

Feasibility Of Laparoscopic Cholecystectomy In Acute Cholecystitis

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Abstract:

Background: Laparoscopic cholecystectomy is the most common laparoscopic surgery performed in the world. The traditional treatment (initial) of acute calculus cholecystitis includes bowel rest, intravenous hydration, correction of electrolyte abnormalities, analgesia, and intravenous antibiotics. Following this treatment, patients with uncomplicated disease are managed on outpatient basis and are called for laparoscopic cholecystectomy after a period of 6–8 weeks. Laparoscopic cholecystectomy is avoided for acute cholecystitis due to concerns about the potential hazards of complications, especially common bile duct injury and a high conversion rate to open cholecystectomy

Materials and Methods: In this prospective randomized study, 30 consecutive patients presenting with acute calculus cholecystitis, were compared with a control group of 30 patients of acute calculus cholecystitis undergoing delayed laparoscopic cholecystectomy. The study was conducted at Department of Surgery, AJ Institute of Medical Sciences, Mangalore between May 2014 and December 2016.

Results: During the study period, a total 60 patients were evaluated: 30 patients in the early group and 30 patients in the delayed group. The mean operating time was 65.78 min in the early group and 56.83 min in the delayed group. Three patients in early group and 2 patients in delayed group underwent conversion to open surgery (P value: 0.780). The main reasons for conversion in the early cases were unclear Calot's triangle anatomy and hemorrhage. The main reason for conversion in the delayed group was hemorrhage

Conclusion: These findings indicate that for surgeons with adequate experience, the optimal timing of laparoscopic cholecystectomy for treatment of acute cholecystitis is within 48 hours of admission.

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I. Introduction

Laparoscopic cholecystectomy (LC) has become the gold standard surgical procedure for the management of symptomatic gallbladder disease, including acute cholecystitis. Initially introduced as an elective procedure, laparoscopic cholecystectomy has demonstrated its feasibility and safety in the acute setting as well.^[1] Acute cholecystitis is characterized by inflammation of the gallbladder, often associated with gallstones, which can cause severe pain and potentially life-threatening complications if left untreated. The traditional open cholecystectomy, which involves a larger incision and longer recovery time, has been largely replaced by the minimally invasive laparoscopic approach.^[2]

Feasibility studies have evaluated the safety, efficacy, and outcomes of laparoscopic cholecystectomy in patients with acute cholecystitis. These studies have shown that LC can be successfully performed in most cases of acute cholecystitis, provided that appropriate patient selection, timely intervention, and experienced surgical expertise are available.^[3-4] The laparoscopic technique offers several advantages over open cholecystectomy, including smaller incisions, reduced postoperative pain, shorter hospital stays, faster recovery, and improved cosmetic outcomes.

The feasibility of laparoscopic cholecystectomy in acute cholecystitis depends on various factors, such as the severity of inflammation, the presence of complications, and the surgeon's expertise. Several classification systems, such as the Tokyo Guidelines and the American Association for the Surgery of Trauma grading system, have been developed to stratify acute cholecystitis cases and guide the selection of the appropriate surgical approach. In cases of mild or moderate acute cholecystitis without significant complications, laparoscopic cholecystectomy is generally considered feasible and is associated with better patient outcomes. The traditional treatment (initial) of acute calculus cholecystitis includes bowel rest, intravenous hydration, correction of electrolyte abnormalities, analgesia, and intravenous antibiotics.^[4-8] Following this treatment, patients with uncomplicated disease are managed on outpatient basis and are called for laparoscopic cholecystectomy after a period of 6–8 weeks

Studies have shown that early intervention with laparoscopic cholecystectomy within 48 hours of symptom onset can reduce the risk of complications and conversion to open surgery. However, in cases of severe acute cholecystitis with complications such as gangrene, perforation, or empyema, conversion to an open procedure may be necessary to ensure adequate control of the infection and prevent further complications. Laparoscopic cholecystectomy is avoided for acute cholecystitis due to concerns about the potential hazards of complications, especially common bile duct injury and a high conversion rate to open cholecystectomy.^[9-15]

In conclusion, laparoscopic cholecystectomy is a feasible and safe surgical approach for acute cholecystitis in appropriately selected patients. It offers several advantages over open cholecystectomy, including shorter hospital stays, faster recovery, and improved cosmetic outcomes. However, the decision to perform laparoscopic cholecystectomy should be individualized based on the severity of inflammation, the presence of complications, and the surgeon's expertise. Early intervention with laparoscopic cholecystectomy, when feasible, can lead to better patient outcomes and reduced morbidity associated with acute cholecystitis. Initial studies, however have shown that early laparoscopic cholecystectomy can be done during acute cholecystitis. Since most surgeons prefer to delay surgery during the acute phase, we undertook a prospective randomized study to compare early and delayed laparoscopic cholecystectomy in the treatment of acute cholecystitis.^[16]

II. Material And Methods

Study area-The study was conducted at Department of Surgery, AJ Institute of Medical Sciences, Mangalore.

