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Original Research

EARLY OUTCOMES OF LAPAROSCOPIC SURGERY FOR COMMON BILE DUCT STONES IN THE ELDERLY

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ABSTRACT: This study was conducted to describe the clinical and paraclinical characteristics and evaluate early outcomes of laparoscopic surgery for common bile duct (CBD) stones in elderly patients. We performed a retrospective study of 95 patients over 60 years of age diagnosed with CBD stones who underwent laparoscopic surgery at the Hepatobiliary Surgery Department, Thong Nhat Hospital from January 2016 to December 2022. Among the 95 surgical cases, there were 49 male patients (51.58%) and 46 female patients (48.42%), with a mean age of 74.67 years (ranging from 60 to 95 years). Regarding clinical manifestations, abdominal pain was the most common symptom, present in 91.58% of patients, followed by cholangitis in 41.05% (39 cases). Post-surgery, the stone clearance rate reached 94.7%, demonstrating the high effectiveness of the laparoscopic approach. The mean operative time was 136.36 ± 23.26 minutes, and the average hospital stay was 13.4 ± 3.8 days. Postoperative complications were documented, including bile leakage (3.16%), bleeding (1.05%), and infection (2.11%). Notably, no mortality was recorded in this study. The findings indicate that laparoscopic surgery for CBD stones in elderly patients at Thong Nhat Hospital is a safe and feasible procedure, provided that patients are carefully selected preoperatively. This study contributes additional evidence supporting the efficacy and safety of laparoscopic surgery in treating CBD stones in elderly patients, who typically present with more comorbidities and higher risk of complications compared to younger patient groups. The low complication rates and absence of mortality in our series suggest that, with proper patient selection and surgical expertise, advanced age should not be considered a contraindication to laparoscopic CBD stone management.

Keywords: Common bile duct(CBD), elderly, laparoscopic

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1. INTRODUCTION

Biliary stone disease, particularly common bile duct (CBD) stones, is a prevalent condition within the spectrum of hepatobiliary disorders. It is frequently associated with serious complications such as cholangitis, acute pancreatitis, biliary sepsis, and even multiorgan failure. Over the years, a variety of treatment modalities have been employed to manage CBD stones, including oral bile acid dissolution therapy, open or laparoscopic surgery, extracorporeal lithotripsy, and endoscopic retrograde cholangiopancreatography (ERCP).

At Thong Nhat Hospital, laparoscopic surgery for CBD stones has been routinely performed for many years. However, to date, no specific study has focused on the elderly patient population—a group increasingly encountered in clinical practice due to rising life expectancy. Given the higher risk of perioperative complications in this demographic, the safety and efficacy of laparoscopic approaches warrant further investigation.

This study, titled "Early Outcomes of Laparoscopic Surgery for Common Bile Duct Stones in the Elderly," was undertaken with the following objectives:

+ To describe the clinical and paraclinical characteristics of common bile duct stones in elderly patients.

+ To determine the rates of complications, early complications, and stone clearance rates of laparoscopic surgery for treating common bile duct stones in elderly patients at the Hepatobiliary Surgery Department of Thong Nhat Hospital.

2. SUBJECTS AND METHODS

2.1. Study Subjects

Patients from 60 years of age who were diagnosed with CBD stones (ultrasound/ CT scan/MRI/ERCP) and confirmed to have stones recorded in surgical reports and treated with laparoscopic surgery at Thong Nhat Hospital from 01/2016 to 12/2022.

Exclusion criteria:

Incomplete medical records

Patients with CBD stones treated by other methods (open surgery, ERCP,...)

Patients with CBD stones combined with liver stones

2.2. Study Design

Retrospective, descriptive case series study.

3. RESULTS

3.1. General Characteristics

3.1.1. Gender

In the study, there were 49 males accounting for 51.58%, 46 females accounting for 48.42%, with a female/ male ratio of 0.93.

