

ORIGINAL ARTICLE

Role of Laparoscopic Cholecystectomy in Early Management of Acute Calculous Cholecystitis

Amir Iqbal Memon, Shazmah, Agha Taj Mohammad, Tarnum Naz, Aisha Masroor Bhatti,
Hitesh Kumar

Dr. Amir Iqbal Memon (*Corresponding Author*)

Professor of Department of Surgery
Liaquat University of Medical & Health Sciences
(LUMHS), Jamshoro, Sindh-Pakistan.
Email: dramiriqbalmemon@gmail.com

Dr. Shazmah

Post Graduate Trainee
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Agha Taj Mohammad

Associate Professor of Surgery
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Tarnum Naz

Post Graduate Trainee
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Aisha Masroor Bhatti

Post Graduate Trainee
LUMHS, Jamshoro, Sindh-Pakistan.

Dr. Hitesh Kumar

Post Graduate Trainee
LUMHS, Jamshoro, Sindh-Pakistan.

ABSTRACT

OBJECTIVE: To demonstrate the results of early laparoscopic cholecystectomy in patients having acute calculous cholecystitis undergone surgery specially focusing hospital stay duration and postoperative complications related to biliary injury and port site infection.

METHODOLOGY: This observational study was carried out at surgical department Unit-II, Liaquat University Hospital Jamshoro/Hyderabad and Minimal Invasive Surgical Center from July 2018 to June 2019 with Non-probability, consecutive sampling technique. Patients of acute calculous cholecystitis irrespective of sex between 15 to 60 years age, who need admission for laparoscopic cholecystectomy were included. A calculous acute cholecystitis, hepatitis B and C+ve, coagulopathy, patients below age of 15 years and above 60 years, gall bladder cancer, acute pancreatitis, choledocholithiasis and previous abdominal surgery.

RESULTS: 138 patients, 127(92.02%) female and 11(7.91%) male. Mean age was 41.13 ± 4.50 years. Presented with RHC pain 77(55.79%), RHC along with epigastrium pain 61(44.20%), nausea & vomiting 41(29.71%), dyspepsia 29(21.01%) and fever 38(27.53%). Ultrasound revealed single stone 39(28.26%), multiple stones 99(71.73%), impacted stone at gallbladder neck in 26(18.84%), thick wall gallbladder in 69(50%), pericholecystic fluid in 101(73.18%) and mucocele 13(9.42%) patients.

Complications were biliary injury 2(1.44%), bleeding in 7(5.07%), port site infection or abscess 3(2.17%), conversion to open surgery 5(3.62%), injury to organs and mortality 0% patients. Mostly patients discharged on 3rd postoperative day 75(54.34%), followed by 2nd postoperative days 53(38.40%) patients.

CONCLUSION: Early laparoscopic cholecystectomy in acute cholecystitis is possible, safe, costs effective and requires shorter hospital stay without affecting the morbidity and mortality if surgical intervention is done within 72 hours of onset of symptoms.

KEY WORDS: Acute calculous cholecystectomy, early laparoscopic cholecystectomy, delayed laparoscopic cholecystectomy.

INTRODUCTION

Laparoscopic cholecystectomy has now become the gold standard treatment for cholelithiasis. There is growing evidence in support of early laparoscopic cholecystectomy (LC) for acute cholecystitis¹⁻³. Acute cholecystitis as a major complication of gallstones is diagnosed in 10% to 35% of patients admitted for cholecystectomy^{4,5}. Two approaches are available for the treatment of acute cholecystitis. The first approach is early (within 7 days of onset of symptoms) laparoscopic cholecystectomy (LC) in the same hospital admission. The second approach is to keep the patient on conservative treatment which is successful in about 90% of the cases and then delayed cholecystectomy is performed in the second hospital admission after an interval of 6–12 weeks⁶. The studies⁷⁻¹⁰ found a significant advantage of early LC in reducing hospital stay and lowering cost. Most surgeons consider early LC as the optimum treatment for acute cholecystitis^{11,12}. Several randomized and non-randomized studies have documented the feasibility and safety of early LC for acute cholecystitis in experienced hands¹³. Early cholecystectomy for the gall stone disease is mere good towards early recovery and to reduce complication associated with gall stone disease¹⁴. The rational of this study is to evaluate preoperative and postoperative complications and benefits in terms of early recovery and hospital stay when acutely inflamed gall bladder is removed laparoscopically instead of conservative management followed by elective removal.

