

Gallstones and common bile duct stones: single or separated-step endoscopic retrograde cholangiopancreatography and laparoscopic cholecystectomy?

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Abstract:

Purpose: the treatment of concomitant gallstones and common bile duct (CBD) stones by endoscopic retrograde cholangiopancreatography (ERCP) following laparoscopic cholecystectomy (LC). The analysis of single-step or separated-step characteristics.

Object: during the three years (2015-2017), 68 patients having CBD stones concomitant gallstones suitable criteria for inclusion at Hue Central Hospital.

Retrospective clinical description study. Results: the average age is 52.2±12.5 years (24-90) and the male/female ratio is 0.7/1 (27/41). Abdominal pain was the most common symptom 91.2%, which was followed by jaundice 51.5%; direct bilirubin increased by 27.3±15.6 µmol/l (2.2-165). The size of CBD stones is 12.4±3.2 mm (6-20), the size of gallstones is 11.3±6.2 mm (5-36). The first time CBD stones 95.6%, recurrent CBD stones 4.4%. Single-step ERCP and LC 34 patients, separated-step group: ERCP 1.4±2.5 times and secondary LC. Single-step ductal clearance 76.5%, separated-step ductal clearance 94.1% (p=0.041). Length of hospital stay 6.5±4.3 days and 13.6±2.2 days (p<0.0001). **Conclusions:** the rate of ductal clearance in the separated-step group was significantly higher than the single-step group with p=0.041. The indication of laparoscopic cholecystectomy immediately ERCP should be based on the patient's morbidity, the ductal clearance as well as the prognostic complications of ERCP.

Keywords: gallstones, common bile duct stones, endoscopic retrograde cholangiopancreatography.

Classification number: 3.2

Introduction

Biliary stone is a common disease in gastrointestinal surgery and often causes serious complications. Diagnosis is usually not difficult, but the treatment of clearance and prevention of recurrence, especially with intrahepatic stones, is often difficult [1, 2].

According to the studies of many authors, at the time of diagnosis, gallstones are about 10-18% concomitant CBD stones.

With gallstones, LC has become the gold standard and the first choice. However, for concomitant gallstones and CBD stones, laparoscopy alone is not enough, and thus, we need other methods such as open choledochotomy and particular ERCP with or without Oddi sphincterotomy [3, 4].

With the development of science-technology and the cooperation between gastrointestinal surgeons and interventional endoscopists, ERCP has been widely applied. By cleaning the CBD stones through ERCP, patients avoid a long incision from open surgery, avoid Kehr drainage with its complications, as well as decreasing length of hospital stay, the cost of treatment and early working.

Based on the treatment of concomitant gallstones and CBD stones in Hue Central Hospital, we conducted this study to evaluate the results of applying ERCP technique and the effects of single-step LC at the same time anaesthesia or separated-step LC.

Materials and methods

Materials: during the three years (2015-2017), 285 patients having CBD stones concomitant or not gallstones underwent ERCP. This included 68 patients who underwent ERCP following laparoscopic cholecystectomy (34 patients

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single-step LC, 34 patients separated-step LC) and were suitable for this research.

Methods:

- Retrospective clinical description study at Hue Central Hospital.

- The duration was three years (from January 2015 to December 2017).

- Inclusion: patients with concomitant gallstones and CBD stones (Fig. 1).

+ Symptomatic gallstones or size ≥ 1 cm.

+ The first time CBD stones or recurrence size ≤ 2 cm suitable for ERCP [3].

- Exclusion: patients underwent ERCP and LC but:

+ Had concomitant intrahepatic stones.

+ Post-op diagnosis was malignancy of biliary tract, ampullary or periampullary cancer.

+ Presence of old scar in the middle: choledochotomy, gastrectomy.

Technique (Fig. 2):

- Patients diagnosed with concomitant gallstones and CBD stones are characterised by clinical, biochemical, haematologist and abdominal ultrasonography. Patients could not excluded CBD stones as dilatation of CBD, increasing of direct bilirubinaemia and alkaline phosphatemia, thus, magnetic resonance imaging (MRI) was required for confirmation and a different diagnosis.

- Endoscopic retrograde cholangiopancreatography (ERCP) [5]:

+ General anaesthesia is used for all patients; the cannula is inserted gently through the mouth into the esophagus, stomach and the duodenum and the ampullar Vater, where the bile duct and pancreatic duct fall into the duodenum.

+ Evaluation of the combined lesions of the esophagus and stomach during the endoscopic examination was possible.

+ The catheter was inserted into the bile in the direction of 11 hours, injecting the contrast to assess the position of CBD obstruction and other lesions such as CBD stones and CBD stenosis.

