

## ORIGINAL RESEARCH

## A Retrospective Four-Year Study Of Cases Underwent Laparoscopic Cholecystectomy At A Tertiary Hospital

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### ABSTRACT

**Background:** The advent of Laparoscopic cholecystectomy (LC) has revolutionized the treatment of gall bladder disease. Laparoscopic cholecystectomy is preferred because of accompanying less postoperative pain, shorter hospital stay, faster recovery, improved cosmetic results, early return to work. In present study, we retrospectively analysed cases underwent laparoscopic cholecystectomy during last 4 years at our tertiary hospital.

**Material and Methods:** This retrospective, descriptive study was conducted among patients, who underwent laparoscopic cholecystectomy.

**Results:** During study period, 366 laparoscopic cholecystectomies were performed. Mean age was  $40.45 \pm 13.25$  years, majority were female (78.69 %) as compared to male (21.31 %). Mean body weight was  $58.78 \pm 13.51$  kgs, while mean BMI was  $23.81 \pm 2.23$  kg/m<sup>2</sup>. Various risk factors noted among cases were gall bladder contracted (18.85 %), raised bilirubin (16.12 %), acute attack (6.28 %), raised alkaline phosphates (3.55 %), previous laparotomy (3.01 %) & previous ERCP (1.64 %). Indication for surgery were Chronic calculous cholecystitis (61.75 %), Symptomatic cholelithiasis (15.30 %), Gallstone pancreatitis (13.11 %), Acute cholecystitis (6.28 %), Gall bladder mucocele (3.01 %) & Cholecystoduodenal fistula (0.55 %). Majority surgeries were done by 4 ports (88.52 %) as compared to 3 ports surgery (11.48 %). Mean duration of surgery was  $77.49 \pm 24.27$  minutes. Drain placed in 20.22 % cases while 5.19 % cases required conversion to open cholecystectomy. Complications noted were leakage of bile (7.92 %), postoperative haemorrhage (4.10 %), subhepatic abscess (3.01 %), port site induration (2.73 %) & retained bile stone (0.55 %). Average length of stay was  $2.53 \pm 1.24$  days.

**Conclusion:** Laparoscopic cholecystectomy is safe and efficacious surgery, with advantages such as shorter duration of surgery, less intra and post-operative complications, early discharge and mobilization.

**Keywords:** Cholecystectomy, Laparoscopic Cholecystectomy, Complications, symptomatic gall stones.

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## INTRODUCTION

The advent of Laparoscopic cholecystectomy (LC) has revolutionized the treatment of gall bladder disease. It is now the gold standard treatment of gall stones, and the commonest operation performed by Laparoscopy globally.<sup>1</sup> Common indications for LC include symptomatic cholelithiasis, asymptomatic cholelithiasis in patients at risk for gallstones or gallbladder cancer. acalculous cholecystitis, Polyps > 0.5 cm, porcelain gallbladder. Contraindications include diffuse peritonitis with hemodynamic compromise and uncontrolled hemorrhage.<sup>2</sup>

Laparoscopic cholecystectomy is preferred because of accompanying less postoperative pain, shorter hospital stay, faster recovery, improved cosmetic results, early return to work, fewer complications such as infection, adhesions, less operating time and short learning curve and, it is superior to other developed techniques because of economic advantage.<sup>3,4</sup>

Various problems faced are difficulty in creating pneumoperitoneum, accessing peritoneal cavity, releasing adhesions, identifying anatomy, anatomical variation and extracting the gall bladder. The success rate of laparoscopic procedures is directly proportional to the learning curve of the operating surgeon. In present study, we retrospectively analysed cases underwent laparoscopic cholecystectomy during last 4 years at our tertiary hospital.

## MATERIAL AND METHODS

This retrospective, descriptive study was conducted among patients, who underwent laparoscopic cholecystectomy, during the period from January 2018 to December 2021 (4 years). Study was conducted in department of general surgery, at Melmaruvathur Adhiparasakthi Institute of medical sciences and research college & hospital, Melmaruvathur, India.

Case records were obtained & data such as Patient's demographic details, detailed clinical history (onset of pain, duration, progression, associated fever, vomiting and jaundice), family history, personal history (diabetes mellitus, hypertension, respiratory and cardiac problems), drug intake, previous surgical history, preoperative investigations (routine in all patients CBC, bleeding-coagulation times, liver function tests, renal function tests, blood glucose level, screening for hepatitis), preoperative ultrasonography findings (number of stones, sizes, gall-bladder wall thickness, pericholecystic collection, and diameter of common bile duct), ASA score, intra-operative findings (duration of operation, intra-operative bleeding and iatrogenic injuries), conversion from laparoscopic to open cholecystectomy and reason for conversion, postoperative complications, early (haemorrhage, bile leak, wound infection) and late complications (biliary stricture and port site hernia), hospital stay and mortality were reviewed from patients' records.

Data was collected and compiled using Microsoft Excel, analysed using SPSS 23.0 version. Statistical analysis was done using descriptive statistics.