3.1.2. Age

The mean age in the study was 74.67 ± 7.3 years. The youngest was 60 years old, the oldest was 95 years old. Among these, 37 patients were 80 years old and above.

3.1.3. Medical History

Patient history was mainly hypertension (73.68%). Patients with 2 combined diseases such as hypertension and type 2 diabetes mellitus accounted for 41.05%. History of biliary stones (cholecystectomy, previous ERCP, or CBD stent) accounted for 44.21%.

3.2. Clinical and Paraclinical Characteristics

3.2.1. Clinical Manifestations

Table 1. Clinical manifestations (n=95)

Clinical manifestation	No. of patients	Percentage (%)
Abdominal pain	87	91,58
Fever	35	36,84
Jaundice	31	32,63
Cholangitis	39	41,05

Abdominal pain in 87 patients accounted for 91.58%. Fever occurred in 35 patients accounting for 36.84%, jaundice accounted for 32.63%, and cholangitis accounted for 41.05%.

3.2.2. Paraclinical Characteristics

Table 2. Laboratory test results

Test results	No. of patients	Percentage (%)
White blood cells < 10 G/L	60	63.16
White blood cells ≥ 10 G/L	35	36.84
AST ≥ 40 U/L	60	63.16
ALT ≥ 40 U/L	62	65.26
Total bilirubin < 51 mmol/L	64	67.37
Total bilirubin ≥ 51 mmol/L	31	32.63

Laboratory test results showed: Elevated white blood cells (>10 G/L) accounted for 36.84%; elevated AST (>40U/L) accounted for 65.26%; total bilirubin ≥ 51 mmol/L accounted for 32.63%.

3.2.3. Preoperative CT Scan Results

41 cases (43.16%) had gallbladder stones combined with CBD stones.

54 cases (56.84%) had isolated CBD stones.

3.2.4. Degree of Cholangitis

In the study, there were 39 cases (41.05%) of acute cholangitis. Patients were graded for acute cholangitis according to Tokyo Guidelines 2018 [1]. Grade 1 cholangitis accounted for the majority (61.53%). No cases had grade 3 cholangitis.

3.3. Surgical Characteristics

3.3.1. Technical Characteristics

There were 41 cases (43.16%) with cholecystectomy. 100% of cases had Kehr drain placement.

3.3.2. Common Bile Duct Stone Management

Stone extraction using Randall forceps accounted for the majority (82.11%). Successful stone clearance in one operation was considered successful stone removal. Stone clearance assessment was based on intraoperative choledochoscopy or intraoperative cholangiography.

Table 3. Treatment results (n=95)

Stone management	No. of patients	Percentage (%)
Successful stone extraction (stone clearance)	90	94.73
Intraoperative choledochoscopy	76	80.00
Intraoperative cholangiography	19	20.00
Intraoperative hydraulic lithotripsy	10	10.52

Successful stone extraction (stone clearance) occurred in 90 patients, accounting for 94.73%. Intraoperative choledochoscopy accounted for 80%. Intraoperative cholangiography accounted for 20%. Intraoperative hydraulic lithotripsy was performed in 10 patients, accounting for 10.52%.

3.3.3. Operative Time

Table 4. Operative time by age group

Operative time	No. of patients	Mean (minutes)	p
< 80 years	58	137.07 ± 22.45	0.512
≥ 80 years	37	135.27 ± 24.75	

The mean operative time in the study was 136.36 ± 23.26 minutes. The operative time in the under-80 group was longer than the 80-and-above group. The mean operative time in the under-80 group was 137.07 minutes, and in the 80-and-above group was 135.27 minutes. This difference was not statistically significant.

3.4. Early Intraoperative and Postoperative Complications

3.4.1. Intraoperative Complications

During surgery, there was 1 case of bleeding (moderate degree) due to the cystic artery crossing over the CBD. Blood loss was approximately 100ml, and this case was managed with arterial clipping.

This case had cholangitis.