+ Oddi sphincterotomy: guidewire guided, cutting and haemostatic control of the sphincterotomy was made in the direction from 11 to 1 o'clock.

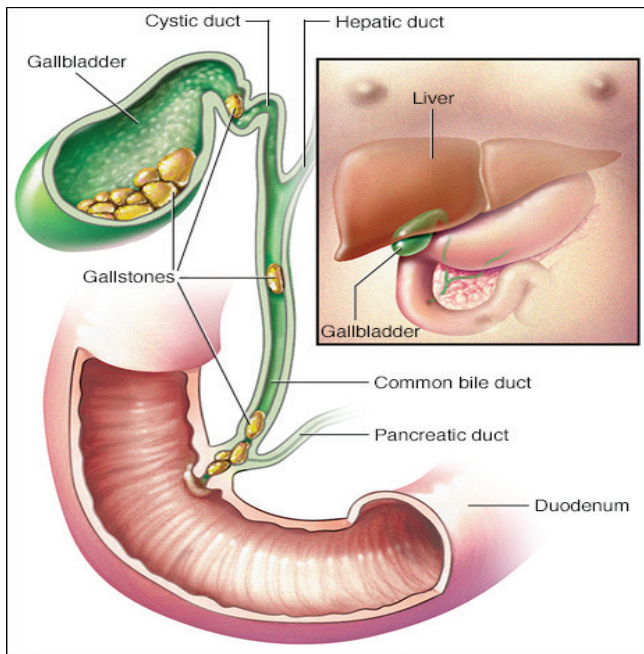


Fig. 1. Concomitant gallstones and common bile duct stones.

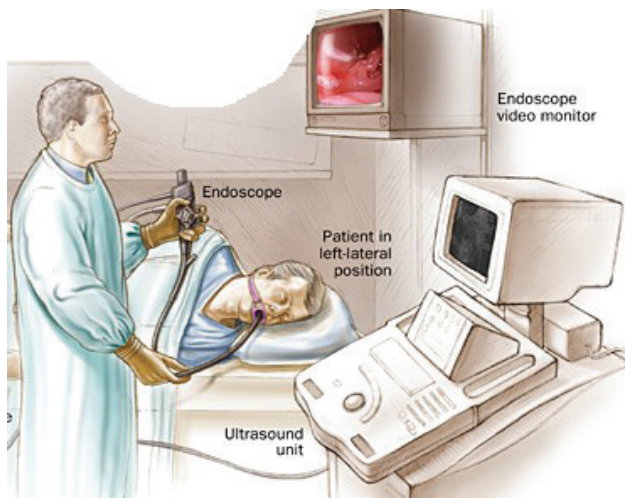
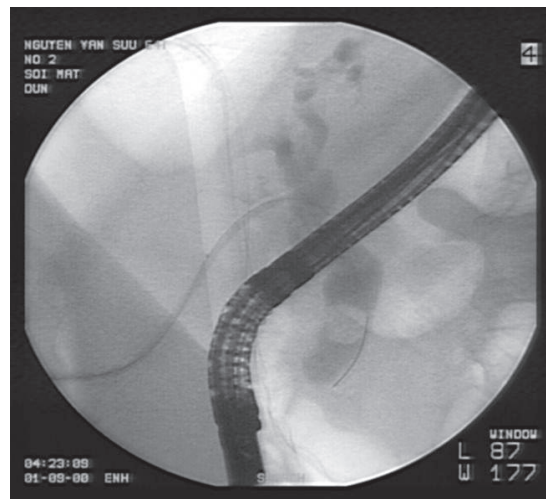


Fig. 2. Endoscopic retrograde cholangiopancreatography.



+ Enlarging the papillary opening, extraction stones by the balloon catheter or the basket and placing the stent. The process takes 2-3 times if the stones are large and many in number [5].

- Laparoscopic cholecystectomy:

+ For Single-step (at the same time anaesthesia): after the ERCP, the patient was changed to a Trendelenburg posture, the trocas was inserted to perform the laparoscopic cholecystectomy.

For Separated-step (2 times anaesthesia): after the ERCP and sphincterotomy for remove stones, the patient was returned to the GI Department and the ductal clearance was evaluated by abdominal ultrasonography, bilirubin blood (in the next day). The complications of ERCP were evaluated through blood tests, amylasemia and lipasemia for stable treatment. If remnant stones still existed after the first ERCP, the second or the third ERCP was performed for ductal clearance and separated-step LC.

+ After three times, if ERCP is not ductal clean, it has fail. Patients will be changed to other treatments.

- The length of the hospital stay (LOH) is from the first ERCP to the discharge of the patient from the hospital.