## RESULTS

During study period, 366 laparoscopic cholecystectomies were performed. Mean age was  $40.45 \pm 13.25$  years, majority were female (78.69 %) as compared to male (21.31 %). Mean body weight was  $58.78 \pm 13.51$  kgs, while mean BMI was  $23.81 \pm 2.23$  kg/m<sup>2</sup>. Various risk factors noted among cases were gall bladder contracted (18.85 %), raised bilirubin (16.12 %), acute attack (6.28 %), raised alkaline phosphates (3.55 %), previous laparotomy (3.01 %) & previous ERCP (1.64 %).

**Table 1: General characteristics**

| Parameters                 | Frequency/ mean $\pm$ SD | Percentage |
|----------------------------|--------------------------|------------|
| Age (years)                | 40.45 $\pm$ 13.25        |            |
| Gender                     |                          |            |
| Female                     | 288                      | 78.69%     |
| Male                       | 78                       | 21.31%     |
| Weight (kg)                | 58.78 $\pm$ 13.51        |            |
| BMI (kg/m <sup>2</sup> )   | 23.81 $\pm$ 2.23         |            |
| Risk factors               |                          |            |
| Gall bladder contracted    | 69                       | 18.85%     |
| Raised Bilirubin           | 59                       | 16.12%     |
| Acute attack               | 23                       | 6.28%      |
| Raised alkaline phosphates | 13                       | 3.55%      |
| Previous laparotomy        | 11                       | 3.01%      |
| Previous ERCP              | 6                        | 1.64%      |

Indication for surgery were Chronic calculous cholecystitis (61.75 %), Symptomatic cholelithiasis (15.30 %), Gallstone pancreatitis (13.11 %), Acute cholecystitis (6.28 %), Gall bladder mucocele (3.01 %) & Cholecystoduodenal fistula (0.55 %).

**Table 2: Indication for surgery**

| Diagnosis                       | Frequency | Percentage |
|---------------------------------|-----------|------------|
| Chronic calculous cholecystitis | 226       | 61.75%     |
| Symptomatic cholelithiasis      | 56        | 15.30%     |
| Gallstone pancreatitis          | 48        | 13.11%     |
| Acute cholecystitis             | 23        | 6.28%      |
| Gall bladder mucocele           | 11        | 3.01%      |
| Cholecystoduodenal fistula      | 2         | 0.55%      |

In present study, majority surgeries were done by 4 ports (88.52 %) as compared to 3 ports surgery (11.48 %). Mean duration of surgery was 77.49  $\pm$  24.27 minutes. Drain placed in 20.22 % cases while 5.19 % cases required conversion to open cholecystectomy. Complications noted were leakage of bile (7.92 %), postoperative haemorrhage (4.10 %), subhepatic abscess (3.01 %), port site induration (2.73 %) & retained bile stone (0.55 %). Average length of stay was 2.53  $\pm$  1.24 days.

**Table 3: Surgery related characteristics**

| Characteristics                   | Frequency / mean $\pm$ SD | Percentage |
|-----------------------------------|---------------------------|------------|
| Number of ports                   |                           |            |
| 3 ports                           | 42                        | 11.48%     |
| 4 ports                           | 324                       | 88.52%     |
| Mean duration of surgery (min)    | 77.49 $\pm$ 24.27         |            |
| Drain placed                      | 74                        | 20.22%     |
| Converted to open cholecystectomy | 19                        | 5.19%      |
| Complications                     |                           |            |
| Leakage of bile                   | 29                        | 7.92%      |
| Postoperative haemorrhage         | 15                        | 4.10%      |
| Subhepatic abscess                | 11                        | 3.01%      |

|                               |             |       |
|-------------------------------|-------------|-------|
| Port site induration          | 10          | 2.73% |
| Retained bile stone           | 2           | 0.55% |
| Average length of stay (days) | 2.53 ± 1.24 |       |

## DISCUSSION

Laparoscopic cholecystectomy is the most common minimal invasive procedure in general surgery and has replaced the invasive procedure of open cholecystectomy in the treatment of gall stones. De Mestral C et al.,<sup>5</sup> in a population-based study, found that early laparoscopic cholecystectomy (ELC) was associated with a shorter total hospital stay and a similar rate of post-operative complications compared with delayed laparoscopic cholecystectomy (DLC). Most previous contraindications to laparoscopic cholecystectomy, such as morbid obesity, previous upper abdominal surgery, and acute cholecystitis are no longer absolute contraindications, with the growing experience, a selection criterion has become more liberal.<sup>6</sup>

In retrospective study by Aamir HH et al.,<sup>7</sup> in 1200 patients who underwent laparoscopic cholecystectomies, at Government Medical College, J & K, India, a total of 1200 patients were studied including 216 males (18%) and 984 females (82%). The mean age of the patients was 43.35 ± 8.61. The mean operative time in our study was 55.5 ± 10.60 minutes with range of 45 – 90 minutes. Conversion rate was 2.6%. 2 patients were re-explored. Bile duct injury was found in 6 patients (0.5%).

