DOI: 10.63583/yqcqkh52

Clinical and paraclinical characteristics and preliminary outcomes of laparoscopic surgery for choledochal cysts

NGUYEN HOANG NGOC ANH*, NGUYEN THE DUY, TRAN MANH THANG, TRAN MANH DUNG
108 Military Central Hospital

Abstract

Objective: *To investigate the clinical and paraclinical characteristics and evaluate the preliminary outcomes of laparoscopic surgery for choledochal cysts.* ***Subject and method:*** *A cross-sectional descriptive study combined with a prospective, uncontrolled interventional design was conducted on 47 patients diagnosed with choledochal cysts who underwent laparoscopic cyst excision and Roux-en-Y hepaticojejunostomy from May 2019 to June 2024.* ***Result:*** *Among the 47 patients undergoing laparoscopic surgery for choledochal cysts, the majority were female (89.36%) with a mean age of 39 ± 14 years. The most common symptom was right upper quadrant abdominal pain (74.47%). Magnetic resonance imaging showed that 85.11% of cases had simple cysts, mostly less than 50 mm in size. Type IC cysts were the most common intraoperative finding (51.1%). The mean operative time was 198.7 ± 52.4 minutes, with 53.2% of cases lasting over 180 minutes. Postoperatively, patients resumed bowel function after an average of 2.6 days and had an average hospital stay of 10.2 days. The complication rate was low, and 93.6% of surgical wounds showed good healing. Conclusion: Laparoscopic surgery for choledochal cysts demonstrated promising initial results with a low complication rate and good wound healing. This technique is safe and effective when performed with proper indications.*

Keywords: *Choledochal cyst, laparoscopic surgery, Roux-en-Y*

I. Background

Choledochal cyst is a rare congenital malformation of the biliary system, characterized by abnormal dilation of the common bile duct and/or intrahepatic bile ducts. The condition is more prevalent in females and occurs more commonly in Asian countries, with an incidence rate approximately ten times higher than that in Western nations [1]. If not detected and treated promptly, choledochal cysts can lead to various serious complications such as recurrent cholangitis, pancreatitis, biliary stones, cirrhosis, and especially malignant transformation into cholangiocarcinoma, particularly extrahepatic cholangiocarcinoma [2].

In terms of treatment, complete surgical excision of the cyst combined with biliary-enteric reconstruction via Roux-en-Y hepaticojejunostomy is currently considered the optimal approach [1]. With the advancement of minimally invasive surgery, laparoscopic techniques have increasingly replaced open surgery in many major centers worldwide, offering advantages such as reduced postoperative pain, faster recovery, fewer abdominal wall complications, and improved cosmetic outcomes [3], [4]. However, in Vietnam, laparoscopic surgery for choledochal cysts remains relatively new and is not yet widely adopted, with limited clinical evaluation data available.

Received*: 05/01/2025 ,* ***Accepted****: 13/05/2025*
Corresponding author*: Ngocanhyhp2804@gmail.com*
108 Military Central Hospital

DOI: 10.63583/yqcqkh52

Therefore, this study was conducted with the following objectives:

1*) To investigate the clinical and paraclinical characteristics of patients with choledochal cysts;*

2) To evaluate the initial outcomes of laparoscopic surgery for the treatment of choledochal cysts.

2. Subject and method

Study Population

The study included 47 patients diagnosed with choledochal cysts who underwent laparoscopic cyst excision and biliary-enteric reconstruction using the Roux-en-Y technique between May 2019 and June 2024.

Inclusion Criteria

Patients aged >16 years.

Choledochal cyst classified as type IA, IB, IC, or IVA according to the Todani classification.

ASA physical status classification < 3.

Patients provided informed consent to participate in the study.

Exclusion Criteria

Patients presenting with septic shock, systemic toxicity, prior abdominal surgery through the umbilical region, or pregnancy.

Contraindications to laparoscopic surgery.

Patients who did not consent to participate.

Study Design

This is a cross-sectional descriptive study combined with a prospective, non-controlled interventional component.

Sample Size and Sampling Method

A convenience sampling method was employed, including all eligible patients during the study period. A total of 47 patients were enrolled.

Data Collection and Analysis

Research Indicators:

Patient characteristics: age, gender, clinical symptoms, medical history, laboratory tests, and MRI findings.

Initial surgical outcomes: operative characteristics, treatment results (postoperative recovery time, surgical complications).

