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SCHEDULED LAPAROSCOPIC CHOLECYSTECTOMY FOLLOWING PERCUTANEOUS TRANSHEPATIC CHOLECYSTOSTOMY VERSUS EARLY LAPAROSCOPIC CHOLECYSTECTOMY WITHOUT PTHC IN ACUTE CALCULOUS CHOLECYSTITIS: A PROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

Backgrounds/Aims: Acute cholecystitis is one of the common conditions we encounter in our daily practice. Emergency laparoscopic cholecystectomy (LC) is the first line treatment of choice. Percutaneous transhepatic cholecystostomy (PTHC) can be a better option for high-risk patients who are not fit for surgery. In this study, we compare and evaluate the outcomes of scheduled Laparoscopic cholecystectomy following PTHC and early Laparoscopic cholecystectomy without PTHC.

Methods: A prospective observational, comparative study done between January 2024 and December 2025. 80 patients, age >50yrs, with acute cholecystitis, who had undergone LC, were studied. Patients were divided into two groups Non-PTHC group included 40 patients who underwent early LC without PTHC. The other group, PTHC group, included 40 patients who underwent scheduled LC after PTHC. Clinical outcomes were analysed according to each group.

Results: Non-PTHC group and PTHC group had a significant difference in patients with cardiovascular diseases with 27.5 % and 50% respectively (P-value- 0.039). Re-intervention (radiological) in 5% of patients, Unplanned admissions in 17.5% of patients in the PTHC group. Non-PTHC group had almost equal ASA class I and class II patients (23 and 17 respectively). PTHC group had more ASA class III (30) patients than ASA class II(10patients).Operation time was more in PTHC group (median = 85min) than Non-PTHC group (median =60 min)Difficulty in dissection in 25% of Non-PTHC group and 40% of PTHC group(P-value 0.152).Intraoperative adhesions, both moderate and severe together more in PTHC, 36 patients(90%) than Non-PTHC ,22 patients (55%),P-value- 0.002 and also PTHC group had more subtotal cholecystectomy (12/40) than Non-PTHC group (4/40) P-value-0.048.Blood loss was higher in Non-PTHC and PTHC group (67.77±6.76 ml and 32.13±9.47, respectively). 2patients in PTHC group had bile leak post LC from PTHC entry site in the liver. Significant difference in total duration of antibiotic usage (Median value 7 in Non PTHC and 14 in PTHC), length of hospital stay (Median of 5 days in Non-PTHC and Median of 12 in PTHC group), no. of days of returning to normal activity (Median of 56 days in PTHC group and 11days in Non PTHC group) and cost of treatment,(P-value being <0.001 in all).Mortality(In-hospital and 30 days) is 0% in both groups.

Conclusions: Doing direct LC was easier, lesser operation time, cost-effective, requires less hospital stay and can return to their normal activities earlier than those who had PTHC, but blood loss is more intra-operatively. Among high-risk patients who are unfit for emergency surgery, delayed LC is a better option. To reduce active inflammation, PTHC can be done as a bridging procedure. But intra-operative adhesions and the chance of subtotal cholecystectomy is higher in scheduled LC after PTHC compared to early LC.

INTRODUCTION

Acute cholecystitis is an inflammatory condition of the gall bladder most often caused by gall stones. More than 80% of people with gall stones are asymptomatic. Acute cholecystitis develops only in few of patients with symptomatic gall stones.[2] Cystic duct get obstructed and causes inflammation resulting in acute cholecystitis. Complication of acute cholecystitis include empyema, perforation or gangrene of the gall bladder can. Diagnosis of acute cholecystitis is made based on clinical features and by the imaging findings. Surgery is the mainstay of treatment in cases of symptomatic gallstones and other gallbladder conditions.LC has become gold standard and replaced open cholecystectomy.

In high-risk patients, the management of acute cholecystitis remains controversial. Cholecystectomy

