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Early laparoscopic cholecystectomy in acute cholecystitis: Preferable option

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Abstract

Background: Approximately 80% of the cholecystectomies are performed laparoscopically. Traditionally, acute cholecystitis is treated conservatively followed by delayed cholecystectomy 6-8 weeks after the acute attack. Various studies have addressed the optimal timing of laparoscopic cholecystectomy (LC) in patients with acute cholecystitis. The aim of this study was to compare early and delayed laparoscopic cholecystectomy.

Methods: A retrospective study was conducted in 60 patients presenting with acute cholecystitis to compare early and delayed laparoscopic cholecystectomy, focussing on intra-operative and postoperative parameters like duration of surgery, surgical difficulties and complications, analgesic requirement, duration of postoperative hospital stay and wound related complications.

Results: Longer operation times were required in the early group. Postoperative pain scores and analgesic requirements were almost similar in two groups. The cost of treatment in the delayed group was significantly higher.

Conclusion: Though early laparoscopic cholecystectomy required longer operative times, it resulted in reduced the cost of treatment than delayed LC.

Keywords: Acute cholecystitis, early laparoscopic cholecystectomy, operation times, cost of treatment

Introduction

About 5% to 25% of the adult western population have gallstones [1, 2, 3, 4]. The annual incidence of gallstones is about 1 in 200 people [5]. Only 2% to 4% of people with gallstones become symptomatic in a year, presenting with biliary colic (pain), acute cholecystitis (inflammation), obstructive jaundice, or gallstone pancreatitis [6, 4].

Acute cholecystitis involves inflammation of the gallbladder and presents with symptoms such as fever associated with intense pain in the upper right quadrant of the abdomen, while biliary colic does not involve inflammation of the gallbladder. Cholecystectomy (removal of gallstones) is the preferred option in the treatment of symptomatic gallstones [7]. Approximately 80% of the cholecystectomies are performed laparoscopically (by key-hole surgery) [8]. A third of the people undergoing laparoscopic cholecystectomy undergo the procedure after an episode of acute cholecystitis [9], which is the most common laparoscopic surgery performed in the world [5].

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 an out-patient basis and are called for laparoscopic cholecystectomy after a period of 6–8 weeks. Laparoscopic cholecystectomy (LC) is usually avoided in patients with acute cholecystitis due to concerns about the potential hazards of complications, especially common bile duct injury and a high conversion rate to open cholecystectomy [10].

Cholecystectomy is indicated in cholecystitis as recurrent attacks are likely, but recommendation regarding the timing of the surgery has undergone change in recent years [11]. As early as four decades ago, surgeons began to recognize that early cholecystectomy is the preferred strategy for managing the acutely inflamed gallbladder because the oedematous plane facilitates dissection and single-stage definitive treatment lessens both the total duration of morbidity and the potential for late complications such as gangrenous or emphysematous cholecystitis [12]. The evidence of benefit from early operation became persuasive via prospective randomized trials in

the 1990s [13, 14]. In 1992, the National Institutes of Health (NIH) Consensus Development Conference stated that laparoscopic cholecystectomy "provides a safe and effective treatment for most patients with symptomatic gallstones" [15]. As laparoscopic cholecystectomy became dominant in the early 1990s, some early adopters began to accept the challenge of a laparoscopic approach to acute cholecystitis. Conversion rates were high. As techniques and equipment have improved, conversion and complication rates have declined compared with those initial reports. [13, 16, 17] During the last several years, various studies have addressed the optimal timing of laparoscopic cholecystectomy in patients with acute cholecystitis; they concluded that early cholecystectomy, within 24 to 72 hours during the index of admission, results in shorter length of hospital stay and similar complication and conversion rates as compared to delayed operations performed several weeks after the admission. [18-23] In addition, at least one study has shown that delaying laparoscopic cholecystectomy results in increased morbidity and may lead to unnecessary readmission of patients awaiting surgery. [24] Despite this accumulation of evidence, it remains common practice to treat acute cholecystitis with conservative treatment followed by delayed laparoscopic cholecystectomy. [25] The aim of our research was to study the difference between early and delayed laparoscopic cholecystectomy, especially in terms of the length of hospital stay, the rate of conversion and major complications rate.