Results

General characteristics of patients

	n=68 (%)
Mean age (min 24; max 90)	52.2±12.5
Male/Female (27/41)	0.7/1
Clinical manifestations	
- Abdominal pain	62 (91.2)
- Jaundice	35 (51.5)
- Biliary infection	15 (22.1)
Direct bilirubin (2.2-165 µmol/l)	27.3±15.6
Abdominal ultrasound findings	
- Quantity of CBD stones (1-5 stones)	1.7±2.1
- Size of CBD stones (min 6 mm; max 20 mm)	12.4±3.2
- Size of gallstones (min 5 mm; max 36 mm)	11.3±6.2
CBD stones characteristics	
- Primary stones	65 (95.6)
- Recurrent stones	3 (4.4)
Concomitant morbidity	
- Biliary infection	15 (22.1)
- Acute pancreatitis	7 (10.3)

Surgical procedures

	ERCP+LC (n=34) (Single-step)	ERCP/LC (n=34) (Separated-step)
ERCP+LC (single-step)	34	-
1ERCP/LC (separated-step)	-	25
2 ERCP/LC	-	7
3 ERCP/LC	-	2
Time of ERCP (mean)	1	1.4±2.5

Results

	Single-step n=34 (%)	Separated-step n=34 (%)	p
Ductal clearance	26 (76.5)	32 (94.1)	0.041
Remnant	8 (23.5)	2 (5.9)	0.041
Complications			
- Bleeding (ERCP)	2 (5.9)	2 (5.9)	-
- Bleeding (LC)	0 (0)	1 (2.9)	0.321
- Duodenal perforation	1 (2.9)	0 (0)	0.321
- Acute pancreatitis	5 (14.7)	3 (8.8)	0.453
- Biliary infection	3 (8.8)	2 (5.9)	0.649
- Injury of the biliary tract (LC)	0 (0)	1 (2.9)	0.321
Conversion	1 (2.9)	1 (2.9)	-
Length of hospital stay (day) (Exclusion of conversion)	6.5±4.3 (n=33)	13.6±2.2 (n=33)	<0.0001

Discussion

Based on our experience, 68 patients underwent endoscopic retrograde cholangiopancreatography combined with laparoscopic cholecystectomy for three years for the treatment of concomitant gallstones and CBD stones.

All patients having concomitant gallstones and CBD stones are not suitable for ERCP to clean CBD stones. However, when it is properly indicated that ERCP is required, this technique can be considered as a ‘minimal intervention with maximum efficiency’. For ductal clearance, the advancement of the equipments as well as the experience of the gastrointestinal endoscopist, the patient does not have to undergo a long incision or traditional Kehr drainage and its complications [1].

The mean age in our study was 52.2±12.5 years (min 24, max 90). A.H. Ghazal and M.A. Sorour [6] showed an average of 45.07±11.3 years (27-65), and according to R.

Mallick and K. Rank [7], the mean age in two study groups was 52.1 ± 20.7 years and 49 ± 20.0 years.

Technically, this is a combination of two techniques: endoscopic intervention and laparoscopic surgery. In the early stages of our study, the majority of patients underwent ERCP and LC at the same time anaesthesia. This work is theoretically more beneficial, as patients do not have to suffer the second anaesthesia for LC. However, it is not suitable in reality; the evaluation and monitoring of the complications resulting from ERCP was considerably difficult, easily obscured and hard to distinguish from the complications resulting from LC, such as bleeding, biliary tract injury and other organ damage, during the laparoscopic operation. We observed one case of duodenal perforation following the late single-step ERCP and LC - patients with fever, abdominal fluid and, especially, disadvantages of abdominal X-rays - that could not distinguish free air intraperitoneum from the duodenal perforation or from the pneumo-peritoneal; additionally, this affects early diagnosis.

According to many authors, the safety and feasibility of the technique of ERCP should be based on the criteria for ductal clearance, complications, morbidity and mortality rate that are technically related [4, 8, 9]. The rate of ductal clearance in our study was 85.3% (58/68), which was consistent with the study of J.H. Darrien and K. Connor [9] that showed 84-97% ductal clearance, complications 4-16% and mortality 0-0.8%. Kieu Van Tuan and Tran Huu Vinh [8] reported 97.8-98.2% ductal clearance, no duodenal perforation, mild bleeding or only injection adrenalin of 7.1%. A.H. Ghazal and M.A. Sorour [6] showed 100% ductal clearance and the length of hospital stay as 2.55 ± 0.89 days (2-5). La Van Phuong, et al. [1] showed a mortality rate of 14.3% due to late hospitalisation, hypotension, coagulopathy, renal failure and electrolyte disorder.