in these patients can lead to serious complications, morbidity and mortality [9] [10] Therefore, imaging-guided percutaneous catheter drainage is increasingly being performed as an alternative to early cholecystectomy. This minimally invasive radiological procedure helps in reducing inflammation avoiding surgical risks [11] According to international guidelines, it is considered a good choice of treatment in high-risk patients and those with moderate or severe cholecystitis[10].But it is not a definitive treatment since the gallbladder is not removed.So can lead to recurrent cholecystitis and other biliary complications with severe clinical effects[12]
A multicentre, randomised trial study first attempted in the Netherlands (CHOCOLATE) to assess whether LC is superior to percutaneous catheter drainage in high-risk patients with acute calculous cholecystitis. This study showed no difference in the rate of mortality and between the laparoscopic cholecystectomy and percutaneous catheter drainage group, but major complications were seen 65% of patients assigned to percutaneous drainage (risk ratio 0.19). It was noticed that Recurrent biliary disease occurred more often in the percutaneous drainage group leading to the lengthy hospital stay[11]. This study concluded that LC compared with percutaneous catheter drainage is the preferred treatment clinically and economically, even among high-risk patients with acute cholecystitis. Jia, B et al.[13] studies assessed the surgical outcomes between the emergency lap cholecystectomy and delayed lap chole following percutaneous cholecystectomy in acute cholecystitis patients, showed combining lap chole with PC is superior. Few studies[18, 19] have reported that initial safest treatment for acute calculous cholecystitis in patients with high risk for surgery is percutaneous cholecystostomy. There have been few works of literature with randomised trials comparing scheduled LC following percutaneous catheter drainage in patients with acute cholecystitis. It, therefore, remains unclear which treatment should be preferred in terms of clinical and economic outcomes. Hence our study attempts to evaluate the surgical outcomes, including procedure- related complications, mortality rate, length of hospital stays, reintervention rates, ICU admission and cost of treatment, in early LC without percutaneous cholecystostomy and scheduled LC following percutaneous cholecystostomy.

MATERIALS & METHODS

Study Group

Patients with clinical features suggestive of acute calculous cholecystitis attending OP/Emergency department or admitted in hospital in the Department of Surgical gastroenterology at Saveetha medical college and hospital, Thandalam , Chennai, Tamilnadu, in Southern part of India during period of January 2017 to December 2019 was considered in study population. According to previous hospital records, the number of patients undergoing combined Percutaneous transhepatic cholecystostomy (PTHC) & LC was less compared to the other group going for early LC. So, we calculated the sample size for a group with PTHC first and to make both the samples equal; we have taken the same number for the other group without PTHC. Based on the calculated sample size a total of 80 patients were enrolled in this study and analysed. Among them, 40 patients underwent early LC without PTHC (Non-PTHC group), and 40 patients underwent scheduled LC following PTHC (PTHC group).LC was done by a single Gastro surgeon.

Diagnosis

Diagnosis of acute cholecystitis was made using criteria for acute cholecystitis -TG18
A. Local signs of inflammation etc. (1) Murphy's sign, (2) RUQ mass/pain/tenderness
B. Systemic signs of inflammation etc. (1) Fever, (2) elevated CRP, (3) elevated WBC count
C. Imaging findings Imaging findings characteristic of acute cholecystitis- thickening of the gallbladder wall (≥4 mm), enlargement of the gallbladder (long axis ≥8 cm, short axis ≥4 cm), gallstones or retained debris, fluid accumulation around the gallbladder, and linear shadows in the fatty tissue around the gallbladder.[85]
Suspected diagnosis: one item in A + one item in B. Definite diagnosis: one item in A + one item in B + C
• Cited from Yokoe et al. (85)
• Acute hepatitis, other acute abdominal diseases, and chronic cholecystitis should be excluded

Inclusion Criteria:
• Patients who were diagnosed to have acute calculous cholecystitis
• Patients who had Laparoscopic cholecystectomy with and without PTHC.
• Age group >50
• Patients with ASA I, II, III categories
• Written informed consent

Exclusion criteria:
• Patients diagnosed to have chronic cholecystitis
• Patients not consenting for surgery
• Patients with bleeding diathesis
• Pregnancy
• Indication for ERCP on admission

