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Research Paper

A Comparison Between Laparoscopic and Open Cholecystectomy in Patients with Acute Cholecystitis

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ABSTRACT

Background: The health consequences of gallstones are found to be severe in the present day. As a treatment for gallstones, open cholecystectomy was the gold standard until the end of the 1980s. Surgery has been revolutionized with laparoscopy, leading to a re-evaluation of various treatment modalities, including cholecystectomy, although it also has its drawbacks. This study was conducted to evaluate if laparoscopic cholecystectomy can be recommended over open cholecystectomy as the preferred approach for the treatment of Acute Cholecystitis.

Method: A total of 25 patients were included in this study who were admitted to the surgical wards of a tertiary medical facility in India between November 2020 and October 2022. All the subjects were categorized into two groups, Group I (Laparoscopic cholecystectomy, n=14) and Group II (Open cholecystectomy, n=11).

The main outcomes that were evaluated were pre- and post-operative complications, length of hospital stay, wound infection and return to work. Statistics were used to analyze the collected data.

Results: The length of the surgery has been significantly longer in Group I (81.0714 13.18) than in Group II (91.363 10.26 minutes) when the two groups had been compared (p = 0.0442 [S]).

Laparoscopic cholecystectomy had more positive results than open cholecystectomy in contexts of postoperative pain (VAS > 4), length of hospital stays, and return to work, and the difference was statistically significant. Wound infection 5 (45.45%) and post-operative paralytic ileus3 (27.27%) were significantly higher in patients who underwent open cholecystectomy. There were no reported significant cases of morbidity or mortality during the study period.

Conclusion: As compared to open cholecystectomy, laparoscopic cholecystectomy has significant advantages including reduced paralytic ileus, less analgesic use, shorter surgery time, fewer postoperative complications and early discharge and mobilization.

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1. INTRODUCTION

The majority of digestive tract disorders in today's fast-paced world are caused by biliary diseases. Cholelithiasis, which results in general ill health, is one of them. Gallstone impaction on the neck of a gallbladder can cause acute cholecystitis (AC), which is characterized by acute biliary pain, fever, and right hypochondria tenderness over an extended period *i.e.* longer than 24 hours [1, 2]. According to estimates, in up to 90% of cases, gallstones are the cause of

acute cholecystitis. Gallstones are said to be up to 10% more common in adult Eastern societies and up to 15% more common in adult Western populations [3]. 12 % of individuals with gallstones shall grow cholecystitis after experiencing related symptoms in 20- 40 % of individuals with gallstones [4]. In recent years, there have been significant paradigm shifts in the management of acute biliary problems and the therapeutic interventions of AC. These modifications entail index admission cholecystectomy and earlier surgical intervention [5,6] followed by open or laparoscopic cholecystectomy [7]. Before the recent advances, it was controversial to perform a laparoscopic cholecystectomy for acute cholecystitis until recently, since complications, particularly common bile duct injury, and a high rate of conversion to an open procedure have been raised. On the other hand, in subsequent studies, it has been demonstrated that laparoscopic cholecystectomy during acute cholecystitis can be performed successfully. This has led to a reduction in hospital stays and costs [5,6]. Therefore, early cholecystectomy frequently lowers the risk of conservative management unsuccessful and recurrent acute cholecystitis during the waiting time. In contrast to a later time, bleeding is less in the first 72 hours and the tissue planes are also distinguishable. Laparoscopic cholecystectomy, while found to be safe and effective, can occasionally be challenging [7,8]. Different challenges with laparoscopic cholecystectomy include those with creating pneumoperitoneum, entering the peritoneal cavity, releasing adhesions, anatomy recognition, anatomical variation, and gall bladder removal. The main reasons for early cholecystectomy conversion to open surgery include the opaque view, challenging dissection of Callot's triangle, and bleeding [9]. With this understanding of the benefits and drawbacks of laparoscopic cholecystectomy and open cholecystectomy in the treatment of symptomatic cholelithiasis, additional research is required to determine which procedure is safer, more affordable, and patient-satisfying. This is precisely why the current study was conducted. The study's objective was to compare laparoscopic and open cholecystectomy for symptomatic cholelithiasis in terms of the operation time, blood loss, post-operative discomfort, and pain, length of hospital stay, cost-effectiveness, and patient satisfaction.

2. METHODOLOGY

A hospital-based comparative study was conducted between November 2020 to October 2022 at a tertiary health care center in patients attending medicine/surgical OPD with acute pancreatitis. This study included a total of 25 patients with a Mean age of 52.8 years, who were divided into two groups. Group I (n = 14) underwent laparoscopic cholecystectomy and Group II (n = 11) underwent open cholecystectomy. A thorough clinical history was obtained from interviews with each patient. A specific proforma was followed for the physical examination. Complete blood counts, urine examinations, liver function tests, X-rays of the chest, and abdominal ultrasonography were all used to investigate the patients. Under general anaesthesia, all patients underwent surgery. The patient consent form was obtained before the surgery. The current study has institutional ethical committee approval as well.

