

Percutaneous transhepatic gallbladder drainage followed by laparoscopic cholecystectomy for acute cholecystitis

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Abstract

Introduction: Laparoscopic cholecystectomy (LC) has been considered as main treatment for acute cholecystitis due to gallstones. However, LC is not entirely safe for patients with severe comorbidities, high risk of surgery. In such circumstances, two-stage treatment including percutaneous transhepatic gallbladder drainage (PTGBD) first and then LC is an appropriate choice. PTGBD followed by LC or LC after PTGBD might be technically difficult. This article was written to evaluate the feasibility and the safety of PTGBD followed by LC (PTGBD + LC).

Materials and Methods: This case series report was conducted on patients who underwent PTGBD + LC in University Medical Center, Ho Chi Minh City, Vietnam, from June 2018 to June 2020. We applied TG 2018 criteria for diagnosis and severity grading of cholecystitis in all patients. The comorbidities were evaluated according to Charlson comorbidity index (CCI) and American Society of Anesthesiologists physical status (ASA-PS) classification. Indications for PTGBD were grade II or grade III acute cholecystitis and the presence of a severe comorbidities (CCI \geq 6 and/or ASA \geq III).

Results: From June 2018 to June 2020, there were 13 cases performed PTGBD + LC. There were 84,6% of grade II cholecystitis cases and 15,4% of grade III cholecystitis cases according to Tokyo guidelines 2018 criteria with comorbidities (30,8% of cases with CCI \geq 6, 100% of cases with ASA \geq III). Mean operative time: 126 minutes; one case needed transfusion due to bleeding from gallbladder inflammatory; no conversion to open surgery; morbidity rate was 23,1% (1 bile leakage successfully treated with preservation, 1 surgical site infection, 1 pneumoniae); mean hospital stay was 5,25 days; no mortality was observed in this series.

Conclusions: PTGBD followed up by LC is feasible and safe procedure for acute cholecystitis in selected patients.

Introduction

Gallstone is a very common pathology in Vietnam and Asian countries. Cholecystitis is the most common complication due to gallstone. For establishing the diagnosis, most authors have been applied Tokyo

guidelines (TG) criteria for diagnosis of cholecystitis, which was first published as 2007 version, then updated in 2013, 2018 versions [5], [6].

Up till now, laparoscopic cholecystectomy (LC) has been considered gold standard for the treatment

of cholecystitis due to gallstone. However, LC could not be safe in patients with many comorbidities, high risk for surgery. According to Tokyo Guidelines 2018 [5], percutaneous transhepatic gallbladder drainage (PTGBD) is indicated in cases of severe cholecystitis with high risk for surgery. When the patient in good health conditions, LC could be performed definitive treatment.

PTGBD followed up by LC (PTGBD + LC) is not always easy. The dense inflammatory fibrosis, altered anatomical gallbladder and surrounding structures make LC difficult, long operating time, increase intra- and post-operative complications, worsen comorbidities, long hospital stay.

Many authors have been studying the optimal time of PTGBD + LC as well as the surgical results of the procedure with various conclusions [1], [2], [3], [4].

In Vietnam, there have been few reports on the results of PTGBD + LC. So that, we make a report to evaluate the feasibility and the safety of this procedure in a single center.

Materials and methods

Patients

This case series report was conducted on patients



Image 1: Trocars location in PTGBD + LC

who underwent PTGBD + LC in University Medical Center, Ho Chi Minh City, Vietnam, from June 2018 to June 2020.

We applied TG 2018 criteria [6] for diagnosis and severity grading of cholecystitis in all patients. The comorbidities were evaluated according to Charlson comorbidity index (CCI) and American Society of Anesthesiologists physical status (ASA - PS) classification.

Indications for PTGBD were grade II or grade III acute cholecystitis and the presence of a severe comorbidities (CCI \geq 6 and/or ASA \geq III).

PTGBD technique

In all patients, PTGBD was performed by ourselves under ultrasound and fluoroscopic guidance. Under local anesthesia, secalon catheter was advanced transhepatically into the gallbladder. After placing a guide wire and dilating the track, a 8 Fr pigtail catheter was positioned in the gallbladder. Bile was aspirated from all patients for culture. Cholangiograms were carried out to confirm that the pigtail catheter was in the correct position within the gallbladder.

Operative technique

We use three trocars and performed LC with conventional technique (Image 1, 2).