• Suspicion of acute cholangitis and patients with Age<50yrs

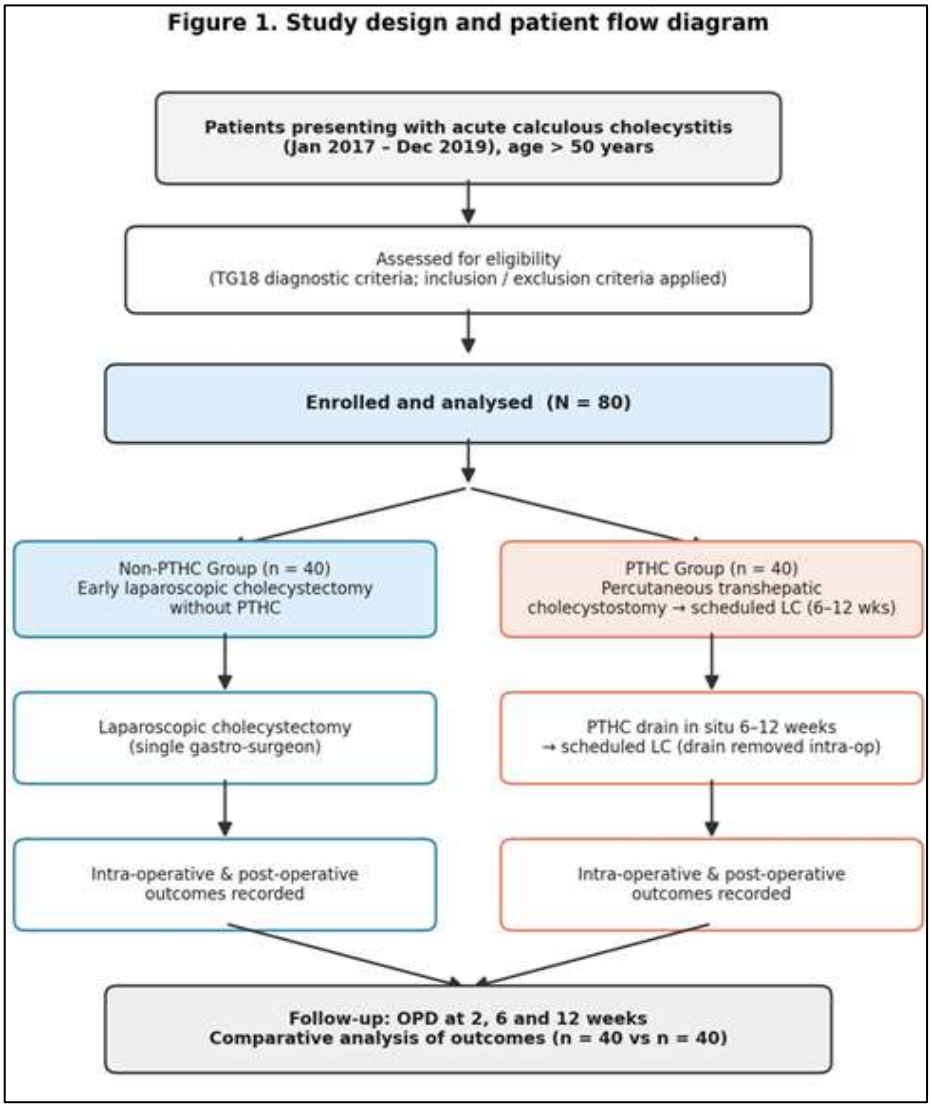
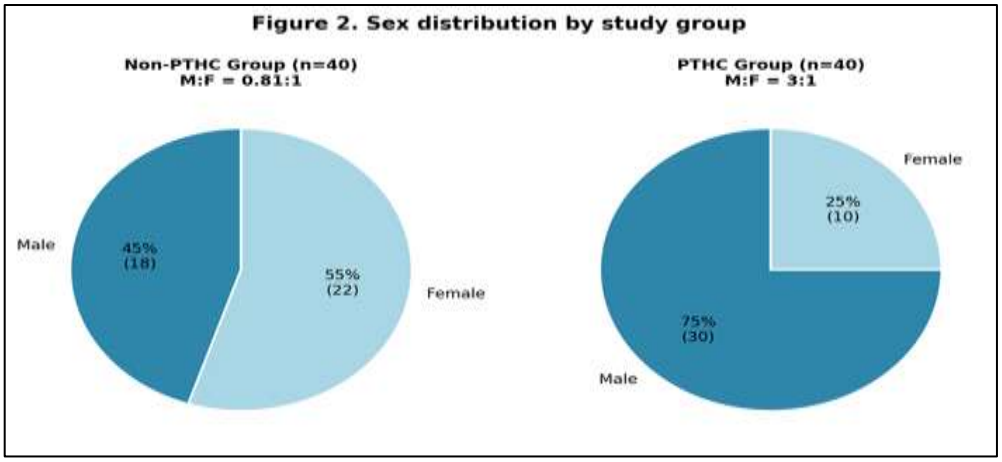


Figure 1. Study design and patient flow diagram (N = 80; 40 Non-PTHC vs 40 PTHC).



Laparoscopic cholecystectomy

A standard four-port technique was used for LC, with open cannulation using a 10mm port through supra or infra-umbilical incision and three further ports- epigastric (10mm) and two right upper quadrants (5mm)- under laparoscopic vision. Intra-abdominal pressure maintained below 15mm Hg. The camera was placed through the umbilical port. Calot's triangle dissected. Critical posterior window created. Clips applied to the cystic duct and cystic artery individually and cut.GB dissected off the liver bed with diathermy hook and retrieved using BERT bag through the umbilical port. GB sent for HPE. The drain tube is kept. No.1 vicryl closure of umbilical

port fascia and 3-0 monocryl subcuticular used for skin. Oral antibiotics and analgesics continued postoperatively. Once the patient is stable discharged.