METHODOLOGY

This observational study was carried out from July 2018 to June 2019 upon a sample of 138 cases, came at surgical Unit II Hyderabad/Jamshoro and Minimal Invasive Surgical Center with calculous cholecystitis. Patients were chosen via non-probability, consecutive sampling technique. All diagnosed patients of acute calculous cholecystitis irrespective of sex between 15 to 60 years of age, who need hospital admission for operative intervention (laparoscopic cholecystectomy) were enlisted in the study. Acalculous acute cholecystitis, patients with hepatitis B and C+ve, coagulopathy and patients younger than 16 years of age and older than 60 years, patients with gall bladder ca, acute pancreatitis, cholidocholelithiasis, and patients with previous abdominal surgery all were excluded.

Data collection: Patients who come to surgical Unit II Hyderabad/Jamshoro and Minimal Invasive Surgical Center with features of acute calculous cholecystitis was diagnosed after history and relevant abdominal examination and confirmed by ultrasound abdomen. Those who fulfill the criteria was enlisted. Informed as well as written consent was taken after explaining the procedure, benefits and complications. Data was put in the proforma containing biodata, history, clinical examinations and relevant investigations. Patient after having anesthesia fitness was kept on next available list. Conventional 4-port laparoscopic cholecystectomy was performed. Any complication during surgery related to biliary tree was entered in proforma. Collected data, analyzed with (SPSS) software, 22.0 version. Age was measured by mean and standard deviation as quantitative variable. Frequency and percentages was calculated for sex, complications, mortality and hospital Stay. Effect modifier like age, sex and complications, mortality and hospital stay were done. Stratification using student's t-test.

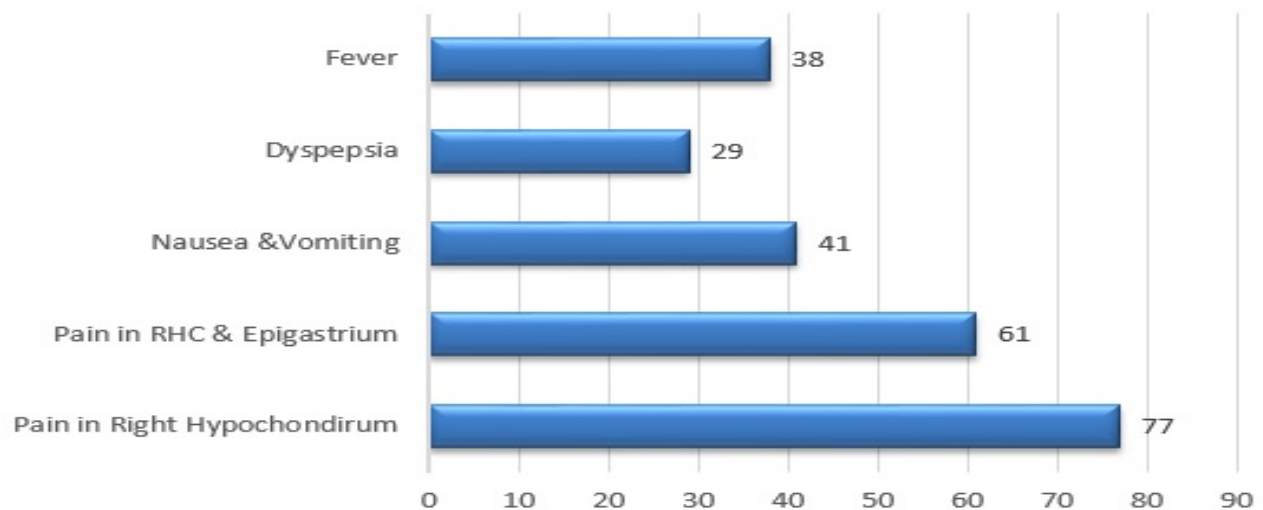
RESULTS

Out of 138 patients 127 (92.02%) were female and 11 (7.91%) male. Age ranging from 15 to 60 years. The mean age was 41.13 ± 4.50 years

