

Original Article

Early Laparoscopic Cholecystectomy in acute cholecystitis and its sequelae: Experience in tertiary care hospital

Md. Ezharul Haque Ratan¹, Hasina Alam²**Abstract**

Background: Acute cholecystitis (AC) is a common surgical condition requiring emergency hospitalization. Traditionally, these patients were treated conservatively, followed by delayed surgery six weeks or longer after acute event has subsided. Recently, early emergency cholecystectomy at same admission is suggested. This has the advantage of reduced length of stay (LOS) in hospital without any significant increase in complication rate. Moreover, conservative management is not always successful. We are here, observing the feasibility of emergency cholecystectomy in practical setting.

Method: Between March 2008 and March 2017, 483 patients were admitted in a surgical unit of BIRDEM general hospital with the diagnosis of acute cholecystitis or its complications. The patients were assessed clinically with laboratory and imaging investigations. We planned early laparoscopic cholecystectomy (ELC) in all case, as soon as assessment and resuscitation were completed, irrespective of duration from symptom onset. Cases were analyzed for gender, age, operation time, volume of blood loss, conversion to open surgery, post-operative complication and length of hospital stay.

Results: A total of 483 patients with AC and its sequelae were admitted, between March 2008 and March 2017 in a single unit of a tertiary care hospital which deals most of the diabetic patients of the country. Among them 477 patients were treated with emergency or urgent laparoscopic cholecystectomy (LC). The earlier the patient presented for surgery and those who were treated with antibiotics were easier to operate. Incidence of gangrene and perforation were more among those with acalculus cholecystitis. Surgical procedures were the most difficult in those presented beyond two weeks of symptom onset. Consequently operation time was over 100 minutes and blood loss was more than 250ml in such cases. Fortunately none required conversion to open procedure. Subhepatic drain were used in 17 cases. Subcutaneous simple tube drain in umbilical port was used in those with gangrene, perforation and transmural gall bladder wall pyogenic infection. Consequently umbilical port infection were very low (3cases, 0.6%). One patient presented with subhepatic fluid collection, 6 weeks after emergency LC. Laparotomy was done and found to have altered blood and pseudo-aneurysm of cystic artery (chronic blood loss from one of its lateral twig). Length of stay (LOS) in hospital were short (mean-1.8days, range: 20hours-4 days) except those with bile leak (5, 8 and 9 days respectively). None of the cases had bile duct injury or uncontrolled bleeding. There was no mortality in this series.

Conclusion: Early laparoscopic cholecystectomy (ELC) has proved to be an effective and safe day case surgical procedure for AC and their complications. It provides much benefits with low complication and conversion in experienced hands.

Key words: Laparoscopic cholecystectomy (LC), Early laparoscopic cholecystectomy (ELC), Delayed laparoscopic cholecystectomy (DLC), Acute cholecystitis (AC), Length of stay (LOS)

Introduction:

Acute cholecystitis (AC) and its complications remain among most common surgical condition which require emergency

hospitalization. These patients are commonly treated initially non-operatively followed by delayed surgery six weeks or longer after acute event has subsided¹. Recently, there has been significant paradigm shifts in management of such cases to early surgery at same admission with the advantage of reduced length of stay (LOS) in hospital while complications rate remain the same². Moreover, conservative management is not always successful. About one fifth of the cases, who were waiting for delayed surgery, had persistent symptoms or developed another acute attack requiring intervention before planned operation³.

Controversy persists regarding the optimal timing for intervention in AC. Some follow the policy of emergency surgery in 24-96 hours after onset of symptoms while others suggest early surgery in acute phase within 3 days after admission and still others define 'early' as ranging from 24hours to 7 days from diagnosis or onset of symptoms^{4,5}. The Tokyo guidelines of the Japanese society of hepatobiliary

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pancreatic surgery suggested that emergency cholecystectomy was indicated for patients with symptoms within 72 hours while that of the national institute for health and care excellence (NICE) recommended that AC should be treated within seven days of diagnosis⁷.