Indication of percutaneous cholecystostomy

Indication of Percutaneous Transhepatic cholecystostomy was made based on severity of cholecystitis and comorbidity status of patient , that require further optimisation before surgery which includes Cardiovascular dysfunction (hypotension on supportive medications), patient on antiplatelet medication, recent cardiological interventions, Neurological dysfunction (decreased level of consciousness), Respiratory dysfunction (PaO2/FiO2 ratio < 300), Hepatic dysfunction with PT/INR > 1.5, Renal dysfunction (oliguria, creatinine > 2.0mg/dl), Haematological dysfunctions, low platelet counts

Percutaneous Transhepatic cholecystostomy

Performed under local anaesthesia, under USG guidance by an interventional radiologist. The 10-Fr Pigtail catheter is used. The transhepatic approach was preferred (Percutaneous transhepatic cholecystostomy PTHC). Aspiration of bile/pus from the drain confirms the satisfactory position. Pus taken for culture and sensitivity and antibiotics started accordingly. Watch for any catheter displacement/migration, bleeding, bile leakage and biliary peritonitis, bowel injury (transperitoneal puncture), bradycardia and hypotension after GB manipulation. Patients were observed for at least three days or till they were stabilised and if the patient showed clinical improvement & stable, they were discharged with PTHC drain in-situ.

The drain was left in place for a period of 6weeks to 12 weeks for the track to mature and infection to settles down. Scheduled LC was done after that. Removal of PTHC tube was done intraoperatively. Follow up done in OPD 2weeks,6weeks and 12 weeks after discharge.

Statistical Analysis

In-hospital mortality,30-day mortality, procedure (both LC and PTHC) related complications were considered as primary outcome variables. Conversion rate, operation time, blood loss, length of stay, re-intervention, etc., were considered as secondary outcome variables. Study group Non-PTHC group Vs PTHC group) was considered as Primary explanatory variable.

Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency and proportion for categorical variables. Non-normally distributed quantitative variables were summarised by the median and interquartile range (IQR). All Quantitative variables were checked for normal distribution within each category of an explanatory variable by using visual inspection of histograms and normality Q-Q plots. Shapiro- Wilk test was also conducted to assess normal distribution. Shapiro Wilk test p value of >0.05 was considered as a normal distribution. For normally distributed Quantitative parameters, the mean values were compared between study groups using Independent sample t-test (2 groups). For non-normally distributed Quantitative parameters, Medians and Interquartile range (IQR) were compared between study groups using Mann Whitney u test (2 groups).

Categorical outcomes were compared between study groups using Chi square test /Fisher's Exact test (If the overall sample size was < 20 or if the expected number in any one of the cells is < 5, Fisher's exact test was used.) P value ≤ 0.05 was considered statistically significant. IBM SPSS version 22 was used for statistical analysis.

RESULTS

Comparison of clinical characteristics pre-operatively

The mean ages of the patients two groups were 68.7 in Non-PTHC (n=40) and 69.35 in PTHC (n=40). Both groups were comparable with regards to age. The Male to female ratios were 0.81:1 ((18/22) in Non-PTHC group and 3:1 (30/10) in PTHC group. Significant differences were observed in the time of presentation and duration of symptoms between both groups. In Non-PTHC group, patients with symptoms ≥3 days were 30% were as in PTHC group patients with symptom duration ≥ 3days were 57.5%.