Symptoms of Patients

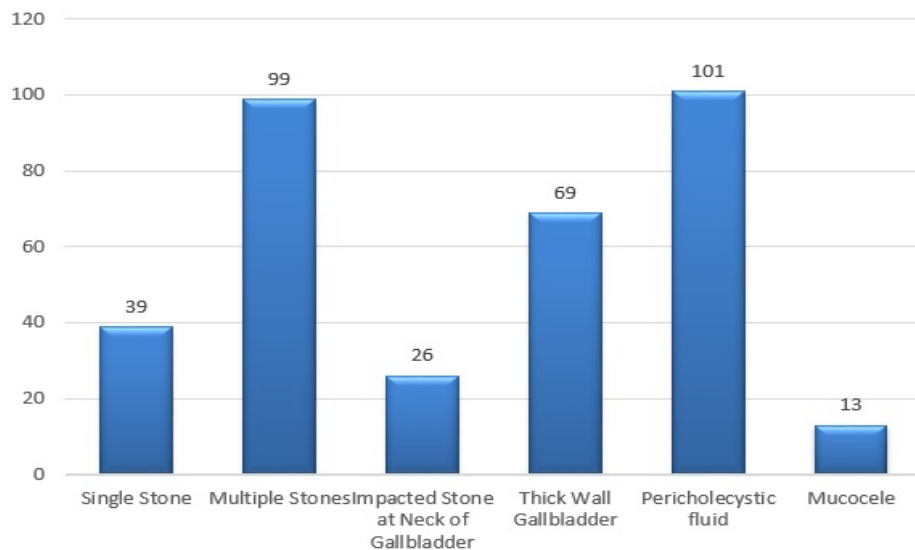
Usually the presentation was RHC pain 77 (55.79%), RHC associated with epigastrium pain in 61 (44.20%), nausea & vomiting 41 (29.71%), dyspepsia 29 (21.01%) and fever in 38 (27.53%) of cases (Graph I).

GRAPH I: SYMPTOMS OF PATIENTS



Ultrasound Findings: The ultrasound findings were solitary calculus 39(28.26%) and multiple calculi (stones) 99(71.73%) cases, calculi at gallbladder neck in 26(18.84%) patients, thick wall gallbladder in 69(50%) patients, pericholecystic fluid in 101(73.18%) patients and mucocoele in 13(9.42%) patients. Chart II.

GRAPH II: ULTRASOUND FINDINGS



Complications after surgery: The complications seen in this study was biliary injury in 2(1.44%) patients, bleeding in 7(5.07%) patients, port site infection or abscess in 3(2.17%) patients, conversion to open surgical procedure in 5(3.62%) patients, injury to organs and mortality reported zero percentage (Table I).

TABLE I: COMPLICATIONS AFTER SURGERY

Complications after surgery	No. of patients (n=138)	Percentage (%)
Biliary injury	2	1.44%
Bleeding	7	5.07%
Port site infection or abscess	3	2.17%
Conversion to open surgical procedure	5	3.62%
Injury to organs	0	0%
Mortality	0	0%

Hospital stay: Stay varies up to 6 days. Mostly patients discharged on 3rd days 75(54.34%)cases followed by 2nd days 53(38.40%) cases. It was longer about 4-6 days in 6(4.34%) patients. The patients developed complications after surgery or laparoscopic conversion to open surgery had still longer stay. Mean hospital stay was 2.51±0.37 days. (Table II) Hospital Stay (n=138)

TABLE II: HOSPITAL STAY

Hospital stay	No. of patients	Percentage
1 day	4	2.89%
2 day	53	38.40%
3 day	75	54.34%
>4 day	6	4.34%
Total	138	100%

DISCUSSION

Acute inflammation of gall bladder is termed as acute cholecystitis. It is due to gall stones in 90-95% of cases and is the most common reason for emergency cholecystectomy¹⁵.