Patients and Methods

Study Design and Population

A retrospective study was conducted between October 2015 to September 2017 at the Department of Surgery, D. Y Patil Medical College & Hospital, Nerul, Navi Mumbai to compare the results of early laparoscopic cholecystectomy and delayed laparoscopic cholecystectomy. Sixty patients who were diagnosed with acute cholecystitis and operated were included in the study.

Inclusion criteria

- Patients in whom physical, laboratory, and USG findings suggested acute cholecystitis, and who were operated by laparoscopy.
- Diagnosis was based on a combination of clinical and radiologic criteria.

Criteria suggesting an acute episode include

- Right sub-costal tenderness;
- positive Murphy's sign;
- Fever more than 37.5 degree centigrade;
- Leukocytosis;
- Thickened, oedematous distended gallbladder;
- Presence of gallstones and pericholecystic fluid collection on ultrasound examination.

Exclusion criteria

- Patients with common bile duct stones,
- Acute pancreatitis,
- Severe concomitant medical problems deeming them unfit for laparoscopic surgery.

The patients were divided into two groups

Group I (Early operation group): Patients who were operated on within 72 hours of admission (30 patients) and

Group II (Late operation group): Patients who were operated

upon 6 to 8 weeks after the initial treatment (30 patients). Patients in the late group were treated with intravenous fluids, antibiotics, and analgesics. Patients who responded to conservative treatment were discharged after a complete relief of symptoms. They were called for laparoscopic cholecystectomy after 6 or 8 weeks, when the acute episode had subsided.

Laparoscopic cholecystectomy

- Laparoscopic cholecystectomy operations were performed with the patient under general anaesthesia using endotracheal intubation.
- Pneumoperitoneum was created by 'Open method' through a supra-umbilical incision.
- Four laparoscopic ports were used: 10mm umbilical for the optical instrument (30 degrees), 10mm sub-xiphoidal for working instruments, 5mm right sub-costal along the mid-clavicular line also for working instruments, and 5mm in the right flank for retraction instruments.
- Adhesions were released and Calot's triangle was exposed.
- If necessary, the gallbladder was aspirated through a laterally inserted aspiration needle to allow better grasping.
- The cystic pedicle was detected to isolate the cystic duct and the artery separately. Both were then clipped and divided.
- The gallbladder was dissected off its bed with a mono-polar cautery hook.
- At the completion of surgery, the gallbladder was placed in a retrieval bag and extracted through the sub-xiphoidal incision, which was enlarged if necessary.
- Haemostasis was achieved in the gallbladder bed, and after a through saline lavage, a suction drain was placed if clinically indicated and the incisions closed.
- When required, a conversion to open surgery was performed through a right sub-costal incision.

Postoperatively, the patients were allowed oral intake 24 hrs after surgery. Pain relief was provided with intravenous diclofenac injection, which was changed to tablet form once patient was allowed orally. Drain was removed 48-72 hrs after surgery depending on the amount of collection.

We compared the results of early and delayed laparoscopic cholecystectomy retrospectively, focussing on the following parameters: intra-operative parameters included duration of surgery, surgical difficulties, gallbladder perforation, common bile duct injury, conversion to open cholecystectomy and requirement of drains.

The parameters of surgical difficulties included: severe adhesions, severe cicatrization of Calot's triangle, difficult dissection of cystic duct and severe cicatrization of gall bladder bed.

In the postoperative period, we retrospectively compared the two groups on the following parameters: analgesic requirement, pain scoring using visual analogue scale, duration of postoperative hospital stay and wound related complications.

Statistical analysis was performed using unpaired student's t-test and Chi-square test. SPSS version 17 was used to determine the p-value (p-value < 0.05 was considered significant).

Results

During the study period, a total of 60 patients were evaluated; 30 patients in the early laparoscopy group and 30 patients in the delayed laparoscopy group. The two groups were well compared in terms of age and sex, as well as clinical and laboratory parameters.

There were no significant differences in patient age, sex, post-operative stay, conversions and post-operative complications in both the groups.

However, longer operation times were required in the early group than in the delayed group. The mean operating time was 75 minutes in the early group and 60 minutes in the delayed group. The difference in operation time was statistically significant ($p < 0.001$).

