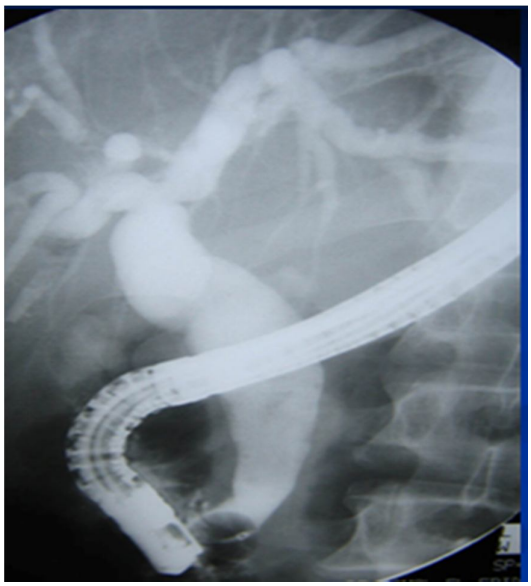

Fig 1a. ERCP showing Dilated CBD with a stone at its distal end.

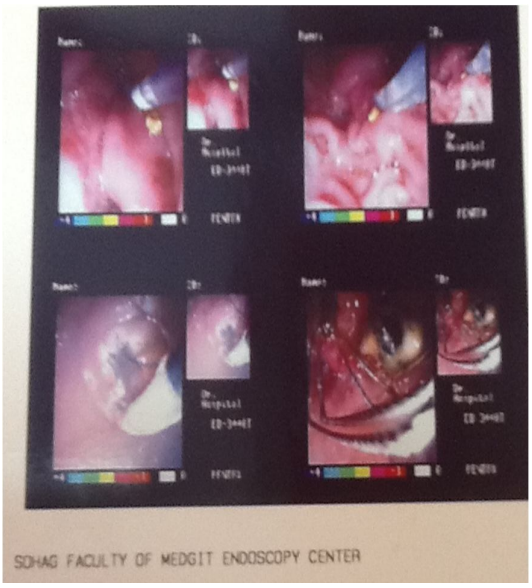

Fig 1b. Wide ES & stone extraction using Dormia basket.

Fig 2a. Skeletonized dilated cystic duct during LC.

Gathered data were processed using SPSS version 15 (SPSS Inc., Chicago, IL, USA). Quantitative data were expressed as mean±SD while qualitative data were expressed as numbers and percentages (%). Student t test was used to test significance of difference for quantitative variables while Chi square was used to test significance of difference for qualitative variables. A probability values (p–value) ≤0.05 was considered statistically significant.

RESULTS

During the period of the study, 115 patients with calcular obstructive jaundice underwent successful ERCP (74 females and 41 males) with a mean age of 46±12.8 (range 25-65) years. Patients were classified into two groups (early and delayed). Both groups were matched to each other as regard age, sex, laboratory and US characteristics. The demographic and clinical data are summarized in Table 1.

After ES, stone extraction was done by the use of Dorrmia basket and/or ballon catheter. Mechanical lithotripsy was done in 15 patients. No complications due to ERCP were recorded in both groups apart from 7 (6.08%) cases of mild acute pancreatitis; 4 in the early group and 3 in the delayed group who were treated conservatively and prepared for LC in their scheduled time.

LC was planned and performed within 48 hours in 60 patients (early group) and after 4 weeks in 55 (delayed group). During the waiting period, 15 (27.2%) patients in the delayed group developed recurrent biliary symptoms in the form of biliary colic (7 patients), acute cholecysitis (3 patients) and cholangitis (5 patients); those patients required readmission and managed conservatively.

Outcome data: The mean duration of surgery was significantly longer (75.4±16.8 (range 40-90) versus 45.5±10.6 (range 30-75) minutes) in the delayed group than in the early group. The conversion rate was also significantly more incident in delayed group (21.8% versus 6.6%). The main reasons for conversion were dense adhesions, unclear anatomy and bleeding. In spite of less postoperative complications in the early group, yet the complications in both groups were minor, insignificant and responded well to conservative management. The mean length of hospital stay in the early group was significantly shorter (2.5±1.8 (range 2-5) versus 5.4±3.2 (range 3-8) days). There were no deaths in both groups. The outcome of patients was shown in Table 2.

Table 1. Patients' characteristics.

Variable	Early group	Delayed group	p-value
Number of cases	60	55	
Age (years) mean ± SD	47.3±11.1	48.2±14.1	0.89 (NS)
Sex (Female/Male)	39/21	35/20	NS
Proportion of abnormal LFTs (%)	52/60	51/55	0.06 (NS)
US findings			
Dilated CBD diameter (> 8mm)	49/60	42/55	0.7 (NS)
CBD stone (s)	44/60	37/55	0.9 (NS)
Recurrent biliary symptoms	0/60	15/55	0.001

NS = not significant.
P-value ≤0.05 = significant.