While accepting early surgery for AC, consensus is still lacking regarding technical aspects, whether open or laparoscopic cholecystectomy is to be done. Considering presence of inflammation, oedema, necrosis and adhesion are unfavorable for safe dissection², 48.7% of AC are operated with the open technique. Some literature and Tokyo guideline 2013 have shown concern about supposedly higher mortality rates in emergency laparoscopic cholecystectomy (AL) in AC. According to some author, conversion rate to open procedure is also higher during LC in acute phase^{8,9}. On the other hand, some randomized controlled trials¹⁰⁻¹³ and meta-analysis¹⁴⁻¹⁶ recommended acute phase LC with the advantage of fewer complications, less operative blood loss and shorter post-operative LOS⁶. Gonzalez Rodrigueg FJ et al considered urgent LC 72 hours after onset of symptoms to be difficult and associated with higher risk of complications¹⁶. While some studies found no difference in conversion rate, morbidity and LOS between patients with symptoms less or more than 72 hours.

Many of our patients present late due to financial or personal constrains, ignorance, fear of operation, delayed diagnosis, and getting treatment in another hospital. Delay also occurs due to failure of conservative management, recurrent symptoms before planned operation or due to optimization of medical condition for possible safe anaesthesia. Whatever may be the cause of delay, progressive inflammation may lead to complication like gangrene and perforation of the gallbladder and pericholecystic abscess formation compelling urgent surgery. The feasibility and safety of LC for AC and its sequelae 7 days after symptom onset in patients who were unable to receive earlier surgery are unclear. This retrospective study was aimed to observe the feasibility and safety of emergency and urgent LC in AC and its sequelae during persisting symptoms in same admission.

Materials and methods

Between March 2008 and March 2017, 483 patients were admitted in a surgical unit of BIRDEM general hospital with a diagnosis of acute cholecystectomy or its complications. The patients were assessed clinically (Murphy's sign or right upper quadrant abdominal pain or tenderness or mass & fever) with laboratory tests (leukocytosis, liver & pancreatic enzymes) and imaging (ultrasound examination and computed tomography in selected cases). Diagnostic and/or therapeutic endoscopic retrograde cholangiopancreatography (ERCP) was done in those with suspected biliary tree stone or pathology. We planned laparoscopic cholecystectomy in all cases as soon as assessment and resuscitation were completed irrespective of duration from symptom onset. Surgery was delayed in seven patients for five days after antiplatelet agent has stopped or for ERCP. Six patients were excluded from this study as their surgery was due to high risk for emergency

surgery (poor general condition, cardiac function, renal function, or recent stroke). Emergency LC was done in rest of the patients (477), by a single attending surgeon using standard four port technique. Carbon dioxide was used for peritoneal insufflation maintaining a pressure between 10 and 12 mmHg. The gallbladder was decompressed by aspirating its contents. The cystic artery and duct were skeletonized and sealed using hem-o-lock individually. Cystic duct was ligated or transfixated with 1-0 vicryl in selected cases (wide and /or fragile). Saline irrigation was done in all cases. A subhepatic tube drain was placed in those with perforated or gangrenous cholecystitis or pericholecystic abscess. Gallbladder were removed through umbilical port. Those having gangrene, perforation, transmural infection or spillage of stone were placed in 'glove-bag' before removal. Histopathological examination of resected gall bladder was routinely performed to confirm acute cholecystitis. Cases were analyzed for gender, age, operation time, volume of blood loss, conversion to open surgery, post-operative complication and length of hospital stay. Operation time was defined as beginning with skin incision and ending when dressing has been placed over ports.