3.4.2. Postoperative Complications

Bile leakage occurred in 3 cases, of which 1 case was due to Kehr tube displacement. Of these 3 cases, only 1 case had cholangitis. There were 2 cases (2.1%) of infection. Both cases had cholangitis.

3.4.3. Hospital Stay

The average hospital stay was 13.4 ± 3.8 days. Hospital stay in the under-80 group was shorter than in the 80-and-above group. This difference was not statistically significant.

4. DISCUSSION

4.1. General Characteristics

4.1.1. Age

The mean age in the study was 74.67 years (60-95 years), with 37 patients (38.95%) over 80 years old. The mean age was comparable to other authors .

4.1.2. Gender

There were 46 female patients and 49 male patients. The female/male ratio was 0.93.

4.2. Clinical and Paraclinical Characteristics

4.2.1. Medical History

Since the patients in the study were elderly, underlying diseases were quite numerous, mainly hypertension and type 2 diabetes mellitus. 70 patients had hypertension, accounting for 73.68%. 39 patients had both hypertension and type 2 diabetes mellitus, accounting for 41.05%. 42 patients had a history of biliary stones (including previous diagnosis of gallbladder stones, previous cholecystectomy, or previous ERCP), accounting for 44.21%.

4.2.2. Clinical Symptoms

The primary clinical manifestations of CBD stones typically include abdominal pain, fever, and jaundice. In our cohort, abdominal pain was the most prevalent symptom, reported in 87 patients (91.58%). Fever and jaundice were observed in 36.84% and 32.63% of cases, respectively. Cholangitis was identified in 39 patients (41.05%), with grade 1 cholangitis comprising the majority (61.53%). Notably, no cases of grade 3 cholangitis or higher were recorded.

Comparative data from other studies support these findings. La Van Phu, in a study involving 72 elderly patients undergoing laparoscopic stone extraction, reported an abdominal pain incidence of 98.61%. Similarly, Zheng C. evaluated 172 patients aged 70 years and older with CBD stones and found abdominal pain in 95.9%, jaundice in 56.1%, fever in 19.5%, and cholangitis in 56.9% of cases. In our analysis, there was no statistically significant association between age subgroup and the presence of cholangitis.

4.2.3. Common Bile Duct Stone Location on CT Scan

CT scan is an important diagnostic tool that determines surgery. CT scan aims to determine the presence or absence of stones, stone location, stone size, and CBD size. Our study recorded isolated CBD stones accounting for 56.84%, combined CBD and gallbladder stones accounting for 43.16%.

Other authors reported similar rates of isolated CBD stones and CBD stones combined with gallbladder stones, such as La Van Phu with rates of 30.56% and 33.33% respectively, Nguyen Quang Trung with rates of 24.46% and 22.3% respectively, and Duong Xuan Nhuong with rates of 89.4% and 37.9% respectively.

4.2.4. Common Bile Duct and Stone Size on CT Scan

Our study results showed 88 cases with CBD diameter greater than 10mm, and 70 cases (73.68%) had stones > 10mm. Among these, stones > 20mm accounted for 23.16%.

According to William E. et al. (2017) , CT scan has a sensitivity of 69-87% and specificity. Therefore, CT scan is the primary tool for assessing CBD stones preoperatively.

4.3. Laparoscopic Surgery Characteristics

4.3.1. Surgical Indication

The indication for CBD exploration

and stone extraction is based on many factors by various authors. Quaresima S. et al. only performed CBD exploration and stone extraction when the CBD diameter was > 10mm. Su Guoqi indicated CBD exploration and stone extraction when CBD size was > 10mm.

Therefore, in this study, the indication for CBD exploration and stone extraction was when the CBD size was ≥ 10mm. In my opinion, this is a reasonable and safe limit that is easy to implement because small CBD size is very prone to stenosis and difficult for Kehr placement as well as intraoperative choledochoscopy examination.