Table 2. Outcome of patients.

Variable	Early group	Delayed group	p-value
Operative time (min) mean ± SD	45.5 ± 10.6	75.4 ± 16.8	0.001
Conversion rate	4/60 (606%)	12/55 (21.8%)	0.02
Length of hospital stay (days) mean ± SD	2.5 ± 1.8	5.4 ± 3.2	0.001
Post-operative complications:			
Bleeding	0	1/55	NS
Bile leak	1/60	2/55	NS
Wound infection	2/60	3/55	NS

NS = not significant.
(P-value ≤ 0.05) = significant.

DISCUSSION

The advent of LC has reopened the debate on the optimal management of patients with CBD stones or suspected CBD stones undergoing cholecystectomy. The major reason for this is to extend the benefits of minimally invasive surgery to this group of patients. An accepted treatment strategy for gallstones with secondary CBD stones is LC following ERCP. Although, early LC is advised there is no consensus about the time interval between LC and ERCP.[14] Possibly, the timing of LC after ES may have an influence on the difficulty of surgery. Many surgeons believe that surgery is safer several weeks after ES.[15] The literature has little data for determining the optimal timing of LC after ES.

In this study we evaluated two different approaches (ERCP followed by LC within 48 hours versus ERCP followed by LC after 4 weeks). The base line differences in our work (age, sex, abnormal liver function tests and US findings) were not statistically significant. Our results showed that patients who underwent early LC after ERCP have significantly lower conversion rate to open cholecystectomy when compared to patients who underwent delayed LC (6.6% Vs 21.8%). This was in agreement with Salman et al[14] who conducted randomized trial to compare patients who were operated between 24 and 72 hours after ERCP and those who were operated more than 72 hours after ERCP. Also, El Labban et al[16] found that patients who underwent LC within72 hours after ERCP have significantly lower conversion rate to open cholecystectomy compared to those patients who underwent LC after 6 weeks. Vries et al[12] stated that a significantly higher conversion rate was encountered when LC was performed 2-6 weeks after ES, as compared with 1 week after ES. There were studies that showed few technical problems or complications resulting from the presence of inflamed bowels when LC was performed immediately after ERCP.[17] The main causes for conversion in our study were dense adhesions, unclear anatomy and bleeding.

In our series the operative time and hospital stay were longer in the delayed group compared to the early group (75.4±16.8 versus 45.5±10.6 minutes and 5.4±3.2 versus 2.5±1.8 days respectively) which were statistically significant and this came in accordance with the results of Hassanen[18] and El Labban et al.[16] The reasons of longer operative time were scarring and fibrosis of the biliary tree and Calot`s triangle while the longer hospital stay was explained by the higher percentage of conversion rate, the more encountered postoperative complications and more readmission for recurrent biliary symptoms.

Early LC after ES may prevent recurrent biliary complications which occurred during the waiting period and associated with increased postoperative morbidity and prolonged hospital stay.[19] However several authors did not justify the routine use of LC after endoscopic clearance of CBD (20,21) and preferred to reserve it only for patients experiencing untreatable, recurrent biliary symptoms or acute cholecystitis. The concept for this is that ES alone, besides treating choledocholithiasis, may prevent (or decrease) biliary complaints in a good number of cases.[22,23]

In our present study the incidence of recurrent biliary symptoms were significantly higher in the delayed group (27.2%) compared to the early group (0%). As regard the postoperative complications, they were minor and treated conservatively with no statistical significance between the two groups. There were no mortalities.

In conclusion this study clearly revealed that performing early LC (within 48 hours) after ERCP had better outcome than delayed one (more than 4 weeks after ERCP). It had lower conversion rate, less operative time, shorter hospital stay and decreased postoperative complications.

Implementation: The results of this study have encouraged us to consider early LC after ERCP as an adopted policy in the management of calcular obstructive jaundice in our department.