Results

A total of 483 patients with AC and its sequelae were admitted, between March 2008 and March 2017 in a single unit of a tertiary care hospital which deals most of the diabetic patients of the country. Among them 477 patients were treated with emergency or urgent laparoscopic cholecystectomy. As most of the cases were evaluated in emergency or outpatient department, preoperative hospital stay were only few hours for resuscitation except inpatient referred cases, those required ERCP, with acute pancreatitis or on anti-platelet drugs. Patients demographics are shown in Table I. The ASA scores of the patients were classified as 1E (n=81, 17%), 2E (n=181, 59%) and 3E (n=115, 24%). Table-2 shows clinical, imaging and laboratory characteristics of the patients. The patient numbers underwent LC on the days after symptom onset were as follows- 23 (day 0), 47 (day 1), 71 (day 2), 76 (day 3), 63 (day 4), 55 (day 5), 47 (day 6), 33 (day 7), 44 (day 8-14), 18 (day 15 and beyond). Operative findings of the patients are demonstrated in Table 3. The earlier the patient presented for surgery and those who were treated with antibiotics were easier to operate. Incidence of gangrene and perforation were more among those with acalculus cholecystitis. Among six patients with acute pancreatitis, two were in ICU for initial days of management and surgery were done one day after stepping down to ward or cabin. Surgical procedures were the most difficult in those presented beyond two weeks of symptom onset. Consequently operation time was over 100 minutes and blood loss was more than 250ml in such cases (Table 4). Fortunately none required conversion to open procedure. Subhepatic drain were used in 17 cases, most of which were removed 2-3 days postoperatively except three, who had bile leak due to total gangrene of gall bladder and cystic duct. Bile discharge dried up in 4th, 7th and 9th post-operative day respectively. Subcutaneous simple tube drain in umbilical port was used in those with gangrene,

perforation and transmural gall bladder wall pyogenic infection ; removed in first follow up on 7th post-operative day, consequently umbilical port infection were very low (3 cases, 0.6%). One patient presented with subhepatic fluid collection, 6 weeks after emergency LC. Laparotomy was done and found to have altered blood and pseudo-aneurysm of cystic artery (chronic blood loss from one of its lateral twig). Length of stay (LOS) in hospital were short (mean-1.8 days, range: 20 hours-4 days) except those with bile leak (5, 8 and 9 days respectively). None of the cases had bile duct injury or uncontrolled bleeding. There was no mortality in this series.

Discussion

Early LC (emergency, urgent, expedited) is a feasible treatment option in patients with AC¹.

Gall stone related complications develop in 1-4% of patients per year such as AC. Since pre-laparoscopic era early surgery has shown advantage in terms of hospital stay and reoperation time². Modern trend is towards an increased rate of early laparoscopic cholecystectomy (ELC) for AC. But the exact time point of ELC in AC is still a matter of debate. Tokyo Guidelines 2013 preferred to perform LC within 72 hours of symptom onset⁶, whereas NICE recommended LC in AC within 7 days of diagnosis⁷. Till now there is no published document on LC beyond 7 days of onset of AC. We have treated all of our patients (except 6 out of 483, 1.2%) who presented with AC or its sequelae irrespective of its severity, time of appearance from symptom onset and treatment received. All these cases were analyzed retrospectively for efficacy and safety of urgent LC during acute phase. We did not require any conversion during operation. Some author considered potentially serious complications and conversion rates were higher in early LC in AC^{17, 18}. But facts are changing with time and expertise. A meta-analysis demonstrated a reduction in overall mortality rate with LC in AC performed in the same admission². LC in late phase of AC (4-7 days) till 2004 was reported to have higher conversion rate to open surgery, while recent studies revealed equivalent hospital stay and lower conversion rate of 3% in early phase and 8% in late phase of AC¹. In one of our study including all cases of LC, we found that chronic symptom in elderly male and fibrosed contracted GB at imaging (USG or CT scan) were independent predictors of procedure conversion during LC. They concluded that ELC in late phase is superior to delayed laparoscopic cholecystectomy (DLC)⁶⁻⁸ weeks after AC subsided with conservative treatment. One study from UK demonstrated that a third of their patients were readmitted with recurrent symptoms often more than once while awaiting for DLC⁷.

We operated most of our cases within 24 hours after admission. As expected, we found that severity of AC increases with time from its onset, thickening and hardening of GB wall leads to difficulty in handling and dissection with conventional instruments, neovascularization increased blood loss from adhesions associated GB surface. The sooner the LC is attempted, the easier and less time consuming with least bleeding - the procedure can be accomplished.