4.3.2. Stone Characteristics

Cases of CBD stones combined with gallbladder stones: Su Guoqi had 22 cases of extrahepatic stones: CBD stones combined with gallbladder stones and performed laparoscopic CBD exploration with main bile duct stone extraction and cholecystectomy with good results. He concluded that laparoscopic CBD stone extraction and cholecystectomy in one stage is a reasonable choice for treating CBD stones combined with gallbladder stones.

Similarly, La Van Phu reported that 24 out of 72 elderly patients presented with combined CBD and gallbladder stones and underwent one-stage laparoscopic CBD exploration with cholecystectomy, yielding good clinical results. In our current study, 41 elderly patients were identified with both CBD and gallbladder stones. All underwent single-stage laparoscopic CBD stone removal and cholecystectomy with successful outcomes, reinforcing the safety and practicality of this approach in elderly populations.

Cases of isolated CBD stones: Li K.Y. et al. conducted a comparative study between open surgery group, laparoscopic CBD exploration group, and ERCP stone extraction group, finding that laparoscopic CBD exploration is a safer, more reliable, and more effective alternative treatment method, especially in elderly patients. At Thong Nhat Hospital, ERCP stone extraction is indicated for patients with stones < 15mm. This technique is particularly beneficial in severe acute pancreatitis, biliary septic shock, and those unsuitable for surgery.

4.3.3. Stone Management Methods

We used various methods to extract stones. We had 82.1% of stones extracted using Randall forceps, and 17.9% extracted using baskets. La Van Phu had a rate of stone extraction using conventional instruments (Randall) of 87.5%.

4.3.4. Intraoperative Choledochoscopy

Su Guoqi and La Van Phu also proposed routine intraoperative choledochoscopy as a good method to assess whether the bile duct still contains stones.

We performed choledochoscopy in 76 cases (80%). The reason we didn't perform it in 100% of cases was that before 2018, we didn't have choledochoscopy equipment. Before 2018, we performed intraoperative cholangiography to assess stone clearance (based on X-ray, number of stones extracted compared to preoperative CT scan).

4.3.5. Electrohydraulic Lithotripsy and Stone Extraction via Choledochoscopy

La Van Phu performed stone extraction via laparoscopic surgery, extracting stones using conventional methods in 87.32% (62 patients) and 12.68% (9 patients) applied electrohydraulic lithotripsy. We performed hydraulic lithotripsy in 10.52% and stone extraction using baskets in 17.89%.

4.3.6. Common Bile Duct Drainage

One of the key challenges in biliary stone surgery is the intraoperative confirmation of complete stone clearance, which subsequently determines the decision to either close the common bile duct or place a drain. While some studies suggest that routine placement of a Kehr T-tube may prolong hospital stay and increase overall treatment costs, others emphasize its value in postoperative monitoring. According to La Van Phu, primary duct closure is appropriate when complete stone removal is confirmed through intraoperative choledochoscopy, preoperative imaging (e.g., CT scan), and when there is no or only mild bile duct inflammation along with good sphincter of Oddi function.

Despite advances in diagnostic modalities—such as preoperative CT, magnetic resonance cholangiography, ERCP, intraoperative cholangiography,

endoscopic ultrasound, and intraoperative choledochoscopy—retained stones can still occur. Therefore, in our practice, we advocate for routine placement of a Kehr drain to facilitate postoperative monitoring and, if necessary, endoscopic or percutaneous intervention for residual stones. As a result, bile duct drainage via Kehr T-tube was performed in 100% of cases in this study.

4.3.7. Operative Time

The mean operative time for the isolated CBD stone group was 130.27 minutes, and for CBD stones combined with gallbladder stones was 144.39 minutes. This difference was statistically significant.

Su Guoqi studied 100 patients with an operative time of 139.3 ± 50.0 minutes. La Van Phu had a mean operative time of 105.7 ± 34.87 minutes for 71 cases. Vu Duc Thu reported 133.6 ± 46.3 minutes.