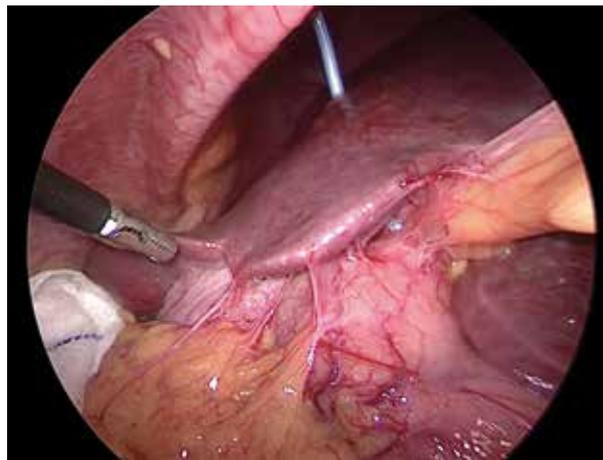


Image 2: One case performed PTGBD + LC with dense adhesions

Data collecting

We recorded the mean time intervals between PTGBD and LC, blood loss, transfusion amount, operative time (min), intra and post operative complications, hospital stay, mortality.

Results

From June 2018 to June 2020, there were 13 cases performed laparoscopic LC after PTGBD in UMC.

The mean ages were 72 years old (61 - 91 years old).

Gender: 4 males and 9 females.

Most patients had comorbidities classified owing to Charlson comorbidity index (CCI) (table 1) and American Society of Anesthesiologists physical status (ASA - PS) system (Table 2).

Table 1: Patients' CCI before PTGBD

CCI	N	%
3	3	23,1
4	5	38,4
5	1	7,7
6	3	23,1
7	1	7,7
Total	13	100

Table 2: Patients' ASA-PS classification before PTGBD

ASA-PS	N	%
III	5	38,5
IV	8	61,5
Total	13	100

All patients were in high risk for anesthesia and surgery (Table 3).

Table 3: Patients' risk factors

Risk factors	N	%
Anti-coagulating factors medication	2	15,4
Anti-platelet medications using	8	61,5
Unstable hyperthyroidism	1	7,7
Debilitating disease	1	7,7
Epilepsy/ neurosurgery	1	7,7
Total	13	100

Table 4: Acute cholecystitis grading according to Tokyo guidelines 2018

Acute cholecystitis grading	N	%
II	11	84,6
III	2	15,4
Total	13	100

Most cases (84,6%) were grade II cholecystitis, 15,4% of cases were grade III cholecystitis, none of cases was grade I cholecystitis according to TG 2018 criteria (Table 4).

The mean time for LC after PTGBD were 4,6 days (2 - 7 days) in the same period of treatment group and 111,5 days (16 - 525 days) in 2 separated periods of treatment group.

The mean operative time was 126 min (70 - 126 min).

LC was successful in all cases, no conversion to open surgery.

The mean blood loss was 46ml. One case, in which patient needed transfusion, lost 500ml of blood due to oozing from inflammatory tissue. This case was successful with LC, no need to open conversion.

Table 4: Post-operative complications

Post - operative complications	N
Bile leakage	1
Surgical site infection	1
Pneumonia	1

The post - operative complication rate was 23.1%: 1 bile leakage successfully treated with preservation, 1 surgical site infection, 1 pneumoniae.

The mean hospital stay was 5.25 days (1 - 16 days).

There was no mortality.

Discussion

Gallstone is popular condition. Cholecystitis is the most common complication due to gallstone

LC has been considered gold standard for the treatment of cholecystitis due to gallstone. However, the operation is only safe when patient in good performance status.