Study population- All eligible patients with acute calculus cholecystitis (ASA grade 1–3) presenting to surgery emergency and OPD of AJ hospital, Mangalore

Study size- The study included 30 consecutive patients presenting with acute calculus cholecystitis, which were compared with a control group of 30 patients of acute calculus cholecystitis undergoing delayed laparoscopic cholecystectomy

Study period-The study period was between May 2014 and December 2016.

Study population – All eligible patients with acute calculus cholecystitis (ASA grade 1–3) presenting to surgery emergency and OPD of AJ hospital, Mangalore

Inclusion- Diagnosis of acute cholecystitis was based on the following four diagnostic criteria: acute upper abdominal pain with tenderness under the right costal margin, fever more than 37.5°C, leukocytosis more than 10,500/mm³, and ultrasonographic evidence of acute cholecystitis (thickened gallbladder wall, edematous gallbladder wall, presence of gallstones, and pericholecystic fluid collection).

Exclusion- Patients of acute cholecystitis with ASA grade >3, who had pancreatitis and common bile duct stones, were excluded

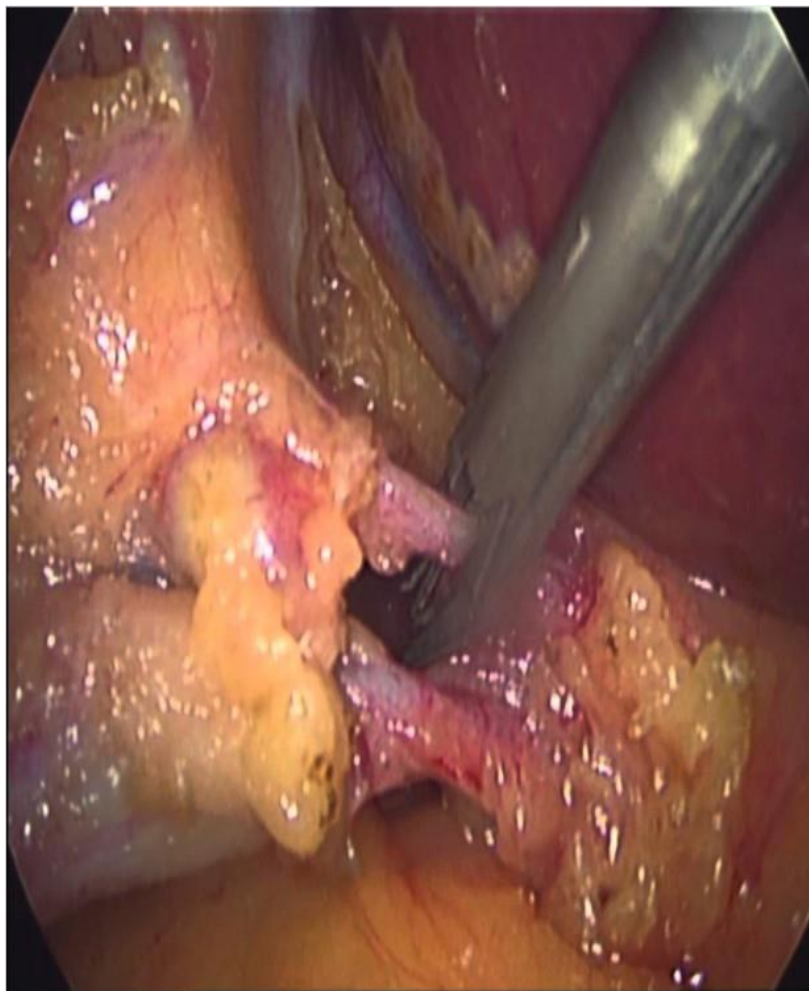
Ethical consideration- Institutional Ethics Committee Approval was obtained, before beginning the study. Study procedure was explained to the participants and informed consent from their parents was taken from them.