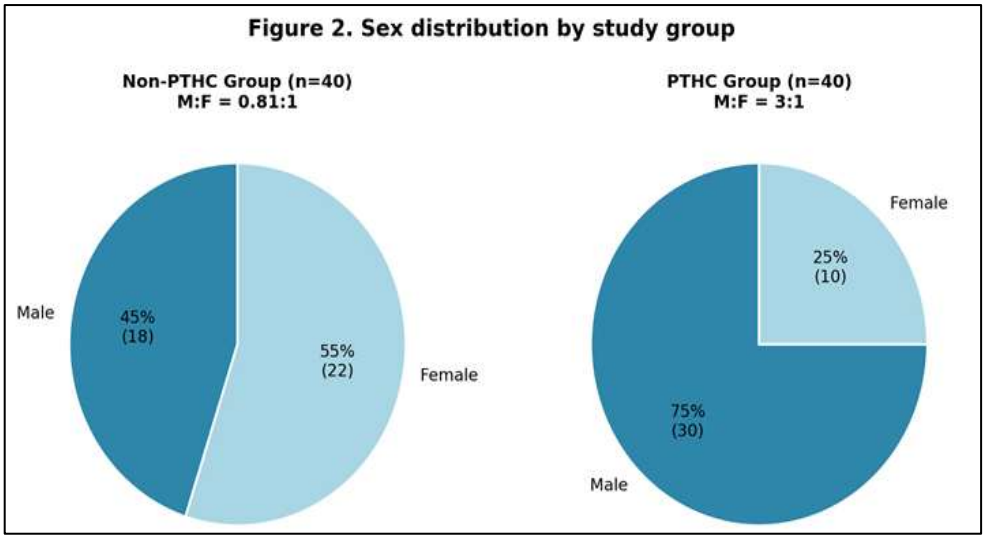


Table 1. Clinical characteristics of two groups on admission

	Non- PTHC group (N=40)	PTHC group (N=40)	P-value
Age (in yrs.)	68.7±6.83	69.35±8.29	0.703
Sex ratio (M: F)	0.81:1(18/22)	3:1(30/10)	
Symptom duration of ≥3 days	12(30%)	23(57.5%)	
Previous abdominal surgeries			
Yes	7(17.5%)	6(15%)	
No	33(82.5%)	34(85%)	0.762
Heart rate (per min)	89.93±13.98	92.43±15.39	0.449
Blood pressure (mm of Hg) *Median (IQR)* SBP	130(110,130)	120(120,130)	0.918
DBP	80(70,87.5)	80(70,90)	
O2 saturation (%)	97.45±0.93	96.2±2.22	0.002
Temperature (in F) *Median (IQR)*	98.3 (97.2,99)	98.2 (97.6,99)	0.504
ASA class II	17(42.5%)	10(25%)	0.098
III	23(57.5%)	30(75%)	

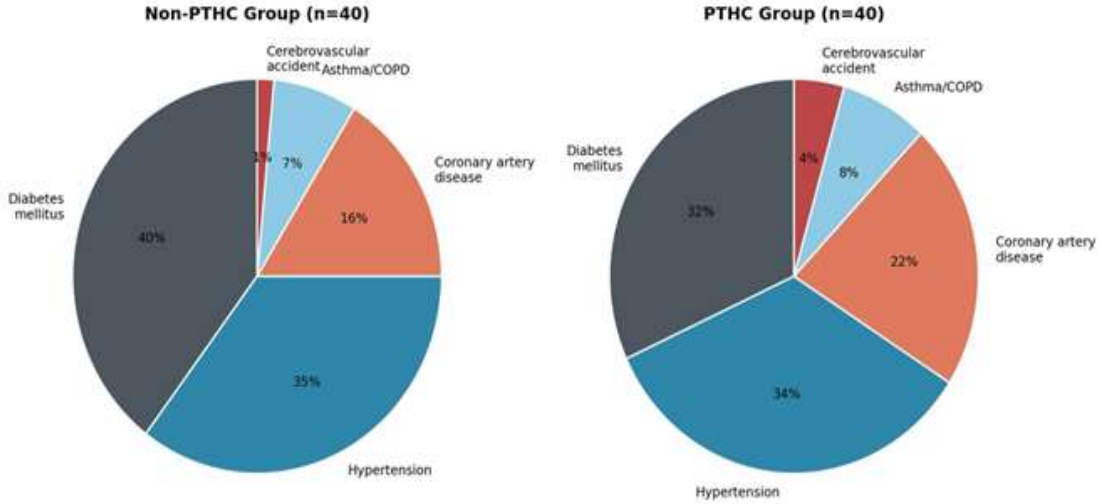


Figure 3. Relative share of major comorbidities within each study group (Table 2).

In PTHC group number of patients with cardiovascular diseases (20, 50%) was relatively higher (P-value-0.039). Re-intervention (radiological) in 5% of patients in PTHC group due to catheter displacement/ migration. Because of recurrent biliary attacks unplanned admissions in 17.5 % of patients in the PTHC group.

On comparing the vital parameters at the time of admission a lower levels of oxygen saturation were seen more in PTHC group (p-value 0.002). This was one of the reasons for doing PTHC to avoid respiratory compromise. On-PTHC group had almost equal ASA class I and class II patients (23 and 17 respectively). PTHC group had more ASA class III (30) patients than ASA class II (10 patients). (Table 1,2,3)

Comparison of outcomes of operation

Operative time was higher in PTHC (median 85min) than Non PTHC group (median 60 min) Difficulty dissection in 25% of Non-PTHC group and 40% of PTHC group (P-value 0.152). Intraoperative adhesions, were more in

PTHC, 36 patients (90%) than Non-PTHC ,22 patients (55%), P-value- 0.002. None had a conversion to open, so conversion rate 0% in both groups. Blood loss was higher in Non-PTHC and PTHC group (67.77±6.76 ml and 32.13±9.47, respectively). PTHC group had more subtotal cholecystectomy (12/40) than Non-PTHC group (4/40) P-value-0.048. Two patients (5%) in PTHC group had bile leak noticed during LC from PTHC entry site in the liver, which was sutured and settled intra-operatively. 2 patients (5%) in Non-PTHC group and 4 patients (10%) in PTHC had intra-abdominal (pericholecystic) abscess. (Table 4)

Comparison of post-operative outcomes

None of the patients had post-operative wound infections in both groups. Significant difference in total duration of antibiotic usage (Median value 7 in Non PTHC and 14 in PTHC), length of hospital stay (Median of 5 days in Non-PTHC and Median of 12 in PTHC group), no. of days of returning to normal activity (Median of 56 days in PTHC group and 11days in Non

PTHC group) and cost of treatment,(P-value being <0.001 in all). Mortality (In-hospital and 30 days) is 0% in both groups. (Table 5)

