

Results of laparoscopic cholecystectomy for acute calculous cholecystitis following percutaneous transhepatic gallbladder drainage at Le Van Thinh Hospital

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Abstract

Introduction: Percutaneous transhepatic gallbladder drainage (PTGBD) is a safe, effective initial treatment for acute cholecystitis in high-risk patients. Laparoscopic cholecystectomy (LC) is the definitive treatment. This study evaluates the feasibility and optimal timing of LC post-PTGBD at Le Van Thinh Hospital, as outcomes may be similar regardless of surgical timing.

Patients and Methods: A prospective descriptive case series was conducted from January 2022 to June 2024 at the General Surgery Department of Le Van Thinh Hospital. Patients diagnosed with grade II, III acute calculous cholecystitis who underwent PTGBD followed by LC were included. Patients were categorized into two groups based on the timing of surgery: within (group A) or beyond four weeks (Group B) post-PTGBD.

Results: Seventeen patients underwent LC after PTGBD (mean age 68.76 ± 17.70 years; 41.2% male). Mean operative time was 114 ± 28.51 minutes with no conversions to open surgery. Intraoperative and postoperative complications occurred in 11.8% and 23.5% of patients, respectively. The mean hospital stay was 7 ± 1.83 days. Patients in Group A were generally younger and had fewer comorbidities and lower ASA scores compared to those in Group B. Although overall surgical outcomes were comparable, intraoperative complications were more frequent in Group B.

Conclusions: LC following PTGBD for acute calculous cholecystitis is a safe and effective procedure, with low complication rates in appropriately selected patients with well-managed infections and comorbid conditions.

Keywords: Acute calculous cholecystitis, percutaneous transhepatic gallbladder drainage, laparoscopic cholecystectomy.

Introduction

Percutaneous transhepatic gallbladder drainage (PTGBD) is a well-established treatment for acute cholecystitis, particularly in cases with severe inflammation, poor response to conservative management, elderly patients, or individuals with high surgical risk [1]. PTGBD is effective, safe, and minimally invasive; however, long-term catheter placement can lead to complications such as bile leakage, tube dislodgement, and patient discomfort. Conversely, premature removal of the drainage tube may result in recurrence of cholecystitis. Laparoscopic cholecystectomy (LC) serves as the definitive treatment, improving patient quality of life [2].

Previous studies have demonstrated the feasibility of LC following PTGBD [3–5]. Reported conversion rates to open surgery range from less than 3% [4,6] to 5–10% [3,5]. While some researchers advocate for early laparoscopic surgery within four weeks post-PTGBD, others recommend delaying surgery beyond four weeks to allow for patient stabilization. However, certain studies suggest that surgical outcomes remain comparable regardless of the timing [9,10].

This study aims to evaluate the feasibility and determine the optimal timing of LC following PTGBD at Le Van Thinh Hospital.

Patients and methods

A prospective descriptive case series was conducted from January 2022 to June 2024 in the General Surgery Department of Le Van Thinh Hospital. Patients diagnosed with acute calculous cholecystitis who underwent PTGBD, followed by LC were included. Patients were categorized into two groups based on the timing of surgery: within (group A) or beyond four weeks (Group B) post-PTGBD.

Patients were monitored at two-week intervals following PTGBD to assess surgical eligibility. Collected data included demographic characteristics, comorbidities, preoperative ASA scores, severity of acute cholecystitis, and the time interval between

PTGBD and surgery. Surgical outcomes were evaluated based on operative success, duration, intraoperative and postoperative complications, and length of hospital stay.

Data were recorded using Microsoft Excel and analyzed with SPSS 20.0. Statistical comparisons were performed using appropriate tests, with significance set at $p < 0.05$.

Results

From January 2022 to June 2024, seventeen patients met the study criteria at the General Surgery Department of Le Van Thinh Hospital. The mean age was 68.76 ± 17.70 years (range: 27–85 years). Group A (surgery within 4 weeks) had a significantly younger mean age (61.40 ± 19.53 years) than Group B (79.29 ± 6.62 years) ($p = 0.03$).