Essenhigh, in 1966 initially prescribed early surgical intervention for acute cholecystitis. Multiple studies and randomized trials have been done and is in favor of early surgical intervention with the diagnosis of acute cholecystitis. Early surgical intervention is prescribed for cases presented within 72 hours of acute attack of pain, in order to operate during the edema phase of acute inflammation, in comparison to late intervention as opposed due to hyper vascular phase, abscess formation, necrosis, and leads to scarring¹⁶. In this study we are in favor of surgical intervention within 72 hours of onset of symptoms.

It was reported by Mohan H, in his study that 925 cases were females' and 148 were males, out of 1100 total cases¹⁷. Memon MR in his study revealed the age variation up to 45 years¹⁸.

Presenting features in our study were RHC pain 77(55.79%), RHC pain associated with epigastric pain 61(44.20%), nausea & vomiting 41(29.71%), dyspepsia 29(21.01%) and fever in 38(27.53%) of cases. Moreover, Laghari AA¹⁹ in his study reported that the frequent presenting complains are upper abdominal pain either in right hypochondrium (51.67%) or in right hypochondrium and epigastric (29.17%) or epigastric pain (19.17%)¹⁹.

Radiological assessment like ultrasound is a first line diagnostic investigation of modality for the patients presenting with abdominal pain²⁰. Ultrasound can diagnose cholelithiasis, cholidocholelithiasis and dilation of biliary ducts. In our study radiological findings were solitary calculus (stone) in 39(28.26%) patients where as multiple calculi in 99(71.73%) patients, calculi impacted at the gallbladder neck in 26(18.84%) patients, thick wall gallbladder in 69(50%) patients, pericholecystic fluid in 101(73.18%) patients and mucocoele in 13(9.42%) patient. Ji W et al²¹ reported multiple calculi (stones) in 69.71%, gallbladder wall thickness in 41.67% and multiple adhesions in 35% of cases.

Laparoscopic cholecystectomy procedure is technically difficult, there are many conditions that can technically difficult procedure like include acute cholecystitis, empyema gall bladder, gangrenous cholecystitis, porcelain gall bladder and intrahepatic gall bladder²². Apart from these, there are many other cases where it is very difficult laparoscopic cholecystectomy. These include previous laparotomy and postoperative adhesions, portal hypertension, cirrhosis of liver and surgery in a pregnant patient²². Bile leakage is one of the major postoperative complications. Biliary complications including bile leakage after cholecystectomy are a major cause of morbidity and extended hospital stays²³. Though the reported figure of operative bile duct injuries are much lower than the actual incidence, a recent audit of 1522 laparoscopic cholecystectomies performed in Thailand revealed a bile duct injury rate of 0.59%²⁴, this biliary injury rate is nearer to that found in our study 2(1.44%). This study found bleeding from port site in 3 (5.07%) and the results compared with Malik AM study²⁵, reported bleeding from port site in 13(0.5%) cases. In this study the frequency of port site infection observed in 2.17% cases, while Shindholimath VV et al²⁶ observed port site infection was 6.3%.

In this study observed 5(3.62%) patients who underwent laparoscopic converted open cholecystectomy procedure because of the reasons for higher conversion may have been the presence of empyema GB. In a study by Vikas Goyal et-al²⁷ the conversion rate for acute cholecystitis was noted to be 5.8%. However conversion rates of 6.5%-35% have been reported in literature²⁸⁻³⁰. The conversion to open surgical process rate in our study was within the acceptable conversion rate. Hence our study favors the positive results of early laparoscopic

cholecystectomy for acute cholecystitis during emergency admission and is safe and associated with low morbidity. According to Tokyo guidelines, to decrease the complication of gall stone disease we have to observe surgical difficulty appropriately and standardized the treatment option accordingly³².

CONCLUSIONS

Early laparoscopic cholecystectomy in acute cholecystitis is possible, safe, and cost effective and requires shorter hospital stay without affecting the morbidity and mortality if performed within 72 hours of onset of symptoms.

Ethical permission: Liaquat University of Medical & health Sciences ERC letter No. LUMHS/REC/-615, dated 31-0502017.