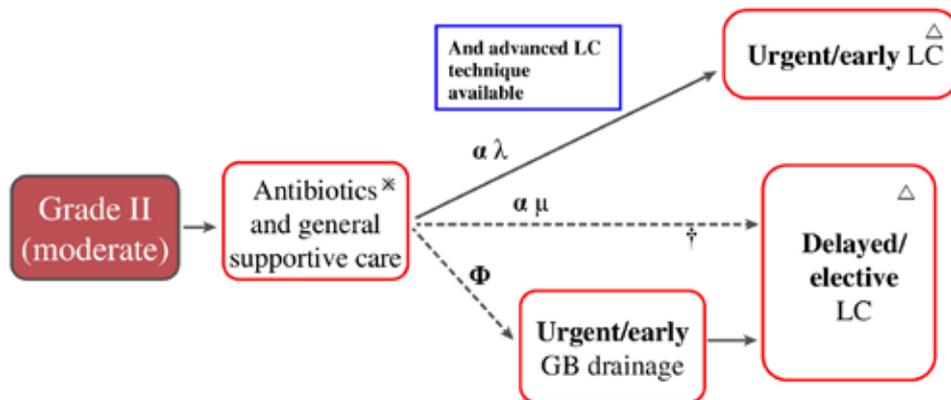


Fig.1 TG18 flowchart for the management of acute cholecystitis Grade II. α , antibiotics and general supportive care successful; λ , CCI 5 or less and/or ASA-PS class II or less (low risk); μ , CCI 6 or greater and/or ASA-PS class III or greater (not low risk); *, performance of a blood culture should be taken into consideration before initiation of administration of antibiotics; Φ , antibiotics and general supportive care fail to control inflammation; \dagger , a bile culture should be performed during GB drainage; Δ , in case of serious operative difficulty, bail-out procedures including conversion should be used. ASA-PS American Society of Anesthesiologists physical status, CCI Charlson comorbidity index, GB gallbladder, LC laparoscopic cholecystectomy. [Colour figure can be viewed at wileyonlinelibrary.com]

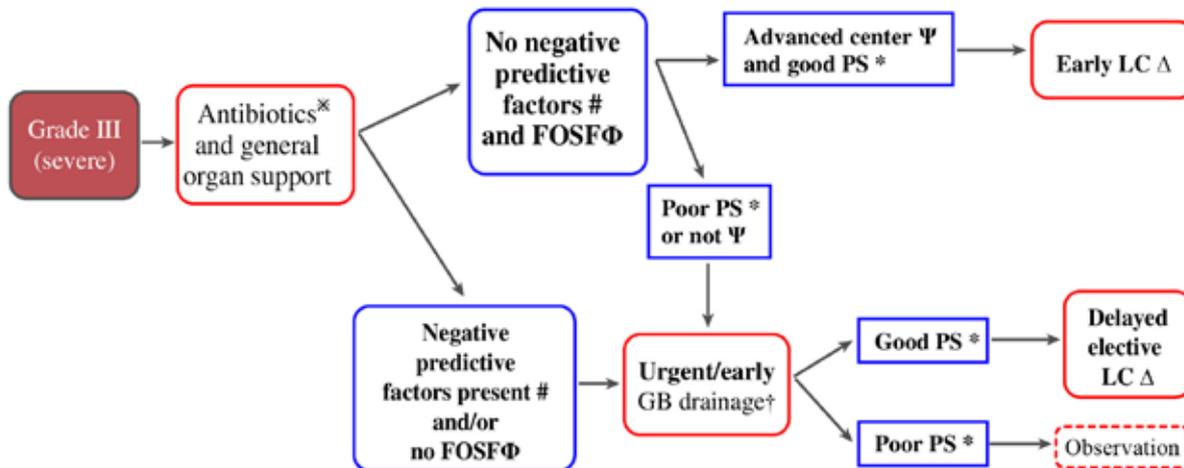


Fig.2 TG18 flowchart for the management of acute cholecystitis Grade III. *, performance of a blood culture should be taken into consideration before initiation of administration of antibiotics; #, negative predictive factors: jaundice (Tbil ≥ 2), neurological dysfunction, respiratory dysfunction; Φ , FOSF: favorable organ system failure – cardiovascular or renal organ system failure which is rapidly reversible after admission and before early LC in AC; * in cases of Grade III, CCI (Charlson comorbidity index) 4 or greater, ASA - PS 3 or greater are high risk; \dagger , a bile culture should be performed during GB drainage; Ψ , advanced center = intensive care and advanced laparoscopic techniques are available; Δ , in case of serious operative difficulty, bail - out procedures including conversion should be used. GB gallbladder, LC laparoscopic cholecystectomy, PS performance status Colour figure can be viewed at wileyonlinelibrary.com]

Nowadays, TG 2018 [5] has been applied worldwide. According to TG 2018, in cases of grade II and III acute cholecystitis, antibiotics and general organ support are first-line treatment. If antibiotics and general supportive care are successful, CCI ≥ 6 and/or ASA-PS $\geq III$, delayed/ elective LC is indicated. However, if antibiotics and general supportive care fail to control inflammation, urgent/early PTGBD is indicated. When patient was in good health condition, delayed/ elective LC would

be performed (Figure 1, 2).