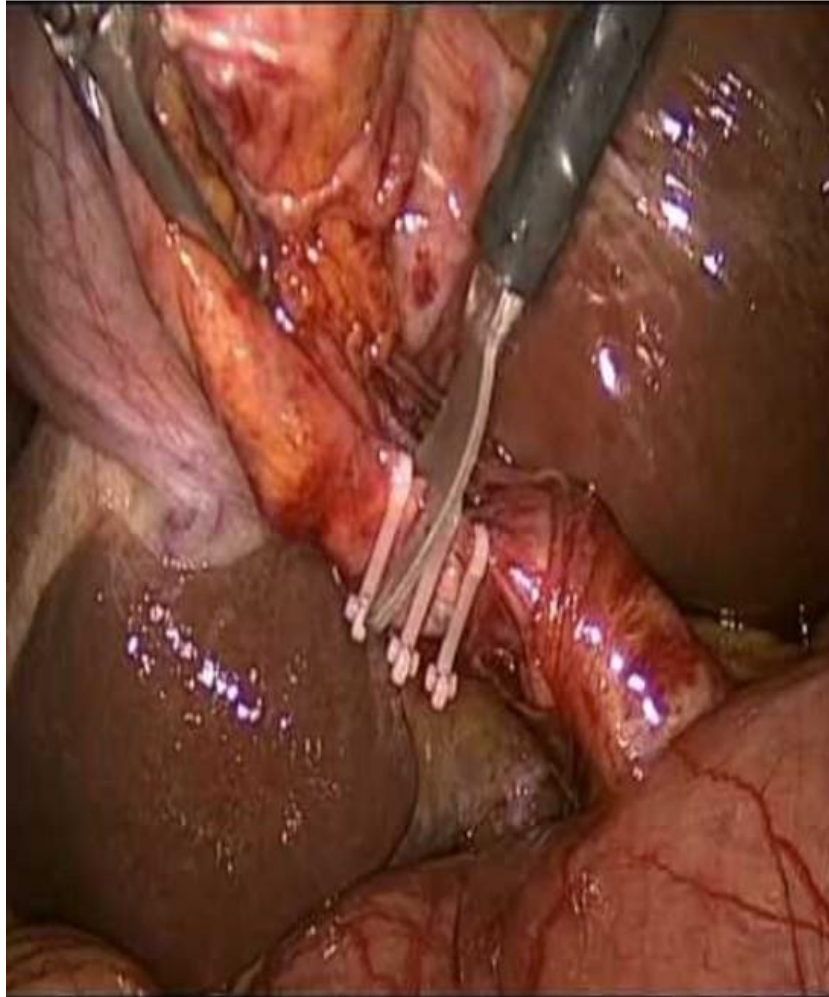
Protocol and Procedure-

1. In the early group, laparoscopic cholecystectomy was performed within 48 hrs of admission, whereas in the delayed group laparoscopic cholecystectomy was done after 6 to 8 weeks.
2. Laparoscopic cholecystectomy was performed using the standard 4 port technique.
3. Postoperatively, the patients were allowed oral intake 6–12 h after surgery provided, they had no nausea or vomiting. Pain relief was obtained by intramuscular diclofenac (75 mg) injection, which was changed to tablet form once patient was allowed orally. Postoperative pain assessment was performed by visual analog scale (VAS). The patients were discharged once the patients were afebrile and taking nutrition orally.
4. In the intraoperative period, the following parameters were evaluated: duration of surgery starting from incision for the port to closure of port sites, gall bladder perforation, common bile duct injury, conversion to open cholecystectomy and requirement of drains.
5. In the postoperative period, the following parameters were evaluated: analgesic requirement, pain scoring using visual analogue scale, duration of postoperative hospital stay, wound related complications.
Laparoscopic Cholecystectomy (LC) equipment including:
 - a. Two laparoscopic monitors
 - b. One laparoscope (5/10 mm, 0/30 degrees) including camera cord and light source
 - c. Carbon dioxide source and tubing for insufflation

- d. 5 mm to 12 mm trocars (average three 5 mm working trocars and one 10 mm to 12 mm trocar)
- e. Laparoscopic instruments: Atraumatic graspers, Maryland grasper, clip applier, electrocautery (e.g., hook, spatula), and a retrieval bag
- f. Scalpel (11/15 blade), forceps, needle driver, and absorbable sutures
- g. Major open tray, for possible conversion

Preparation: The patient medically optimized preoperatively. Preoperative antibiotics such as ceftriaxone or cefalexin 1gram should be given within 30 minutes of incision per protocol. An aseptic surgical field is created from just above the bilateral costal margins to the pubic tubercle and laterally to the right and left flanks. The sterile surgical field allow for the possibility of an open procedure if needed. Surgical Procedure: LC was performed as soon as possible after confirmation of AC. Perioperative intravenous antibiotic therapy was administered to all patients. Residents usually performed LC with a senior doctor who had more than 10 years of surgical experience. After induction of anesthesia and intubation, the LC may begin. First, insufflation of the abdomen by veress needle is achieved to 12-15 mmHg using carbon dioxide. The standard four trocar operative technique was used for LC. Because the gallbladder was usually distended, it was first aspirated and decompressed. To create a critical view of safety, Calot's triangle was dissected of fat and fibrous tissue and the lower end of the gallbladder was dissected off the liver bed. ^[11-15]