Conflict of Interest: There is no conflict of interest.

Funding: There was no any funding agency.

AUTHOR CONTRIBUTIONS

Memon AI:	Main scope, drafting, idea, final approval of article
Shazmah:	Data collection, analysis
Mohammad AT:	Data collection
Naz T:	Data analysis
Bhatti AM:	Data analysis & reconcile
Kumar H:	Data collection

REFERENCES

1. Gurusamy K, Samraj K, Gluud C, Wilson E, Davidson BR. Meta-analysis of randomized controlled trials on the safety and effectiveness of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg*. 2010; 97(2): 141-50.
2. Banz V, Gsponer T, Candinas D, Güller U. Population-based analysis of 4113 patients with acute cholecystitis: defining the optimal time-point for laparoscopic cholecystectomy. *Ann Surg*. 2011; 254(6): 964-70.
3. Barcelo M, Cruz-Santamaria DM, Alba-Lopez C, Devesa-Medina MJ, Diaz-Rubio M, Rey E. Advantages of early cholecystectomy in clinical practice of a tertiary care center. *Hepatobiliary Pancreat Dis Int*. 2013; 12(1): 87-93.
4. Qureshi A, Haider J, Aziz A. Early Laparoscopic Cholecystectomy for Acute Calculous Cholecystitis: What is the Optimal Timing? *J Surg Pak (Int)* 2012; 17(1): 2012: 12-15.
5. Afzal M, Rehman S, Mian MA, Ahmed R. Rate and reasons of conversion of laparoscopic cholecystectomy to open cholecystectomy? A prospective analysis of 450 consecutive laparoscopic cholecystectomies. *PAFMJ*. 2016; 66(1): 117-121.
6. Agrawal R, Sood KC, Agarwal B. Evaluation of Early versus Delayed Laparoscopic Cholecystectomy in Acute Cholecystitis. *Hindawi Pub Corp Surg Resear Prac*. 2015; 1-7.
7. Gurusamy KS, Davidson C, Gluud C, Davidson BR. Early versus delayed laparoscopic cholecystectomy for people with acute cholecystitis. *Cochrane Database Syst Rev*. 2013; 6: CD005440.
8. Saber A, Hokkam EN. Operative Outcome and Patient Satisfaction in Early and Delayed Laparoscopic Cholecystectomy for Acute Cholecystitis. *Minim Invasive Surg*. 2014:1-4.
9. Saeed SA, Masroor I. Percutaneous Cholecystostomy (PC) in the Management of Acute Cholecystitis in High Risk Patients. *JCPSP*. 2010; 20(9): 612-15.
10. Gutt CN, Encke J, Köninger J. Acute cholecystitis: early versus delayed cholecystectomy, a multicenter randomized trial. *Ann Surg*. 2013; 258(3): 385-393.
11. Omer Engina, Mehmet Yildirim, Fevzi Cengiz, Enver İlhan. Laparoscopic Anterograde Cholecystectomy in Acute Cholecystitis. *J Clin Med Res* 2009; 1(3): 186-87.
12. Casillas RA, Yegiyants S, Collins JC. Early laparoscopic cholecystectomy is the preferred management of acute cholecystitis. *Arch Surg*. 2008; 143(6): 533-7.
13. González-Rodríguez FJ, Paredes-Cotórre JP, Pontón C. Early or delayed laparoscopic cholecystectomy in acute cholecystitis? Conclusions of a controlled trial. *J Hepato-Gastroenterol*. 2009; 56(89): 11-16.
14. Imbisat MZ, Rizvi SAA, Ali I. An evaluation of early and delayed laparoscopic cholecystectomy for acute cholecystitis. *Int Surg J*. 2019; 6.
15. Coccolini F, Allegri A, Ceresoli M, D'Amico G, Harbi A, Montori G, et al. Acute Cholecystitis and Cholangitis. In *Acute Care Surgery Handbook*. 2016; 171-193.
16. Ahmad I. Cholecystectomy in acute cholecystitis. *J Pak Med Assoc*. 1992 May; 42(5): 112-5.
17. Mohan H, Punia RPS, Dhawan SB, Ahal S, Sekhon MS. Morphological spectrum of gallstone disease in 1100 cholecystectomies in North India. *North Indian J Surg*. 2005; 67: 140-2.
18. Memon MR, Muhammad G, Arshad S, Jat MA, Bozdar AG, Shah SQA. Study of open conversion in laparoscopic cholecystectomy. *Gomal J Med Sci*. 2011; 9(1): 51-54.
19. Laghari AA, Talpur KAH, Malik AM, Khan SA, Memon AI. Laparoscopic cholecystectomy in complicated gallstone disease. *J LUMHS*. 2008; 18-24.