Our operative time was longer than other authors, partly due to:

Initially deploying choledochoscopy without proficiency

Intraoperative lithotripsy and stone extraction using baskets when choledochoscopy detected stones was one of the reasons for prolonged operative time; we had 27 cases (28.42%) with lithotripsy and/or stone extraction using baskets during surgery.

The mean operative time in the under-80 group (137.07 minutes) did not differ much from the 80-and-above group (135.27 minutes). The difference in operative time between the two age groups was not statistically significant ($p > 0.05$). Thus, advanced age is not a factor related to operative time.

4.3.8. Success Rate of Stone Clearance

Stone clearance rate is an important goal in treating common bile duct stones. To assess stone clearance, we relied on intraoperative choledochoscopy or intraoperative cholangiography. A case was considered surgically successful when all stones were removed in one operation based on one of two criteria:

Intraoperative choledochoscopy showing no remaining stones and the scope could pass through to Oddi

Intraoperative cholangiography showing no filling defects and contrast flowed through to the duodenum

There were 5 patients with retained stones: 3 patients had no retained stones seen on choledochoscopy, 1 patient experienced abdominal pain 2 weeks after discharge, CT scan revealed stones in the distal CBD and underwent ERCP stone extraction, 2 patients had retained stones detected after Kehr cholangiography on postoperative day 7 and subsequently underwent lithotripsy through Kehr; 2 patients had stones intentionally left during the first operation. The reason for intentionally leaving stones in 2 cases was due to 1 patient having broken choledochoscopy equipment and 1 patient having a broken lithotripsy probe during lithotripsy. Both patients subsequently underwent lithotripsy through Kehr.

Some studies determined stone clearance during surgery based on choledochoscopy, such as Xiao L.K. et al. (2018).

4.4. Early Intraoperative and Postoperative Complications

Results of 95 patients undergoing laparoscopic CBD exploration had an overall complication rate of 6.31%, including bile leakage 3.16%, intraoperative bleeding 1.05%, Kehr displacement 1.05%, and infection 2.11%. These intraoperative and postoperative complications had no statistically significant relationship with the degree of cholangitis ($p > 0.05$).

One patient had Kehr displacement on postoperative day 4, developed peritonitis, required reoperation to place Kehr, then the patient was stable, and Kehr was removed on postoperative day 14. One patient had bleeding due to the cystic artery crossing over the common bile duct at the exploration site, which was managed with vascular clipping for hemostasis. Two cases of bile leakage were treated medically and stabilized, with delayed drain removal on postoperative day 21. Two cases had infection due to fluid collection, treated medically with close clinical monitoring and ultrasound examination of the fluid collection with gradual drain withdrawal. One of these patients belonged to the over-80 group and stayed for 21 days after surgery.

Su Guoqi reported postoperative

complication rates of 8%, including 2 cases of severe abdominal pain after Kehr removal, 2 cases of wound infection, 1 case of duodenal perforation, 1 case of mesenteric tear, and 2 cases of bleeding.

Vu Duc Thu reported overall postoperative complications of 10.3%: bile leakage 2.8%, postoperative residual abscess 0.9%, pneumonia 6.6%.

4.5. Hospital Stay

The mean postoperative hospital stay was 13.4 ± 3.8 days. There were 6 cases (6.31%) with prolonged hospital stay beyond 14 days due to postoperative complications. There was no difference in hospital stay between the < 80 years group and the ≥ 80 years group ($p > 0.05$).

La Van Phu reported a mean postoperative hospital stay of 8.8 ± 4.68 days (3-27 days). In the study by Chufa Zheng et al. , postoperative hospital stay was 6.0 ± 4.6 days. Compared to other authors, the hospital stay in our study group was longer. This may be because our study was conducted only on elderly patients, who have slower postoperative recovery. Additionally, hospital stay is related to factors such as stone characteristics, timing of Kehr drain removal, management of complications, or intervention for retained stones.