Data Processing:

Data were analyzed using SPSS version 22.0. Quantitative variables were presented as mean ± standard deviation. Qualitative variables were expressed as percentages. The T-test was used to compare differences between two means, with a p-value < 0.05 considered statistically significant.

3. Result

Table 1. Preoperative clinical and paraclinical characteristics (N = 47)

Characteristic		Number (n)	Percentage (%)
Age (mean ± SD, years)		39 ± 14 (18 - 75)	
Female gender		42	89,36
Clinical symptoms	Right upper quadrant pain	35	74.47
	Vomiting	2	4.26
	Fever	2	4.26
	Jaundice	4	8.51
	Incidental findings	4	8.51
Medical history	Cholecystitis	4	8.51
	No prior hepatobiliary disease	43	91.49

DOI: 10.63583/yqcqkh52

Characteristic		Number (n)	Percentage (%)
Laboratory findings	Elevated WBC (>10×10³/L)	19	40.43
	Elevated SGOT	12	25.53
	Elevated SGPT	9	19.15
	Elevated total bilirubin	14	29.79
MRI findings	Isolated choledochal cyst	40	85.11
	Cyst with bile duct stones	5	10.64
	Cyst with pancreatitis	2	4.26
Cyst size on MRI	< 30mm	21	44,68
	31 - 50mm	16	34,04
	51 - 100mm	10	21,28
Mean cyst diameter		41,35 ± 15,23mm	

Comment: Most patients were female (89.36%) with a mean age of 39 ± 14 years. The most common clinical symptom was right upper quadrant abdominal pain (74.47%), while other symptoms were less frequent. A majority of patients (91.49%) had no prior hepatobiliary disease. On MRI, 85.11% had isolated choledochal cysts. Most cysts were under 50 mm in size, with a mean diameter of 41.35 ± 15.23 mm.

Table 2. Classification of choledochal cysts

Cyst Type	CT Findings		Intraoperative	
	Number (n)	Percentage (%)	Number (n)	Percentage (%)
IA	15	31,9	20	42,6
IB	1	2,1	0	0
IC	22	46,8	24	51,1
IVA	9	19,1	3	6,4
Total	***47***	***100***	***47***	***100***

Comment: Type IC was the most common classification both on CT (46.8%) and intraoperatively (51.1%), followed by type IA (31.9% and 42.6%, respectively). Types IB and IVA were rare; notably, no IB cysts were identified during surgery. There was a slight discrepancy between imaging and surgical classification.

Table 3. Operative Time (N = 47)

Operative Time (minutes)	Number (n)	Percentage (%)
≤ 120	6	12,8
121 - 150	4	8,5
151 - 180	12	25,5
> 180	25	53,2
Mean time ± SD (max-min)	198.7 ± 52.4 (90-340)	

Comment: The mean operative time was 198.7 ± 52.4 minutes. Most procedures lasted more than 180 minutes (53.2%), followed by 151-180 minutes (25.5%). Only 12.8% of cases were completed within 120 minutes.

DOI: 10.63583/yqcqkh52

Table 4. Treatment Outcomes

Variable	Mean ± SD (min-max)
Bowel function recovery (days)	2.6 ± 0.9 (1-4)
Time to oral intake (days)	3.3 ± 0.8 (2-5)
Drain removal time (days)	3.2 ± 1.1 (1-6)
Postoperative hospital stay (days)	10.2 ± 4.5 (5-22)

Comment: The average time to bowel function recovery was 2.6 ± 0.9 days. Oral feeding began after 3.3 ± 0.8 days. Drains were removed after 3.2 ± 1.1 days. The average postoperative hospital stay was 10.2 ± 4.5 days.

Table 5. Wound Status and Postoperative Complications (N = 47)

Characteristic	Number (n)	Percentage (%)
Wound status		
Dry, well-healed	44	93.6
Wound bleeding	1	2.1
Wound infection	2	4.3
Postoperative complications		
Bile leakage	2	4.3
Intra-abdominal fluid	1	2.1
Pancreatitis	1	2.1
No complications	41	87.2

Comment: Among 47 operated patients, 93.6% had dry, well-healed wounds. Wound-related complications included bleeding (2.1%) and infection (4.3%). Other postoperative complications included bile leakage (4.3%), intra-abdominal fluid collection (2.1%), and pancreatitis (2.1%). The overall rate of patients without complications was 87.2%.

4. Discussion

Our study on the clinical and paraclinical characteristics of 47 patients with choledochal cysts revealed a mean age of 39 ± 14 years, with females accounting for 89.36% of cases. This gender distribution aligns with recent studies that have also reported a higher prevalence of this condition among female patients [1]. The observed gender disparity suggests that hormonal and genetic factors may play a role in the pathogenesis of choledochal cysts [5].