20. Nuernberg D, Ignee A, Dietrich CF. Ultrasound in gastroenterology. Biliopancreatic system. *Med Klin Munich*. 2007; 102(2): 112-126.
21. Ji W, Li LT, Wang ZM, Quan ZF, Chen XR, Li JS. A randomized controlled trial of laparoscopic versus open cholecystectomy in patients with cirrhotic portal hypertension. *World J Gastroenterol*. 2005; 11(16): 2513-17.
22. Cianci P, Tartaglia N, Fersini A, Capuzzolo S, Giambavicchio LL, Ambrosi A, et al. Acute Cholecystitis: Diagnostic Pitfall and Timing of Treatment. In *Updates in Gallbladder Diseases 2017*. Intech Open. 23-45.
23. Dominguez-Rosado I, Sanford DE, Liu J, Hawkins WG, Mercado MA. Timing of surgical repair after bile duct injury impacts postoperative complications but not anastomotic patency. *Ann Surg*. 2016; 264(3): 544-53.
24. Shimizu T, Yoshida H, Mamada Y, Taniai N, Matsumoto S, Mizuguchi Y, et al. Postoperative bile leakage managed successfully by intrahepatic biliary ablation with ethanol. *World J Gastroenterol*. 2006; 12(21): 3450-52.
25. Malik AM, Laghari AA, Mallah Q, Hashmi F, Sheikh U, Talpur KAH. Extra-biliary complications during laparoscopic cholecystectomy: How serious is the problems? *J Minimal Access Surg*. 2008; 4(1): 5-8.
26. Shindholimath VV, Seenu V, Parshad R, Chaudhry R, Kumar A. Factors influencing wound infection following laparoscopic cholecystectomy. *Trop Gastroenterol*. 2003; 24: 90-2.
27. Goyal V, Nagpal N, Gupta M, Kapoor R. A prospective study to predict the preoperative risk factors for conversion of laparoscopic to open cholecystectomy. *Int J Contemp Med Surg Radiol*. 2017; 2(4): 148-152.
28. Kaafarani HMA, Smith TS, Neumayer L, Berger DM, Delalma RG, Itani KMF. Trends, outcomes, and predictors of open and conversion to open cholecystectomy in Veterans Health Administration hospital. *Am J Surg*. 2010; 200 (6): 32-40.
29. Satish KB, Umesh KC, Gopal G, Yudhir S, Anuj D. Evaluation of risk factors in conversion of laparoscopic cholecystectomy in cases of acute cholecystitis. *Int J Cont Med Res*. 2015; 2(2): 205-209.
30. Gill HS, Gupta A, Singh B. Evaluation of the role of various factors in conversion of laparoscopic cholecystectomy into open cholecystectomy. *Int J Contemp Med Res*. 2016; 3(10): 3031-35.
31. Elamin Y E, Walid E A E, Eltahir A G K, Eltaib A S, A Awadelkarim, Kamal E EE. Early Laparoscopic Cholecystectomy for Acute Cholecystitis in a Cohort of Sudanese Patients: Outcome and Complications in Minimum Resource-Settings. *Open Access J Surg*. 2017; 6(3): 555694.
32. Wakabayashi G, Iwashita Y, Hibi T, Takada T, Steven M, et al. Tokyo Guidelines 2018: Surgical management of acute cholecystitis: safe steps in laparoscopic cholecystectomy for acute cholecystitis (with videos). *J Hepatobil Pancreat Sci*. 2018; 25: 73-86.