ORIGINAL ARTICLE

Optimal timing of laparoscopic cholecystectomy in acute cholecystitis?

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Received:
7th December, 2017

Accepted:
19th July, 2017

Abstract

Background: To determine the effect of timing of surgery in patients with acute cholecystitis with respect to duration of procedure, conversion rate and morbidity.

Patients and Methods: All patients that underwent laparoscopic cholecystectomy in the same admission for acute cholecystitis between May 2009 to January 2010 were included in the study. Patients were divided into 'early' and 'late' groups. 'Early' were those that had surgery within 72 hours of onset of symptoms and the 'late' group were those that had surgery after 72 hours of onset of symptoms. Outcome was assessed by comparing: conversion rate, total and post-operative hospital stay, operative time and complications between these two groups.

Results: Sixty five patients underwent laparoscopic cholecystectomy for acute cholecystitis. Out of them, 23 patients underwent cholecystectomy within 72 hours from the onset of symptoms (early group), while the remaining 42 patients had laparoscopic cholecystectomy 72 hours after onset of symptoms (late group). The 'early' group had a conversion rate of 13% (3/23) while 'late' group had a conversion rate of 42% (18/42). Post-operative hospital stay was also significantly longer in patients of the 'late' group (2.8 vs. 2 days). There were five complications in different patients in total. They were all in patients of 'late' group.

Conclusion: Early laparoscopic cholecystectomy (within 72 hours of onset of symptoms) in acute cholecystitis is associated with a lower conversion rate, shorter hospital stay and minimal complications.

Keywords: Early laparoscopic cholecystectomy, acute cholecystitis, conversion rate, complication.

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Introduction:

With the growing experience and confidence in laparoscopic surgery, laparoscopic cholecystectomy has been attempted in the setting of acute cholecystitis with safety. Many prospective studies have proved that laparoscopic cholecystectomy is safe in acutely inflamed gallbladders but with a higher conversion rate, longer operative time, extended post-operative hospital stay and complications.[1]

Timing of laparoscopic cholecystectomy may have an important effect in the outcome of patients of acute cholecystitis. If laparoscopic cholecystectomy is done in the early phase of inflammation, the 'plane of dissection' permits easy dissection and hence results in reduced operative time, quicker recovery, lesser conversion rate and fewer complications. Albeit, the effect of optimal timing of laparoscopic cholecystectomy on reducing these complications has yet to be proven.

The optimal timing of laparoscopic cholecystectomy in acute cholecystitis remains controversial. It has been suggested that laparoscopic surgery should be carried out within 3 to 4 days, after which there is increased risk of complications and conversion to an open procedure. Others regard a window of 7-10 days for urgent surgery as acceptable and some studies deny correlation between operative time and out-

come of cholecystectomy in acute inflammation. Therefore, if there is any optimum 'window period' for surgery in the acute setting, then it has to be determined. The present study aims to determine the effect the timing of surgery in patients with acute cholecystitis with respect to duration of procedure, conversion rate and morbidity.

Material and Methods:

It was a Quasi experimental study done at section of General Surgery, Aga Khan University Hospital, Karachi (Pakistan) between May 2009 to January 2010. There were total of 65 patients divided in two groups. 'Early' group were those that had surgery within 72 hours of onset of symptoms and 'late' group were those that had laparoscopic cholecystectomy after 72 hours of onset of symptoms. There were 23 patients in the early group and 42 patients in the late group.

Inclusion Criteria: All patients that had laparocopic chlolecystectomy in the same admission for acute cholecystitis were included in the study. The diagnosis of acute cholecystitis was based on the following three criteria;

1. Acute upper abdominal pain with tenderness under the right costal margin;
2. Fever more than 37.5 °C / Leukocytosis more than 10 x 103 dl
3. Ultrasonographic evidence of acute cholecystitis (thickened gallbladder wall, pericholecystic fluid, ultrasonographic Murphy's sign)

Exclusion Criteria:

Patients with the following conditions were excluded:

1. Peritonitis/ uncertain diagnosis
2. Previous upper abdominal surgery
3. Contraindications to surgery
4. Concomitant malignancy
5. Pregnancy
6. Those that refused to undergo surgery

The data of all patients admitted during the 8 months duration was collected prospectively on a specially designed performa.