The most commonly reported clinical symptom was right upper quadrant abdominal pain, observed in 74.47% of patients. This finding is consistent with the study by Lee et al. (2021), which also emphasized pain as the most frequent symptom among patients with this condition [5]. Notably, 91.49% of patients had no prior history of hepatobiliary disease, highlighting the often asymptomatic nature of choledochal cysts in early stages and underscoring the diagnostic and therapeutic challenges they present [6].

In terms of paraclinical findings, 85.11% of patients were diagnosed with isolated choledochal cysts based on magnetic resonance imaging (MRI), underscoring the diagnostic value of this imaging modality [7]. The mean cyst size was 41.35 ± 15.23 mm, with the majority measuring

DOI: 10.63583/yqcqkh52

under 50 mm. This observation is comparable to the findings of Liu et al. (2017), who reported similar cyst sizes and emphasized the importance of thorough evaluation in treatment planning [8]. According to the Todani classification, type IC was the most common, accounting for 46.8% of imaging diagnoses and 51.1% of intraoperative findings, which is consistent with previously published data [1].

The average operative time was 198.7 ± 52.4 minutes, with over half of the surgeries lasting more than 180 minutes. This reflects the complexity of the procedure, corroborating findings by Han et al. (2018), who reported similarly prolonged operative durations due to the challenging nature of choledochal cyst surgery [7]. The average postoperative hospital stay was 10.2 ± 4.5 days, and only 12.8% of patients experienced complications a slightly higher but still acceptable rate compared to some other studies [8].

Wound conditions were also reported, with 93.6% of patients having dry wounds and good healing outcomes, indicating effective surgical management and postoperative care [9]. Postoperative complications such as bleeding and wound infection were minimal, occurring in 2.1% and 4.3% of patients, respectively. Other complications like biliary leakage and intra-abdominal fluid collections were also infrequent, supporting the safety profile of the surgical approach.

5. Conclusion

Laparoscopic surgery for the treatment of choledochal cysts has shown promising initial results, with a low complication rate and favorable recovery outcomes. Clinical and paraclinical features serve as essential guides for diagnosis and appropriate management. This study contributes to validating the feasibility and safety of this technique in clinical practice.

References

1. Soares K.C., Goldstein S.D., Ghaseb M.A. et al (2017). Pediatric choledochal cysts: diagnosis and current management. *Pediatr Surg Int*, 33(6), 637–650.
2. He X.-D., Wang L., Liu W. et al (2014). The risk of carcinogenesis in congenital choledochal cyst patients: an analysis of 214 cases. *Annals of Hepatology*, 13(6), 819–826.
3. Bian Z., Zhi Y., Zeng X. et al (2023). Curative effect and technical key points of laparoscopic surgery for choledochal cysts in children. *Front Surg*, 9.
4. Onishi S., Murakami M., Ishimaru T. et al (2024). Current Practice of Laparoscopic Surgery for Choledochal Cyst in Children -A Survey on Opinion and Experience Among IPEG Members. *Journal of Pediatric Surgery*, 59(12), 161683.
5. Lee C., Byun J., Ko D. et al (2021). Comparison of long-term biliary complications between open and laparoscopic choledochal cyst excision in children. *Annals of Surgical Treatment and Research*, 100(3), 186–192.
6. Lee H., Kwon W., Han Y. et al (2018). Comparison of surgical outcomes of intracorporeal hepaticojejunostomy in the excision of choledochal cysts using laparoscopic versus robot techniques. *Annals of Surgical Treatment and Research*, 94(4), 190-195.
7. Han J.H., Lee J.H., Hwang D.W. et al (2018). Robot resection of a choledochal cyst with Roux-en-y hepaticojejunostomy in adults: Initial experiences with 22 cases and a comparison with laparoscopic approaches. *Ann Hepatobiliary Pancreat Surg*, 22(4), 359-366.
8. Liu Y., Sun J., Guo S. et al (2017). The distal classification and management of choledochal cyst in adults: Based on the relation between cyst and pancreatic duct. *Medicine*, 96(12), e6350.
9. Garg P., Sharma M. (2024). Combined Percutaneous Lithotripsy and Transjejunal Stone Extraction for Intrahepatic Bile Duct Stones. *Journal of Clinical Interventional Radiology ISVIR*, s-0044-1792101.