Table 2. Comparison of Co-morbidities if two groups

	Non-PTHC group N=40	PTHC group N=40	P-value
Asthma/COPD	5(12.5%)	7(17.5%)	0.531
Renal Disease	3(7.5%)	33(82.5%)	1.000
Cerebrovascular Accident	1(2.5%)	4(10%)	0.359
Diabetes mellitus	27(67.5%)	29(72.5%)	0.626
Hypertension	24(60%)	31(77.5%)	0.091
CoronaryArtery Disease	11(27.5%)	20(50%)	0.039

Table 3. Descriptive analysis of Post percutaneous cholecystostomy assessment in PTHC group (N=40)

	PTHC group N=40	Percentage
Bleeding	0	0%
Catheter displacement / Migration	2	5%
Bowel injury	0	0%
Biliary peritonitis Re-intervention	0	0%
Surgical	0	0%
Radiological	2	5%
Endoscopic	0	0%
Unplanned re-admissions	7	17.5%
Lost for follow-up	0	0%

DISCUSSION

Acute cholecystitis is a common disease that carry the risk of complications like empyema perforation, gangrene. Gall bladder calculi incidence is more in elderly, hence the elderly patients with severe comorbidities presenting with acute calculous cholecystitis is also more. In the elderly patient doing an emergency LC for acute cholecystitis carries a high risk of operative morbidity and mortality.

Table 4. Comparison of outcomes during Laparoscopic cholecystectomy in two groups

	Non- PTHC group (N=40)	PTHC group (N=40)	P-value
Operation time (in min) {*Median (IQR)}*	60(50,60)	85(75,90)	<0.001
Conversion to open Difficult dissection	None (0%)	None (0) %	
Yes	10(25%)	16(40%)	0.152
No	30(75%)	24(60%)	
Intra-op adhesions			
Yes	22(5%)	36(90%)	<0.002
No	18(45%)	4(10%)	
Blood loss (in ml) Intra-abdominal	67.77±6.76	32.13±19.47	<0.001
abscess/pericholecystic abscess)	2(5%)	4(10%)	0.396

Types of cholecystectomy			
Subtotal	4(10%)	12(30%)	0.048
Total	36(90%)	28(70%)	
Surgical complications			
CBD injury	0%	0%	
Iatrogenic bowel injury	0%	0%	
Bile leak at PTHC entry site	0%	2(5%)	
Vascular injury	0%	0%	

Many of these patients presents in sepsis, further increasing surgery associated risks. Earlier PTHC was used for patients too sick to undergo emergency LC, because of septic complications that resulted from severe inflammation and infection and also due to the morbidity of surgery and anaesthesia in patients with underlying medical comorbidities like diabetes, cardiovascular disease, renal failure, pulmonary insufficiency, and others. Conversion from a laparoscopic to an open procedure is another factor. There is a higher chance of conversion in acute cholecystitis compared to elective LC [84].

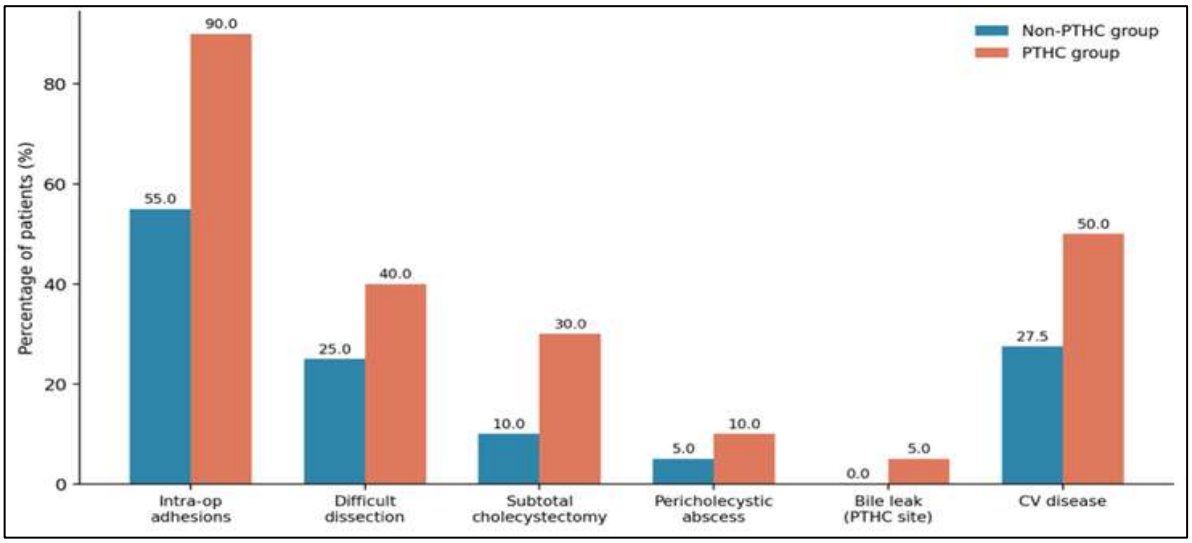


Figure 4. Intra-operative findings and complication rates by study group.