REFERENCES

1. Tazuma S. Epidemiology, pathogenesis, and classification of biliary stones (common bile duct and intrahepatic). Best Pract Res Clin Gastroenterol. 2006;20:1075-83.
2. Perissat J, Huibregtse K, Keane FBV, Russel RCG, Neoptolemos JP. Management of bile duct stone in the era of Laparoscopic cholecystectomy. Br J Surg. 1994;81:799-1810.
3. Al-Hadi FH, Chiedozi LC, Salem MM, Geogre TV, Desouky M, Pasha SM. Comparison of laparoscopic and open cholecystectomy at prince Abdul Rahman Al Sudairy Hospital, Saudi Arabia. East Afr Med J. 1998;75:536-9.
4. Meshikhes AW, Al Dhurais SA, Bhatia D, Al Khatir N. Laparpscopic cholecystectomy; The Dammam Centeral Hospital Experience .Int Surg. 1995;80:102-4.
5. Solana de Lopez, Aguilera E, Vingeras Barroso J, Suarez E, Garcia A, Perez J. Endoscopic Retrograde cholangio-pancreatography prior to Laparoscopic cholecystectomy in patients with suspected choledocholithiasis. Rev gastroenterol Mex. 1998;53:77-81.
6. Helmy H, Abbas M, Youssef Y, Rizk H, Elkhyat H, Elserafry M, et al. The timing of choledocholithotomy and the type of biliary drainage after failed Endoscopic Retrograde Cholangiopancreatography in calcular obstructive Jaundice. Egy J Surg. 2002;4:1088-69.
7. Costi R, DiMauro D, Mazzeo A, Boselli AS, Contini S, Violi V, et al. Routine laparoscopic cholecystectomy after endoscopic sphincterotomy for choledocholithiasis in octogenarians: is it worth the risk? Surg Endosc. 2007;21:41-7.
8. Carr-Locke DL. Cholelithiasis plus choledocholithiasis: ERCP first, what next? Gastroenterol. 2006;130:270-2.
9. Targarona EM, Ayuso RM, Bordas JM, Ros E, Pros I, Martinez J, Terés J, et al. Randomized trial of endoscopic sphincterotomy with gallbladder left in situ versus open surgery for common bile duct calculi in high-risk patients. Lancet. 1996;347:926–9.
10. Schiphorst AH, Besselink MG, Boerma D, Timmer R, Wiezer MJ, van Erpecum KJ, et al. Timing of cholecystectomy after endoscopic sphincterotomy for common bile duct stones. Surg Endosc. 2008;22:2046-50.
11. 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.
12. De Vries A, Donkervoort SC, van Geloven AA, Pierik EG. Conversion rate of laparoscopic cholecystectomy after endoscopic retrograde cholangiography in the treatment of choledocholithiasis: does the time interval matter? Surg Endosc. 2005;19:996–1001.
13. Bostanci EB, Ercan M, Ozer I, Teke Z, Parlak E, Akoglu M. Timing of elective laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreaticography with sphincterotomy: a prospective observational study of 308 patients. Langenbecks Arch Surg. 2010;395:661-6.
14. Salman B, Yilmaz U, Kerem M, Bedirli A, Sare M, Sakrak O, et al. The timing of laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreaticography in cholelithiasis coexisting with choledocholithiasis. J Hepatobiliary Pancreat Surg. 2009;16:832-6.
15. Roberto B, Jean J, Laurence B, Heldi K, Ronald M, Jean B, et al. Selective endoscopic retrograde cholangiography prior to laparoscopic cholecystectomy for gall stones. Am J Surg. 1999;178:46-9.
16. El Labban Gouda, Emad Hokkam, Mohamed Adel, Nader El-Nemr, Mohamed Abdu. The effect of time interval between endoscopic retrograde cholangiopancreatography and laparoscopic cholecystectomy. Egy J Surg. 2011;30:28-33.
17. Basso N, Pizzuto G, Surgo D, Materia A, Silecchia G, Fantini A, Fiocca F, Trentino P. Laparoscopic cholecystectomy and intraoperative endoscopic sphincterotomy in treatment of cholecysto-choledocholithiasis. Gastrointest Endosc. 1999;50:532-5.
18. Hassanen A. Timing of laparoscopic cholecystectomy after endoscopic retrograde cholangiopancreatography. Egy J Surg. 2009;28:26-30.
19. Anandi H, Marc G, Djamila B, Robin T, Marinus J, Karel J, et al. Timing of cholecystectomy after endoscopic sphincterotomy for common bile duct stones. Surg Endosc. 2008;22:2046-50.
20. Schreurs W, Vles W, Stuifbergen W, Ostvogel H. Endoscopic management of common bile duct stones leaving the gallbladder in situ: a cohort study with long-term follow-up. Dig Surg. 2004;21:60–4.
21. Sugiyama M, Suzuki Y, Abe N, Masaki T, Mori T, Atomi Y. Endoscopic re-treatment of recurrent choledocholithiasis after sphincterotomy. Gut. 2004;53:1856–9.
22. Pereira-Lima J, Jakobs R, Winter U, Benz C, Martin W, Adamek H, et al. Long-term results (7 to 10 years) of endoscopic papillotomy for choledocholithiasis: multivariate analysis of prognostic factors for the recurrence of biliary symptoms. Gastrointest Endosc. 1998;48:457–64.
23. James Y, Chon K, Terence M, Bing S, Lymee Y, Paul B, et al. Cholecystectomy or gallbladder in situ after endoscopic sphincterotomy and bile duct stone removal in Chinese patients. Gastroenterol. 2006;130:96–103.