In our report, there were 84,6% of grade II cholecystitis cases and 15,4% of grade III cholecystitis cases according to TG 2018 criteria with comorbidities (30,8% of cases with CCI ≥ 6 , 100% of cases with ASA $\geq III$). Such cases could not afford general anesthesia. Moreover, 76.9% of cases were consuming anti-coagulating factors and anti-platelet medications, who were in high risk of uncontrollable bleeding, especially in cholecystitic

condition. For such cases, PTGBD was indicated.

What are the results of PTGBD + LC? What is the optimal time for PTGBD + LC? Many authors have been researching with various conclusions:

- Byung-Gon Na, et al. [4] reported 116 patients classified into 2 groups: Group I included patients who underwent PTGBD, and patients of group II did not undergo PTGBD before LC. There was no significant difference in operative time ($P = 0,057$) and intraoperative estimated blood loss ($P = 0,291$). The rate of conversion to open operation of group I was significantly lower than that of group II (12,8% vs. 32,5%, $P < 0,050$). No significant difference of postoperative morbidity was found between the two groups (25,6% vs. 26,0%, $P = 0,969$). In addition, perioperative mortality was not significantly different. Preoperative hospital stay of group I was significantly longer than that of group II ($10,3 \pm 5,7$ days vs. $4,4 \pm 2,8$ days, $P < 0,050$). However, two groups were not significantly different in total hospital stay ($16,3 \pm 9,0$ days vs. $13,4 \pm 6,5$ days, $P = 0,074$). The author concluded that PTGBD is a proper preoperative management before LC for elderly patients with acute cholecystitis.

- In Woong Han, et al. [2] reported 67 patients underwent PTGBD + LC, classified into 2 groups: Group I members underwent LC within 72h of PTGBD ($n = 21$), where as group II members underwent LC at more than 72 h after PTGBD ($n = 46$). The open conversion rate, the perioperative complication rate, the overall hospital stay was similar in the two groups. Mean operative time was longer in group I than in group II ($79,3 \pm 25,3$ vs. $53,7 \pm 45,3$ min, $P = 0,02$). There were the complications: severe bleeding in 1 case, postoperative ileus in 1 case, bowel injury in 2 cases. They included that pros and cons were well balanced between the two groups. Decisions on the timing of PTGBD + LC should be made based on considerations of patient condition, hospital facilities, and surgical experience.

- Jae Woo Choi, et al. [1] recorded of 109 consecutive complicated cholecystitis patients who

had undergone an LC in 4 years. They were classified into 2 groups: LC within 5 days of (group I) or 5 days after PTGBD (group II). The peri-operative results of group II showed lower blood loss (186ml versus to 361ml) and relatively shorter operating times than those of group I (20,08 days versus to 12,92 days). Complications in group I included: bile leakage in 2 cases, subhepatic abscess formation in 1 case. Complications in group II included: postoperative bleeding in 1 case, subhepatic abscess formation in 1 case, drain site hemorrhage in 1 case.

- Koetsu Inoue, et al. [3] reported 77 patients underwent PTGBD + LC, classified into 2 groups: Group A patients underwent LC within 216h of PTGBD, where as group B patients underwent LC at more than 216h after PTGBD. Group A had longer mean operative time (143 min. versus to 117 min.), higher post-operative complication rate (35.7% versus to 7.6%). Complications in group A included: intraabdominal abscess in 3 cases, paralytic ileus in 1 case, surgical site infection in 1 case. Complications in group B included: bile leak in 1 case, hematoma in 1 case, paralytic ileus in 2 cases, surgical site infection in 3 cases. The hospital stay in 2 group was different insignificantly.

In our report, PTGBD + LC is feasible with high rate of success, no conversion to open surgery. This is a safe surgery with low complication rate (1 bile leakage successfully treated with preservation, 1 surgical site infection, 1 pneumoniae), no worsened comorbidities, no mortality. However, our volume is low, more researches with large sample size are demanded to evaluate the safety of the surgery and determine the optimal time for PTGBD + LC.

Conclusions

PTGBD + LC is feasible and safe procedure for acute cholecystitis, especially in cases with many comorbidities and high risk for surgery. However, more researches with large sample size are demanded to evaluate the safety of the surgery and determine the optimal time for PTGBD + LC.

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