An even higher conversion rate and an increased complication rate after surgery if the patient presented after 48 to 96hrs. Many authors confirmed both efficacy as well as safety of LC in acute cholecystitis. Some says there is more chance of conversion and bile duct injuries [5]. In uncomplicated acute cholecystitis, LC if done within 72hs reduces the complication rate and it will be similar to another elective LC. Delay in LC causes more fibrosis and adhesions which makes surgery difficult. Eldar et al[3] found a conversion rate of 8% for uncomplicated acute cholecystitis, 12,5% for empyema of the gallbladder, and 40% for gangrenous cholecystitis. Similarly, the complication rate increased from 16% in acute cholecystitis to 22% in empyema or gangrenous cholecystitis. A delayed presentation and advanced cholecystitis was associated with a substantially higher conversion rate[8].

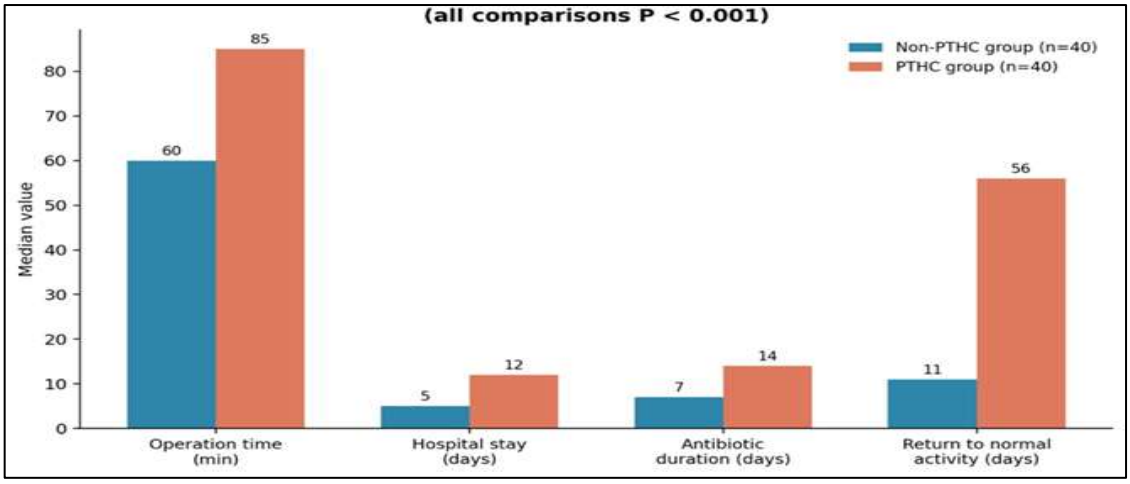


Figure 5. Comparison of median operation time, hospital stay, antibiotic duration and return-to-activity between groups (all P < 0.001).

Table 5. Comparison of Post-operative results between the two groups

	Non- PTHC group (N=40)	PTHC group (N=40)	P-value
Wound infection	None (0%)	None (0%)	
Duration of antibiotic usage (in days) *Median (IQR)*	7(7,11.5)	14(14,21)	<0.001
Total duration of hospital stays (in days) *Median (IQR)*	5(3,7)	12(10,14.75)	<0.001
Cost of treatment (in INR)	72,505	12,8775	<0.001
Return to normal activities (in days) *Median (IQR)*	11(7,14)	56(49,62.25)	<0.001

Considering the advantages of elective LC, rather than conversion surgeons prefer to go in favour of delayed surgery approach. This reduced bile duct injuries also. In our study we took equal proportion of study participants in both groups. Non-PTHC group (Non- PTHC group) included 40 patients who were diagnosed with Acute cholecystitis and had LC in the next available OT list. PTHC group (PTHC group) included 40 patients who were diagnosed with acute cholecystitis and initially had PTHC as they were high risk candidates for early surgery because of severe comorbidities. They had LC as a delayed procedure after 6 to 12 weeks of PTHC placement. All the patients who were included in study were of age > 50yrs. Mean age of both Non-PTHC group and PTHC group were 68.7 and 69.35 respectively. Majority of the patients in Non-PTHC group had symptoms <3 days and in PTHC group most of them had symptom duration of≥3 days. This was similar to study conducted by Lee R et al90 were most of patient ,68%, in direct LC group presented with symptoms <3days and 68.2% of patients in PTHC group presented with symptom duration >3days.