Pericholecystic oedema creates an easy dissection plain especially in those who received antibiotics. These facts increased operation time but did not increase perioperative complication or hospital stay. Meta-analysis found that bile leak rate had no relation with technique (open or laparoscopy). Severity of bleeding in AC, treated either by open or laparoscopy, was not significantly different². It also confirmed reduced mortality, morbidity and post-operative hospital stay without increasing the operation time, reduced operative haemorrhage rates, less expensive, and resulted in better quality of life when AC was treated with ELC compared to DLC. Patience, taking time in dissection, keeping operation field as clean as possible by taking care of 'first drop of blood', clear identification of structures of the region before division, use of telescope with an angle (we used 45°) when needed, were important tricks in successful completion of LC in complicated AC cases.

One of our female patients required readmission and laparotomy, 6 weeks after ERCP followed by LC for common bile duct stone and AC, due to subhepatic fluid collection. Rest of our patients recovered without any intraabdominal consequences. Cases with gangrenous and perforated cholecystitis or per-operative tear of GB with spillage of stones were common in late presented cases which were managed with copious saline irrigation, removal of stone and GB in a 'glove-bag' and use of a subhepatic drain, hence outcome was not affected in terms of mortality or LOS in hospital. As we assessed most of our patients before admission, LOS in hospital was much less than other series. The total expenditure of treatment was not documented but a rough overview of cost involvement assessed. Other options of management of AC using antibiotics alone or in combination with percutaneous cholecystectomy followed by DLC were associated with no difference in operative time or conversion rate, but LOS, readmission and costs were higher than ELC¹⁹. Strength of the study is that all AC cases, fit and willing to undergo ELC were included, irrespective of severity and duration of disease onset. Weakness of the study is that it is a retrospective study.

Conclusion

Emergency and urgent laparoscopic cholecystectomy in acute cholecystitis and its sequelae appears to be effective and safe at any time during persisting symptoms. It has the benefit of minimum conversion rate, morbidity, mortality and short hospital stay. Technical difficulties of the procedure are proportional to the time of surgery since onset of the symptoms. The procedure in late presenting cases are associated with longer operation time and more blood loss without influencing operative complications.

However large randomized controlled trials are needed to draw a solid conclusion and firm recommendation.

Conflict of interest-None

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Ethical approval-Not applicable

Table-I : Patients' Demographic

March 2008 - March 2017	
Total number of patients –	477
Gender–	Male – 181 (38%) Female 296 (62%)
Mean Age-	49.9 years (22-68 years)

Table-II : Clinical, imaging and laboratory characteristics

Clinical features	No of patients
ASA	1E - 81(17%) 2E - 181(59%) 3E - 115 (24%)
Time from onset of symptoms to admission	-8.2 (0.5-16) days
Murphy's sign/Right upper quadrant tenderness or mass	-396 (83%)
Temperature (>37° C)	- 267(56%)
USG/CT/MRCP findings -	
Enlarged distended gall bladder	- 324(68%)
-Wall thickness	- 3.6(2-8mm)
-Pericholecystic oedema	- 391((82%)
-Swollen oedematous pancreas	- 6 (1.3%)
-Abdominal fluid collection	- 6 (1.3%)
Leucocyte count	- 13,200 (6700 - 24300)/ cmm

Table-III : Operative findings

Findings	No of patients
Simple calculous acute cholecystitis	-405 (84.9%)
Acute cholecystitis with dense adhesion	-31 (6.5%)
Acalculous acute cholecystitis	-17 (3.5%)
Gangranous cholecystitis	-12 (2.5%)
Perforated cholecystitis	-06 (1.3%)
Gall stone with acute pancreatitis	-06 (1.3%)

Table-IV : Outcome of emergency laparoscopic cholecystectomy

Conversion to open surgery	nil
Operation time	68 (35-122) minutes
Blood loss	140 (10-350) ml
Use of sub-hepatic drain	19 (4%)
Use of umbilical port drain	54(11.3%)
Complications-	
Bile leakage	3(0.6%)
Sub-hepatic fluid collection	1(0.2%)
Wound infection (ports)	3(0.6%)
Length of stay in hospital	1.8days (20hours- 9 days)
Readmission for pain	1(0.2%)

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