Outcome variables of interest-

Duration of study- Total time required for the procedure, from making the skin incision to closing it.

Blood loss- Using the gravimetric method and swab weighing, the amount of blood lost during an open cholecystectomy was calculated. When performing a laparoscopic cholecystectomy, first calculate the volume of irrigation fluids and deduct that amount from the fluid gathered in suction bottles to calculate the total blood loss.

Pain following surgery- surgery, identical analgesics were administered to each patient and the duration of pain was recorded.

Period of hospitalization-in days and patient satisfaction- Patient satisfaction was evaluated based on the following factors: post-operative pain, complications, length of hospital stay, overall costs, and the ability to return to regular employment.

3. RESULTS

In the current investigation, a total of 25 subjects, ages ranging from 35 to 70 years were included. The Mean age was 52.50 years in both groups. Table 1 shows that gender predominance towards the male gender. The male-to-female ratio in the current investigation was 2:1 (Table 1).

Table 1: Gender Distribution

Gender	Cases	Percent
Male	17	68%
Female	8	32%

Out of 25, a total of 56% (n=14) subjects were the chosen subjects for laparoscopic cholecystectomy (Group I), and the remaining 44% (n=11) were chosen for open cholecystectomy (Group II) (Table 2).

Table 2: Surgery Type

Surgery Type	Cases	Percent
laparoscopic cholecystectomy	14	56%
Open cholecystectomy	11	44%

The length of the surgery ranged from 65 to 120 minutes in group I (Mean 81.07 ± 13.18) and from 70 to 105 minutes in group II (Mean 91.36 ± 10.26). This difference was significant regarding statistics (p 0.044) (Table 3).

Table 3: Duration of procedure

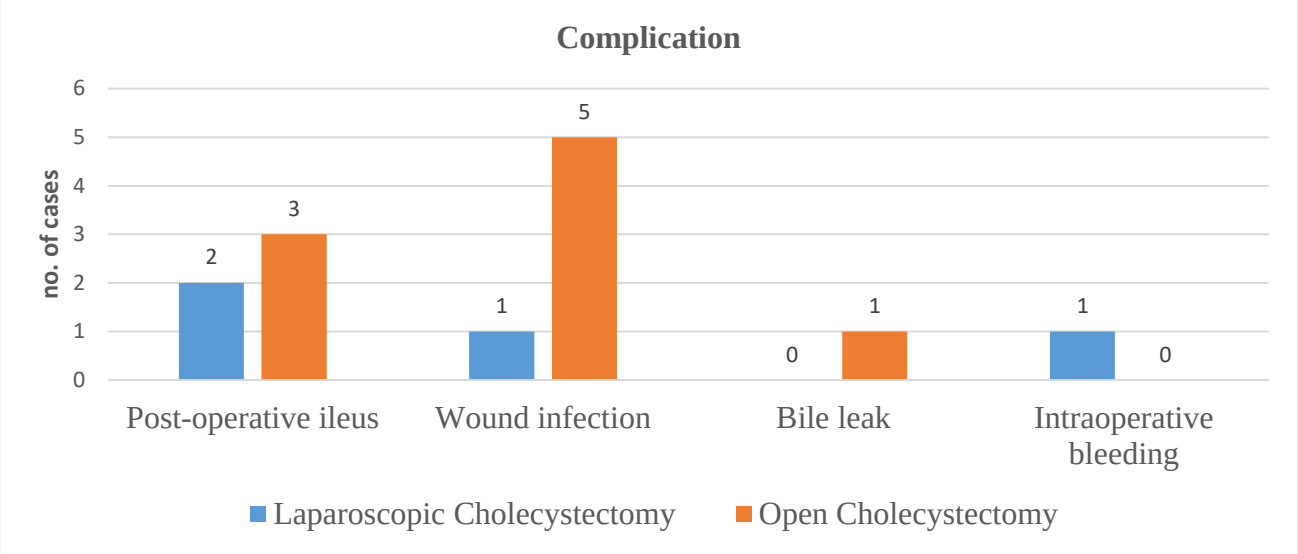
Duration of procedure (In Minutes)	Mean ± S.D.	P value
laparoscopic cholecystectomy	81.0714 ± 13.18	0.044 [S]
Open cholecystectomy	91.363 ± 10.26	

S.D.= Standard Deviation**, S=** Significant

Wound infection and post-operative ileus were the most common presenting complaints in both groups. These complaints were considerably fewer in Group I.