5. CONCLUSION

Based on the analysis of 95 elderly patients who underwent laparoscopic common bile duct exploration at Thong Nhat Hospital, we conclude the following: Hypertension was the most prevalent comorbidity (73.68%). Abdominal pain was the predominant clinical presentation (91.58%), and the incidence of cholangitis was 41.05%. The overall stone clearance rate was high (94.73%), and intraoperative and postoperative complication rates were low (6.31%) with no recorded mortality. The average length of hospital stay was 13.4 days. Notably, there was no significant difference in operative time, hospitalization duration, or complication rates between patients aged below 80 years and those aged 80 years or older.

In conclusion, laparoscopic surgery is a safe, feasible, and effective modality for the treatment of common bile duct stones in elderly patients when appropriately indicated and performed with experienced surgical teams.

REFERENCES

[1] Yokoe M, Hata J, Takada T, Strasberg SM, Asbun HJ, Wakabayashi G, et al. Tokyo Guidelines 2018: diagnostic criteria and severity grading of acute cholecystitis (with videos). Journal of Hepato-Biliary-Pancreatic Sciences. 2018;25(1):41-54. doi: https://doi.org/10.1002/jhbp.515.

[2] Phú LV. Kết quả điều trị sỏi đường mật chính bằng phẫu thuật nội soi kết hợp nội soi đường mật trong mổ ở 72 bệnh nhân cao tuổi. tạp chí Y dược Cần Thơ. 2022;45.

[3] Khởi SQ. Nghiên cứu ứng dụng phẫu thuật nội soimở ống mật chủ lấy sỏi điều trị sỏi đường mật chính tại Bệnh viên đa khoa Kiên Giang [luận án tiến sĩ y học]: Học viện Quân y; 2019.

[4] Zheng C, Huang Y, Xie E, Xie D, Peng Y, Wang X. Laparoscopic common bile duct exploration: a safe and definitive treatment for elderly patients. Surg Endosc. 2017;31(6):2541-7. Epub 20161223. doi: 10.1007/s00464-016-5257-3. PubMed PMID: 28008469.

[5] Trung NQ. Nghiên cứu đặc điểm lâm sàng, cận lâm sàng và thái độ xử trí sỏi đường mật chính ở người cao tuổi [Luận án Tiến sĩ y học]: Học viện Quân y; 2012.

[6] Nhương DX. Nghiên cứu đặc điểm lâm sàng, cận lâm sàng và kết quả điều trị sỏi ống mật chủ ở người cao tuổi [Luận án tiến sĩ y học]: Học viện quân y; 2018.

[7] Williams E, Beckingham I, El Sayed G, Gurusamy K, Sturgess R, Webster G, Young T. Updated guideline on the management of common bile duct stones (CBDS). Gut. 2017;66(5):765-82. Epub 20170125. doi: 10.1136/gutjnl-2016-312317. PubMed PMID: 28122906.

[8] Quaresima S, Balla A, Guerrieri M, Campagnacci R, Lezoche E, Paganini AM. A 23 year experience with laparoscopic common bile duct exploration. HPB (Oxford). 2017;19(1):29-35. Epub 20161124. doi: 10.1016/j.hpb.2016.10.011. PubMed PMID: 27890483.

[9] Li KY, Shi CX, Tang KL, Huang JZ, Zhang DL. Advantages of laparoscopic common bile duct exploration in common bile duct stones. Wien Klin Wochenschr. 2018;130(3-4):100-4. Epub 20170731. doi: 10.1007/s00508-017-1232-9. PubMed PMID: 28762058.

[10] Thụ VĐ. Nghiên cứu ứng dụng phẫu thuật nội soi kết hợp nội soi đường mật điều trị sỏi đường mật [luận án tiến sĩ y học]: Viện nghiên cứu khoa y dược lâm sàng 108; 2020.