There were 7 males (41.2%) and 10 females (58.8%), with a male-to-female ratio of 0.7.

The average time from PTGBD to surgery was 22.6 ± 3.7 days in Group A and 39.57 ± 2.8 days in Group B.

Among the study sample, 7 patients (41.2%) had more than two comorbidities, 4 patients (23.5%) had two comorbidities, and 6 patients (35.3%) had one comorbidity. Of these, hypertension was present in 14 cases (82.4%), and type 2 diabetes mellitus in 10 cases (58.8%). The mean interval between PTGBD and surgery was 22.6 ± 3.7 days in Group A and 39.57 ± 2.8 days in Group B. Group A had a significantly lower comorbidity burden and ASA scores than Group B ($p = 0.01$ and $p = 0.02$, respectively).

Preoperative assessment revealed that 12 patients (70.6%) had grade II acute cholecystitis according to the Tokyo Guidelines 2018 (TG18), while 5 patients (29.4%) had grade III. In Group A, 9 patients (52.9%) were classified as grade II and 1 patient (5.9%) as grade III. In contrast, Group B had 3 patients (17.6%) with grade II and 4 patients (23.5%) with grade III cholecystitis. Statistical analysis indicated a significant difference in the severity distribution of acute cholecystitis between the two groups (χ^2 test, $p=0.05$).

Table 1. Population Characteristics of the Two Groups

Variables	Group A (n=10)	Group B (n=7)	p-value
Time from PTGBD to surgery (days)	22.6 ± 3.7	39.57 ± 2.8	-
Age (years)	61.40 ± 19.53	79.29 ± 6.62	0.03
Gender (male/female)	4 (40%) / 6 (60%)	3 (42.9%) / 4 (57.1%)	0.906
Number of comorbidities			
1	6	0	0.01
> 1	4	7	
ASA Score			
2	10	4	0.02
3	0	3	
Severity of acute cholecystitis			
II	9 (52.9%)	3 (17.6%)	0.05
III	1 (5.9%)	4 (23.5%)	

Table 2. Surgical Outcomes of the Two Groups

Variables	Study Group (N=17)	Group A (N=10)	Group B (N=7)	p-value
Laparoscopic Surgery Success Rate	17 (100%)	-	-	-
Operative Time (minutes)	114 ± 28.51	112 ± 29.36	117 ± 29.27	0.727
Intraoperative incidents	2 (11.8%)	0	2 (28.6%)	0.05
Postoperative Complications	4 (23.5%)	2 (20%)	2 (28.6%)	0.68
Hospital Stay (days)	7 ± 1.83	6.8 ± 1.39	7.29 ± 2.43	0.6

All procedures were successfully completed laparoscopically, without the need for conversion to open surgery. The mean operative time was 114 ± 28.51 minutes. Group A had a mean operative time of 112 ± 29.36 minutes, while Group B had a mean operative time of 117 ± 29.27 minutes ($p = 0.727$).

Intraoperative incidents were observed in 2 patients (11.8%): one case of significant bleeding

(~200 mL) and one minor bile duct injury. Group A had no incidents, while Group B accounted for both cases ($p = 0.05$). Postoperatively, 4 patients (23.5%) developed mild fluid collections, with 2 cases in Group A (20%) and 2 cases in Group B (28.6%) ($p = 0.68$). One patient in Group B required percutaneous drainage due to a persistent fluid collection but recovered without further intervention.

The mean hospital stay was 7 ± 1.83 days, with no significant difference between Group A (6.8 ± 1.39 days) and Group B (7.29 ± 2.43 days) ($p = 0.6$). No major postoperative complications, infections, or reoperations were reported.

Discussion

Clinical Characteristics and Surgical Outcomes

Between January 2022 and June 2024, percutaneous gallbladder drainage was performed in 36 patients, of whom 17 met the inclusion criteria for this study. The mean age of the study population was 68.76 ± 17.70 years indicating a predominance of elderly patients. This is comparable to data reported by Nguyen Thanh Sang (66.3 years) as well as international findings by Ryukyung Lee (69 years) and Hye Woen Jeon (65 years) but notably higher than the average age reported by El-Gandi (49.65 years). Female patients accounted for 58.8% of the cohort, which aligns with the epidemiological characteristics of gallstone-related cholecystitis [3–6].