Statistical analysis- Statistical analysis was performed using paired -test and chi-square test. SPSS version 17 was used to determine the value (value less than 0.05 was considered significant)

III. Result

1. During the study period, a total 60 patients were evaluated: 30 patients in the early group and 30 patients in the delayed group. The two groups were well matched in terms of age and sex, as well as clinical and laboratory parameters.
2. A longer operation time were required in the early group than in the delayed group. The mean operating time was 65.78 min in the early group and 56.83 min in the delayed group. The difference in operation time was statistically significant (P value: 0.046).
3. Three patients in early group and 2 patients in delayed group underwent conversion to open surgery (P value: 0.780). The main reasons for conversion in the early cases were unclear Calot's triangle anatomy and hemorrhage. The main reason for conversion in the delayed group was hemorrhage.
4. Surgery was abandoned in 2 patients from the early group because of difficult anatomy The pain scores, assessed by the visual analogue scale at 12 hours, 24 hours, and 7 days after surgery, in the two groups were statistically insignificant (P value: 0.115).
5. There was no statistically significant difference (P value: 0.115) in the analgesia requirement of the two groups postoperatively.
6. The mean duration of postoperative stay in the early group was 1.67 days as compared to 1.47 days in the delayed group. The difference was statistically insignificant (P value: 0.379).

Table 1: Overall comparison of the patients in the early and delayed gropus

	Early group	Delayed group	P value
Age	31.73	32.8	0.57
Sex (M:F)	4:26	2:28	0.114

Duration of acute symptoms (Hours)	36.8	37.7	0.088
Operating time (Minute)	65.78	56.83	0.046*
Postoperative stays (days)	1.67	1.47	0.379
Conversion rate	3	2	0.78

*Significant P value

IV. Discussion

1. The common approach for management of acute calculous cholecystitis consists of an initial control of inflammation followed by interval cholecystectomy after a period of 6–8 weeks. Arguments made against early laparoscopic cholecystectomy include a high conversion rate and complications. [18-22]
2. Various studies have reported high conversion rates, ranging from 6% to 35% for early laparoscopic cholecystectomy in acute cholecystitis. It is, therefore, argued that if delayed laparoscopic cholecystectomy leads to a technically easier surgery with a lower conversion rate, it may be a better treatment option for acute cholecystitis.
3. However, there is an increased risk of gallstone-related morbidity during the waiting period for cholecystectomy. In our study, both the early and delayed groups had similar conversion rates. In the early stages, 2 cases in the early group were abandoned due to difficult anatomy. [23-30]
4. Most surgeons agree that timing of the procedure is an important factor in determining outcome. Ideally, the surgery should be performed within the “golden 48 h” from the onset of symptoms.
5. In our study, early surgery was performed within this golden period.
6. The technical difficulty of laparoscopic cholecystectomy is related to operative findings during early surgery. A distended and edematous gall bladder is commonly seen in cases of acute cholecystitis.
7. On the basis of our experience, we believe that certain key points must be kept in mind when laparoscopic surgery is performed for acute cholecystitis. For good exposure of Calot’s triangle, decompression of the gallbladder should be done early because this allows better grasping and retraction of the gallbladder.
8. The other technical rules call for the use of a suction-irrigation device for dissection and the use of a retrieval bag to remove spilled stones and perforated gallbladder.
9. In our study, decompression of the gallbladder was required for 50% of the patients in the early group. Stone spillage was seen in 25% of the cases, which was removed by using retrieval bags. A subhepatic drain was required for 20% of the early cases. [31-33]
10. Our experience supports the belief that the inflammation associated with acute cholecystitis creates an edematous plane around the gallbladder, thus facilitating its dissection from the surrounding structures. Waiting for the inflamed gallbladder to “cool down” allows maturation of the surrounding inflammation and results in organization of the adhesions, leading to scarring and contraction, which make the dissection more difficult.
11. The postoperative pain scores and analgesia requirements were similar in the two groups. Longer operation times were required in the early group than in the delayed group. [34-40]

V. Conclusion

The morbidity of laparoscopic cholecystectomy for patients with acute cholecystitis is not reduced by a period of initial conservative treatment. For surgeons with adequate experience, the optimal timing of laparoscopic cholecystectomy for treatment of acute cholecystitis is within 48 hours of admission

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