All patients were admitted through the emergency room with a clinical diagnosis of acute cholecystitis (acute right upper abdominal pain with right hypochondrial tenderness with or without fever). Patient's age, gender, date of admission and time of onset of right upper abdominal pain were recorded. The highest preoperative temperature, white cell count was also recorded in all patients. Liver function tests were done in most patients. Pre-operative imaging evidence of acute cholecystitis (defined as pericholecystic fluid, distended gallbladder or thickened gallbladder) were obtained. Diagnosis of acute cholecystitis was supported by a raised cell counts and ultrasonographic features of acute cholecystitis. Biliary pancreatitis was ruled out by measuring serum amylase and/or serum lipase at the time of admission. Ultrasonography of upper abdomen was done by a consultant radiologist or senior resident on call. Patient and family were counseled about natural course of disease, possible complications, and role of surgery in this admission as a definitive way of treatment. Informed consent from all patients for a 'Laparoscopic cholecystectomy±Open cholecystectomy' was taken. Patients were booked as emergency cases on the first available list. The time in hours from onset of patient's symptoms to the start of laparoscopic cholecystectomy was noted. A pre-operative antibiotic of the cephalosporin group was used from the time of admission to the time of the surgery. Consultant surgeons assisted by surgical residents performed these procedures. The standard four trocar techniques for laparoscopic cholecystectomy using diathermy for coagulation were used. A nasogastric tube was used routinely to decompress the stomach but urinary catheter and intra-operative cholangiography were not used routinely. If the gall-bladder was found to be tense, it was punctured at the fundus and evacuated by an aspiration needle. The epigastric or umbilical port was used to extract the gallbladder and incision was extended if necessary. Conversion to open cholecystectomy, length of hospital stay in days and both pre and post-operative complications were noted. Total and post-operative hospital stay was calculated as the numbers of nights spent in

hospital after surgery. The surgical pathology of the removed gall-bladder was retrieved and recorded.

These patients were followed in the clinic usually between 7th to 10th post-operative days for wound infection.

The patients were divided into two groups for comparisons. The 'early' group consisted of all patients who underwent laparoscopic cholecystectomy within 72 hours after onset of symptoms. The 'Late' group consisted of all patients who underwent laparoscopic cholecystectomy 72 hours or more after the onset of symptoms.

Statistical Analysis: Data was analyzed using SPSS 14 software. Continuous variables like duration of symptoms to surgery (in hours), operative time (in minutes) were presented by mean plus or minus standard deviation and for statistical significance student 't' test was applied to the variables between the 'early' and 'late' groups. Similarly, a categorical variable like conversion rate was presented by percentage and 'chi square' test of significant between 'early' and 'late' group. A 'p' value <0.05 was considered significant.

Results:

During this eight months period, 65 patients with a diagnosis of acute cholecystitis underwent laparoscopic cholecystectomy in the same admission. The diagnosis of acute cholecystitis was based on clinical features and supported by laboratory (leucocytosis) and radiological features (of acute cholecystitis on abdominal ultrasonography). Twenty three of these patients underwent a definitive procedure within 72 hours of onset of their symptoms, and the remaining 42 underwent cholecystectomy after 72 hours. The average age in the early group was 50 years and 51 years in the late group. (Table 1)

3(13%) in the early group and 18(42.9%) in the late group were converted to open surgery (p=0.019). The reasons for conversion were difficult dissection. One patient required conversion due to suspected common bile duct injury.

The operative time was longer in patients who underwent laparoscopic cholecystectomy after 72 hours of onset of symptoms. Mean operative time was 124±48 minutes as compared to the early group 102±40 minutes. This difference was not statistically significant.

The total length of hospitalization was shorter in the early group patients. Mean total hospital stay was 4.4±1.6 days for the early group. It was shorter than hospital stay in the late group 5.69±2.7 days and statistically significant too.

Mean post-operative hospital stay for the early group was 2.3±1.3 days as compared to the late group 2.8±1.36 days but the diffidence was not statistically significant.

There were five patients with complications and all were in the late group. One patient has partial bile duct injury during difficult dissection, this was picked up during the procedure and conversion to perform open primary repair of the bile duct was made. Patient recovered uneventfully. Two patients had intra- abdominal bleeding that caused a drop of hemoglobin concentration by 1g/dl. Both these recovered well and it did not prolong hospital stay. One patient developed lower respiratory tract infection and was managed with antibiotics and this prolonged hospital stay by a few days.