R. Mallick and K. Rank [7] evaluated the combination of single-step ERCP and LC (n=80) or separate-step ERCP and LC (n=33). The LOH of the single-step group was significantly lower than the separate-step group (p=0.03); our results were consistent (p<0.0001). However, according to the study by Mallick, et al., the mean cost was not significant (p=0.167): 49,276 \$ for the single-step group versus 42,261 \$ for the separate-step group.

ERCP is an invasive procedure for the diagnosis and treatment of CBD and pancreatic diseases. According to Ho Van Han and Tran Duy Binh, the rate of complications is 9.8% (pancreatitis 6%, bleeding 1.5%, perforation 1.56%, infection 0.78%) and 1 patient of death due to pancreatitis after ERCP [10]. Therefore, the decision to LC immediately after ERCP at the same time of general anaesthesia (single-step) or later (separate-step) depends on the patient's morbidity, the ductal clearance identified intraoperative as well as the complications. If the patient was suspected of

having gastric-duodenal perforation and bleeding during the ERCP procedure, it is absolutely separate-step LC after complications of infection, pancreatitis, bleeding were treated consistently [11].

Conclusions

The rate of ductal clearance in the separate-step group was significantly higher than the single-step group with p=0.041.

The indication of single-step laparoscopic cholecystectomy immediately after ERCP or separate-step surgery should be based on the patient's morbidity, the ductal clearance as well as the prognostic complications of ERCP.

REFERENCES

- [1] La Van Phuong (2012), "Results of early endoscopic retrograde cholangiopancreatography (ERCP) in the treatment of Complicated cholangitis at Can Tho polyclinic Central Hospital", *Medicine of Ho Chi Minh city*, **16(3)**, pp.49-53.
- [2] Nguyen Kim Tue, Pham Nhu Hiep (1999), *Indication and result evaluation of Endoscopic retrograde cholangiopancreatography (ERCP) and sphincterotomy for canal bile duct stones extraction*, Presentation at 10th Vietnam Surgical Conference, pp.127-132.
- [3] R. Kadam, D. Saxena, A.S. Rana, S. Chhabra (2016), "Laparoscopic common bile duct exploration versus ERCP/stenting and cholecystectomy: is a single staged procedure better?", *International Journal of Hepatobiliary and Pancreatic Diseases*, **6**, pp.57-63.
- [4] A. Shojaiefard, M. Esmaeilzadeh, A. Ghafouri, and A. Mehrabi (2009), "Various techniques for the surgical treatment of common bile duct stones: a meta review", *Gastroenterology Research and Practice*, ID 840208, 12pp, doi:10.1155/2009/840208.
- [5] J. Pohl, D.H.S. Klinik (2012), "Choledocholithiasis - sphincterotomy and stone removal with an extraction balloon", *Video Journal and Encyclopedia of GI Endoscopy*, Germany, doi.org/10.1016/S2212-0971(13)70199-7, pp.445-446.
- [6] A.H. Ghazal, M.A. Sorour, M. El-Riwini (2009), "Single-step treatment of gall bladder and bile duct stones: a combined endoscopic-laparoscopic technique", *International Journal of Surgery*, **7**, pp.338-346.
- [7] R. Mallick, K. Rank, C. Ronstrom, S.K. Amateau, M. Arain (2016), "Single-session laparoscopic cholecystectomy and ERCP: a valid option for the management of choledocholithiasis", *Gastrointestinal Endoscopy*, **84(4)**, pp.639-645.
- [8] Kieu Van Tuan, Tran Huu Vinh (2013), "Treatment of stones bile duct infection by Endoscopic retrograde cholangiopancreatography (ERCP)", *Practical of Medicine*, **893**, pp.147-151.
- [9] J.H. Darrien, K. Connor, A. Janeczko, J.J. Casey, and S. Paterson-Brown (2015), "The surgical management of concomitant gallbladder and common bile duct stones", *HPB Surgery*, Edinburgh EH16 4SA, UK, pp.1-6.
- [10] Ho Van Han, Tran Duy Binh, Nguyen Van Hai (2010), "Diagnostic and therapeutic Endoscopic retrograde cholangiopancreatography (ERCP) at Gia Dinh Hospital", *Medicine of Ho Chi Minh city*, **14(4)**, pp.67-73.
- [11] J. Lu, Y. Cheng, X.Z. Xiong, Y.X. Lin, S.J. Wu, N.S. Cheng (2012), "Two-stage vs single-stage management for concomitant gallstones and common bile duct stones", *World J. Gastroenterol.*, **18(24)**, pp.3156-3166.