All 17 patients had at least one underlying medical condition, including hypertension, diabetes, liver cirrhosis, or respiratory diseases. This finding is consistent with the results reported by Nguyen Thanh Sang (81%) and Hye Woen Jeon (71%) but significantly higher than the proportion reported by El-Gandi (24%). ASA classification showed that 3 patients (17.6%) had an ASA score of 3, while 14 patients (82.4%) had an ASA score of 2. The majority of patients were elderly and presented with multiple comorbidities, which influenced the decision to perform percutaneous gallbladder drainage prior to definitive surgery.

The mean operative time was 114.12 ± 28.51 minutes, which is comparable to the durations reported by Nguyen Thanh Sang (129.3 minutes) and Tran Hoang Nhut (104.58 minutes) [6–7], but longer than those observed in studies by Ryukyung Lee (73.4 minutes) and Hye Woen Jeon (65.97 minutes). However, no cases in our study required conversion

to open surgery, in contrast to international studies which reported shorter operative times but higher conversion rates.

One patient (11.8%) experienced significant intraoperative bleeding (~200 ml), which was successfully managed laparoscopically. This patient had liver cirrhosis, with dense adhesions between the greater omentum and gallbladder, making dissection more challenging. Another case involved minor bile leakage from an accessory bile duct in the gallbladder bed, which was successfully sutured laparoscopically without postoperative leakage or biliary obstruction. In comparison, Nguyen Thanh Sang reported an intraoperative bleeding rate of 3.3% [6], while Tran Hoang Nhut recorded a higher bleeding rate of 33.33% [7], although only 2.7% of cases required conversion to open surgery due to cystic artery injury.

Postoperatively, 4 patients (23.6%) developed mild fluid collections at the gallbladder bed, all of which were resolved with drainage management and conservative treatment, without the need for additional surgical intervention. Tran Hoang Nhut reported a 30.56% rate of postoperative fluid collections [7]. No cases of wound infection were observed in our study, compared to infection rates of 3.3% reported by Nguyen Thanh Sang and 2.7% by El-Gandi [3], [6].

The mean hospital stay was 7 ± 1.8 days, which was longer than in Nguyen Thanh Sang's study (5.5 ± 2.06 days) and Ryukyung Lee's study (5 ± 2.6 days), but shorter than that reported by El-Gandi (10.76 ± 5.75 days) [3], [5], [6].

Comparison of Surgical Outcomes Between Groups

Comparing the two groups, Group A had a younger mean age, fewer comorbidities, and a lower surgical risk. As a result, their infection and medical conditions stabilized more quickly, allowing for earlier laparoscopic cholecystectomy.

Early cholecystectomy (Group A) was associated with shorter operative time, lower postoperative

complication rates, and a reduced length of hospital stay. However, these differences were not statistically significant, partly due to the small sample size and insufficient statistical power. Group B had a higher intraoperative complication rate (2 cases, 28.6%) compared to Group A, which had no complications. These complications were primarily related to underlying conditions and anatomical variations rather than the timing of surgery. This finding is consistent with recent reports by Yunxiao Lyu and Koichi Kimura [9–10], which indicate no significant differences in surgical outcomes such as operative time, conversion rates, or complication rates, based on the interval between PTGBD and definitive surgery.

Although every effort was made to collect and interpret data comprehensively, our study is limited by a relatively small sample size due to the recent implementation of this surgical technique. Further studies with larger cohorts are needed to confirm these findings and better define the optimal timing of laparoscopic cholecystectomy following PTGBD.

Conclusion

Laparoscopic cholecystectomy following PTGBD is a safe and effective procedure in appropriately selected patients. The timing of surgery (within or beyond four weeks) does not significantly affect surgical outcomes. Further studies with larger sample sizes are needed to determine the optimal timing for surgery.

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