Four patients in early group and three patients in delayed group underwent conversion to open surgery ($p = 0.065$). The main reasons for conversion in the early cases were difficult anatomy of Calot's triangle and haemorrhage, while in the delayed group it was haemorrhage.

The demographic data and the clinical parameters observed in the two groups are presented in the table below.

Table 1: Demographic and clinical parameters in the two groups

	Early group (n=30) (M±SD)	Delayed group (n=30) (M±SD)	p- value
Age (years)	35.4 ±5	37.6±6	0.118
Sex (M: F)	5:25	3:27	0.706
Interval b/w admission & surgery (days)	1.8±1	7±2	0.0001
Fasting period (days)	1.5±0.65	8±3.5	0.0001
Operating time (minutes)	75±10	60±5	0.0001
Hospital stay (days)	7±2	15±3	0.0001
Postoperative stay (days)	2.45±0.5	2.67±0.5	0.093
Conversion rate	4± 2.5	3±1.5	0.065
Complications	1±1.7 (wound infection)	2±2.5 (wound infection, bile leakage)	0.075

The pain scores, assessed by visual analogue scale at 12 hours, 24 hours, and 7 days after surgery, in the two groups were statistically insignificant. ($p = 0.128$)

There was statistically significant difference in the cost of treatment in the two groups, with the delayed group spending higher than the early group for reasons such as hospital stay, cost of antimicrobials and loss of earning. It was also noted that there was significant reduction in fasting period, interval between admission and surgery and duration of hospital stay in the early group.

Discussion

The common approach for the management of acute calculus cholecystitis consists of an initial control of inflammation followed by delayed laparoscopic cholecystectomy after a period of 6 -8 weeks. After the introduction of laparoscopic cholecystectomy, it was initially contraindicated for acute cholecystitis because of high conversion rate to open surgery and morbidity [10], but increased experience and improvements in its application have shown LC to be safe and feasible for patients with acute cholecystitis [16, 17]. Also, it has been shown to be preferable to open cholecystectomy [12]. On the other hand, various studies comparing early and delayed LC concluded high conversion rates ranging from 5 to 35% for early LC in acute cholecystitis [26]. It is, therefore, argued that if delayed LC leads to a technically easier surgery with lower conversion rate, it may be a better treatment option for acute cholecystitis.

However, there is increased risk of gallstone- related morbidity during the waiting period for LC. In our study, both early and delayed groups had similar conversion rates. Hospital stay and cost of treatment was found to be high in the delayed group.

Most surgeons agree that the timing of the procedure is an important factor in determining outcome. Ideally, early LC should be performed within "the golden 72 hrs" from the onset of symptoms. In our study, early surgery was performed within this golden period.

The technical difficulty of LC is related to operative findings during early surgery. A distended and oedematous gallbladder is commonly seen in cases of acute cholecystitis. On the basis of our experience, we believe that certain key points must be kept in mind when laparoscopic cholecystectomy is performed for acute cholecystitis.

For good exposure of Calot's triangle, decompression of the gall

bladder should be done early as this allows better grasping and retraction of the gallbladder. The other technical rules call for the use of suction irrigation device for dissection and the use of a retrieval bag to remove spilled stones and perforated gall bladder. In our study, decompression of the gallbladder was required in 70% cases in early group. Stone spillage was seen in 30% cases, which was removed using retrieval bag. A sub-hepatic drain was kept in all cases of early group and 50% cases of late group.

It was found that the inflammation associated with acute cholecystitis creates an oedematous plane around the gall bladder, thus facilitating its dissection from the surrounding structures. While in delayed group, conservative management allows maturation of the surrounding gall bladder inflammation and results in organisation of the adhesions, leading to scarring and contraction, which make the dissection more difficult in delayed group.

The postoperative pain scores, analgesic requirements were almost similar in two groups. Longer operation times were required in the early group than in the delayed group.

Conclusion

Early laparoscopic cholecystectomy was more effective than delayed LC in reducing the cost of treatment, usage of antimicrobials, duration of hospital stay, fasting period and the interval between admission and surgery thus reducing the loss of earning in our study.

Despite the retrospective nature of this study, the results indicate that early LC is more effective than delayed LC, provided it is performed by an experienced surgeon. Although further randomized control trials are required to confirm this, we aim to perform early LC for patients with acute cholecystitis in future.

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