Farda W et al.,<sup>8</sup> studied 1430 LC cases, mean age was 45.77 ± 13.45 years (14–90 years), with male/female ratio of 1:4.7. One third (33%) had comorbidities. Most of patients (~ 97%) were classified as ASA grade I and II. Of all patients, 26.8% of males and 13.2% of females had gallbladder inflammation (OR = 2.203, 95% CI 1.56–2.61, P = 0.000). Overall mean duration of anesthesia was 75 ± 25.6 min. The conversion rate to OC was 4.6% (N = 66), most commonly dense adhesions at Calot's triangle (3.8%). The intraoperative complication rate was 17.5% (N = 249), where bile/stone spillage was the most common indication (N = 235, 16.4%). Immediate postoperative complication rate was 2.4% (N = 35). Average length of stay after LC was 2.23 ± 1.43 days (1–19 days).

Sarda DK et al.,<sup>9</sup> studied 230 patients, aged between 30-65 years, with male predominance, mean age group was 40.21 ± 1.13 years. Majority of cases were of Chronic calculous cholecystitis (64.3%). There were 20% cases (n=46) of acute cholecystitis. There were 12 cases of leakage of bile, out of them 6 were managed conservatively, 4 underwent minimal invasive surgery and 2 underwent open surgery.

Rajabi Mashhadi et al.,<sup>10</sup> studied 500 patients with mean age of 47 ± 11 years. 329 (78.2%) were female and 109 (21.8%) were male. 400 (80.0%) of patients had symptomatic cholelithiasis. The mean operating time was 70 ± 8 minutes. The most common intra-operative complication was bradycardia during gas insufflation into the abdominal cavity. In 430 (86.0%) of patient's length of hospital stay was less than two days. Six patients (1.2%) were complicated by hernia at incision site, 18 (3.6%) by bile leakage, and 15 (3.0%) required laparotomy. Surgical site bleeding and surgical site infection were observed respectively in 11 patients (2.2%) and 17 patients (3.4%). Totally, 52 patients (10.4%) had surgically-induced complications, two (0.4%) of whom died.

Srivastava V et al.,<sup>11</sup> compared three-port LC technique (816 patients, 56.04%) with traditional four-port LC technique (640 patients, 43.96%). Visual Analog Score (VAS) in the postoperative period at six hour was 2.11±0.82 in three-port group versus 3.17±1.12 in four-port group, this suggests that there was a significant difference in pain in these two groups in the early postoperative period (p<0.001). In three-port group, the requirement of analgesic

drug was significantly less as compared to four-port group ( $2.86\pm 0.98$  versus  $3.22\pm 0.87$ ;  $p<0.001$ ). There was no statistically significant difference in the mean operating time, duration of hospital stay, intra and postoperative complications, days to return to normal activity, satisfaction score and conversion rate ( $p=0.087$ ,  $p=0.061$ ,  $p=0.578$ ,  $p=0.555$ ,  $p=0.572$  and  $p=0.145$ , respectively).

Trichak S,<sup>12</sup> compared the three-port technique with the standard four-port method in prospective randomized controlled trial and concluded that the three-port technique is comparable to the four-port method, with no obvious increase in bile duct injuries and that it reduced the need for postoperative analgesic injections.

Amreek F et al.,<sup>13</sup> noted that rate of complications associated with laparoscopic cholecystectomy was 6.8%. Older age, obesity, and multiple pre-operative risk factors were associated with complications. The most common intra-operative complication was hemorrhage (1.3%) and most common postoperative complication was surgical site infection (2.7%) & conversion rate was 3.6%. Both intra-operative and postoperative complications were more common in procedures which were converted to open.

The two most common reasons for conversion are dense upper abdominal adhesions or necrotic gall bladder that precludes grasping and elevation with a grasper. The risk factors for conversion to open cholecystectomy include male gender, previous abdominal surgery, acute cholecystitis, dense adhesions and fibrosis in Calot's triangle, anatomical variations, advanced age, comorbidity, obesity, suspicion of common bile duct stones, jaundice, and decreased surgeon experience. It is, therefore, mandatory to explain to the patients about the possibility of conversion to open technique at the time of taking consent for laparoscopic cholecystectomy.<sup>14</sup>

Harish S et al.,<sup>15</sup> performed retrospective analysis of 907 consecutive patients who underwent LC, conversion from Laparoscopic to Open Cholecystectomy (LOC) was done in 17 (1.87%) out of the 907 cases. Dense adhesions between the gallbladder and the omentum/bowel (58.8%) and fibrosis of Calot's triangle with distortion of anatomy (29.4%) were the most frequent reasons for conversion. It was also found that recent acute cholecystitis and presence of gall bladder perforation were independent predictive factors for conversion

Although laparoscopic cholecystectomy has largely supplanted traditional methods of performing open cholecystectomy for most patients with chronic uncomplicated cholecystitis and cholelithiasis, the open approach continues to be safe and effective therapy for complicated gall stone disease. There are a number of clinical situations that, when present make the laparoscopic approach more difficult and should prompt consideration of open approach.

## CONCLUSION

Laparoscopic cholecystectomy is safe and efficacious surgery, with advantages such as shorter duration of surgery, less intra and post-operative complications, early discharge and mobilization and should be an available option for all patients requiring elective cholecystectomy.

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