PTHC was done based on the patient's comorbidity status, and risk for surgery. In PTHC group most patients (50%) were having CAD with recent history of CABG or percutaneous coronary interventions, or CVA (10%) recently. These patients were on dual antiplatelets, or other anticoagulants which we were not able to stop immediately. Some were having uncontrolled Diabetes (72.5%), exacerbation of COPD/Asthma (17.5%) also. In Non-PTHC Group, the comorbidities present were controlled diseases on regular medications,.27.5% of patients in Non-PTHC group also had CAD in past, but they were on medical treatment for long-term with Aspirin and Statins. Aspirin was with-held at the time of diagnosis itself. PTHC group had 75%patients belonging to ASA grade III were as in Non PTHC there were equal number of ASA II and ASA III patients. Majority of patients in PTHC group had systemic signs of infection, O2 saturation were less, and some needed non-invasive/ invasive ventilatory supports, ICU admissions. They needed further optimization before surgery, and hence PTHC was chosen as a bridging procedure for them.

All PTHC group patients tolerated well with the initial procedure. There were no immediate complications like Bleeding, Bowel injury or Biliary peritonitis etc... But 2 patients (5%) had catheter displacement, and we had to do radiological re-interventions and re-insertion and positioning of pigtail catheter. There were unplanned re-admissions for 7(17.5%) patients which was due to recurrent episodes of cholecystitis or pus discharge from tube site. In the study by Spira M et al., 84(2002) catheter dislodgement and hepatic bleeding were the observed complications in percutaneous transhepatic cholecystectomy.9 out of 55 patients (16.4%) had catheter dislodgement, for 2 of them re-insertion was successful. None of the participants in
our study had hepatic bleeding as a complication. In the study by McKay et al., 24(2012) 16% of patients had tube related complications like tube dislodgement, tube blockage and bleeding. Tube related complication were much

less in our study group.

PTHC group patients had to stay for a longer time period (average of 12 days) in hospital than the Non -PTHC candidates (average of 5 days) because of the severity in initial disease, and of the re admissions they had. Most of them stayed in ICU also for some time, min of 1day to max up to 8days.Median length of stay in ICU is 2 (ranging between 1 to 8 days) in our study group. This finding was almost similar to many other studies, most of which showed length of stay was more in group who underwent percutaneous procedure and LC [23,27,84,90,91]. These patients were treated with antibiotics for longer period. Repeated infections, pus discharges from tube sites etc., made us to prolong the period of antibiotics before the patients get fit for surgery. Surgical outcomes were almost similar for both the groups, except for few factors. None of the participants in both groups had conversion of Lap to open surgery. This is solely because our unit is well experienced in doing Laparoscopic hepatobiliary surgeries. Other studies have shown higher conversion rates in PTHC groups than the early LC group[23,27,29,84,91] . Blood loss during surgery was more in Non-PTHC group because of active inflammation and oozing. Post-PTHC patients had more adhesions intraoperatively, mainly duodenal, colonic and omental.50% of patients had moderate, and 40 % had severe adhesions in PTHC group, only 10 % had no adhesions.45% of patients in Non-PTHC group had no adhesions at all. Almost 40% in PTHC group compared to 25% in Non-PTHC group had difficulty in dissection. Most of the patients had a frozen Calot's, and more fibrosis, which leads to difficulty in dissection. All these factors increased the operation time to an average of 85min in PTHC group compared to 60min in Non-PTHC group. This indicates that the percutaneous approach involves a longer operation duration.

More patients around 30 % (12) had subtotal cholecystectomy in PTHC group, whereas only 4 (10%) had subtotal cholecystectomy in Non-PTHC group. Anatomy of Calot's triangle was altered in these patients due to recurrent inflammatory attacks. There were no major vascular, bowel injury or CBD injury in both the groups. In 2 patients of PTHC group, while removing PTHC catheter intra-op, there was bile leak at its entry site into the liver which was sought out at that time itself by suturing the site. Pericholecystic abscess was seen in 5% of Non-PTHC group, and 10% of PTHC group patients. Post-operative period was uneventful for both the groups. No other major systemic (cardiopulmonary) complications, No In- hospital

or 30 day- mortality, morbidity was observed in any of the patients in Non-PTHC group or PTHC group. In spite of Surgical (Lap cholecystectomy) charges and surgeons charges being same, cost of treatment was more in PTHC group due to more re-admission rates, ICU charges, Cost of medications etc. They had to spent around 70,000 INR to 1,00000 INR range whereas the average cost of treatment for Non-PTHC group was 40,505 INR. Non-PTHC group persons returned to their normal activities and returned to work also earlier. On an average of 11days whereas PTHC group persons took much longer, average of 56 days. This had an impact on patient's quality of life

CONCLUSION

Based on the current study findings, we have concluded that performing direct LC was easier, lesser operation time, cost-effective, requires less hospital stay and can return to their normal activities earlier than those who had PTHC, but blood loss is more intra-operatively. Among high-risk patients who are unfit for emergency surgery, delayed LC is a better option. To reduce active inflammation, PTHC can be done as a bridging procedure. But intra-operative adhesions and the chance of subtotal cholecystectomy is higher in scheduled LC after PTHC compared to early LC.

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