There was no patient in the 'early' group who had similar complications.

Histological examination of the gall-bladder confirmed the presence of acute on chronic inflammation in 86.1%(56/65) of specimens. 10.8%(7/65) showed acute cholecystitis. One patient presented and operated for acute cholecystitis but histopathology revealed adenocarcinoma gall-bladder limited to muscularis layer. Resection margins were free of tumor. The histopathology of one patient revealed chronic cholecystitis.

Discussion:

Acute cholecystitis which is generally found in approximately 20% of all admissions for gall-

bladder disease is no longer considered a contra-indication for laparoscopic cholecystectomy. Infact, urgent laparoscopic cholecystectomy is now considered the optimal treatment in patients with acute cholecystitis.[1-2] It has been associated with a higher conversion rate; increased operative time and prolonged hospital stay as compared to laparoscopic cholecystectomy performed for simpler biliary pain and chronic cholecystitis.[3-4] Timing of surgery can be an important determinant influencing the outcome of patients with acute cholecystitis treated by laparoscopic cholecystectomy and is still debateable. This study is related to the debate of optimal timing of laparoscopic cholecystectomy in the setting of acute cholecystitis.

In the early phase of inflammation, there is significant edema and vascular congestion which is typically noted in the adventitia and adjacent muscle. This creates an easy plane of dissection in the liver bed if operative intervention is performed within 72 hours of the onset of symptoms of acute cholecystitis.[5]

An early cholecystectomy may be easier in patient during the edema phase of acute inflammation, as opposed to later when hypervascularity, abscess formation, necrosis and scarring tend to occur.[6-7] The dense adhesions produced in the chronic phase do not yield easily to blunt dissection in laparoscopic cholecystectomy. Some studies have strongly advocated that the early intervention (within 48 hours from onset of symptoms) is associated with better outcome[2,8,9] Error! Bookmark not defined.,[13] as these results were consistent with our present study. Atul K. Mardan et al showed that laparoscopic cholecystectomy by experienced surgeons is a safe and effective technique for the treatment of acute cholecystitis.[10] Patients treated within 48 hours of onset of symptoms had a lower conversion rate, shorter operative time and reduced hospitalization as were most patients in the 'early' group of our study. Hawasli has also similar concepts and results and he advocated early laparoscopic cholecystectomy within 24 to 48 hours of onset of symptoms was better because of ease of removal during the edema phase of inflammation as compared to difficulty in removing a severity scarred gallbladder after 4 to 6 weeks of conservative treatment.[10] Other studies have not found any effect of a prolonged delay on conversion rate,[4,11,12] which was inconsistent with the present study. Tzovaras G. recommends in his study that laparoscopic cholecystectomy for acute cholecystitis during the index admission is safe; regardless of the time elapsed from the onset of symptoms.[12] There is no statistical difference in conversion rate, morbidity and post-operative stay in patients who were operative within 3 days, between 4 to 7 days and beyond 7 days from onset of symptoms. In the present study, the patients who were operated within 72 hours of onset of symptoms had lower conversion rate and minimal complications relative to those operated after 72 hours. It can be explained by that the degree and character of these histological changes are proportional to the severity and duration of the interval form initial outset and the time till the organ is approached surgically. The denser the adhesions, the greater the difficulty in dissection. Difficulty in dissection is directly proportional to greater conversion rate, longer operative time and prolonged hospital stay and greater complications.

The conversion rate in our study was 34 % in patients of late group. This was statistically higher than the early group. This is due to the degree of gross inflammation and difficulty in identifying the distorted anatomy as the time elapses from onset of symptoms. There is no advantage to delaying cholecystectomy for acute cholecystitis on the basis of outcomes in complications, rate of conversion to open surgery, and mean hospital stay. Thus, early cholecystectomy should be the preferred surgical approach for patients with acute cholecystitis .

Conclusion:
Early laparoscopic cholecystectomy (within 72 hours of onset of symptoms) in acute cholecystitis is associated with a lower conversion rate, shorter hospital stay and minimal complications.

Conflict of interest: None

Funding source: None

Role and contribution of authors:

Dr. Zia Ur Rehman, collected the data and references and wrote the initial write up

Dr. Rizwan Azami critically review the article and made the final changes.

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