However, bile leak 1 (11.11%) was only observed in Group II and intraoperative bleeding was only noted in Group I i.e. 1 (25%) (Figure 1).

Figure 1: Complications



P value = 0.32 which Means no statistical association was found in the surgeries.

In Group II, the Mean duration of hospital stay was noted as greater, 6.81 ± 1.66 (days), compared to Group I, 4.57 ± 1.28 (days), which shows a statistical difference (p 0.009) between the two groups (Table 4).

Table 4: Comparison of hospital stay with surgery type.

Duration of hospital stay	Mean ± S.D.	P value
Laparoscopic cholecystectomy	4.57 ± 1.28	0.009 [S]
Open cholecystectomy	6.81 ± 1.66	

S.D.= Standard Deviation, S= Significant.

In Group I, 71.42% (n=10) of patients returned to normal work within 3 days, (Mean being 3.40 days) but in Group II, 45.45% (n=5) of patients returned to normal activity within 4 to 5, the Mean was 5.92 days. Statistically, this difference was also significant (p <0.001).

4. DISCUSSION

The practice of general surgery has been significantly changed by laparoscopic procedures and their range of uses is rapidly growing due to their advantages over more traditional surgeries. Hence for several such reasons, the current investigation was performed to compare laparoscopic cholecystectomy vs open cholecystectomy for acute cholecystitis. In the current investigation, there were 25 subjects in total, ranging in age from 35 to 70 and the average age group was 52.50 years (Table 1). According to the demographic data the male-to-female ratio was 2:1 which indicates that men were the primary recipients of acute cholecystectomy. However, several other studies showed opposite findings [10,11]. The investigations by Otibi RF *et al.*, and Shukla A *et al.*, noted 81% and 82% of females' preponderance to acute pancreatitis [10,11]. This may be due to geographical variation.

Subjects were divided into two groups, Group I (n=14, underwent Laparoscopic cholecystectomy) and Group II (n=11, underwent open cholecystectomy). Patients had the freedom to choose any of the treatment modalities. Hence, the number of participants in both groups was unequal.

The length of the surgery ranged from 65 to 120 minutes in group I (Mean 81.07 ± 13.18) and from 70 to 105 minutes in group II (Mean 91.36 ± 10.26), showing significant differences in terms of statistics (p 0.044) which was statistically more as compared to the study done by Shukla A *et al.*, [11]. The Mean duration of the procedure in their study in the laparoscopic cholecystectomy group was 52.32±13.33 min and in the open cholecystectomy was 37.66±4.94 min. The findings of the present investigation showed a shorter duration of the procedure in laparoscopic cholecystectomy, which is similar to several other investigations [9, 10, 11]. However, an investigation done by Karim T *et al.*, on 100 cholelithiasis patients between the ages of 25 and 65 found that laparoscopic cholecystectomy took an average of 103.98 minutes, which was significantly longer than the average open cholecystectomy time of 70 minutes (P 0.001) [12].

Post-operative complications such as post-operative ileus i.e. 3 (33.33%) and wound infection i.e. 5 (55.55%) notably more in Group II. The bile leak after surgery i.e. 1 (11.11%) was noted in Group II. Similarly, according to Shukla A *et al.*, in contrast to laparoscopic surgery, postoperative complaints

such as vomiting, jaundice, abdominal distension, and wound infection were reported considerably more in Group II (with a significant statistical difference, p <0.01).

Minimal postoperative hospital stay was found to be one of the key features of laparoscopic cholecystectomy. In the current investigation, Group I had a postoperative hospital stay that lasted 4.57 ± 1.28 days, whereas Group II had one that lasted 6.81 ± 1.66 days. This difference was noteworthy regarding statistics (p =0.009 [S]). The primary benefit of a laparoscopic cholecystectomy procedure continues to be a shorter hospital stay. Consistent findings were found in a study by Shukla A *et al.*, and Anmol N. *et al.*, [11,14].

Laparoscopic surgery is known to have the advantage of allowing patients to return to their normal occupations early. The findings of the present investigation were similar to studies done by Shukla A *et al.*, and Antoniou SA., who discovered that subjects could return to their normal routines earlier after undergoing laparoscopic cholecystectomy in contrast to open one [11,13]. The shorter hospital stays, lower complication rate, early return to work, and earlier return to routine activities are all contributing factors to patient satisfaction with laparoscopic cholecystectomy.

5. CONCLUSION

Based on the aforementioned findings, it could be determined that laparoscopic cholecystectomy is a simple, quicker procedure with a lower risk of complications than open cholecystectomy. In comparison to an open procedure, it also offers the benefit of a shorter hospital stay and an earlier return to work.

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