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### Original Article

## A Comparative Study to Evaluate the Laparoscopic vs Open Surgery Cholecystectomy: A Prospective Study

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#### ABSTRACT:

**Background:** Gallstones are common in Indian population and its treatment has shown a decisive shift from open to minimally invasive route. The studies published so far mention a high rate of complication and conversion in laparoscopic surgical treatment of acute cholecystitis. The study aimed to determine whether laparoscopic cholecystectomy can be recommended over open cholecystectomy as the procedure of choice for the treatment of cholecystitis with cholelithiasis. **Methodology:** In one surgical unit, 40 patients undergoing cholecystectomy were studied to compare patient recovery, subjective and objective pain experienced and complications after laparoscopic and open cholecystectomy. The data were collected prospectively where allocation to open or laparoscopic cholecystectomy was by consecutive attendance. **Results:** Comparison of two groups showed that intraoperative complications were more among laparoscopic surgery as compared to open surgery. Whereas post operative complications were reported higher among the open surgery cases. On comparing both the groups the comparison was although not statistically significant which can be due to less sample size. Post operative pain and analgesics used was also evaluated which was required less in laparoscopic group which statistically significant difference. **Conclusion:** Laparoscopic cholecystectomy was feasible in 90% of patients presenting with symptomatic gallstones. The purported advantages of laparoscopic surgery over conventional open techniques are less pain and faster return to normal functional status. It was safe with less post operative morbidity and was more cost effective as compared with the open surgery.

**Key words:** Cholecystectomy, cholecystitis, laparoscopy.

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#### INTRODUCTION

Since the introduction of laparoscopic cholecystectomy, with the accumulation of experiences and the advances in the instruments, laparoscopic cholecystectomy has been expanding its indications, thus becoming a standard surgical method of cholecystectomy, due to its advantages as a non-invasive procedure.<sup>1</sup>

In patient terms, laparoscopic surgery has the advantages of avoiding large open wounds or incisions and thus of decreasing blood loss, pain and discomfort. Patients have fewer unwanted effects from analgesia because less analgesia is required. The fine instruments are less apt to cause tissue trauma and blood loss. The rate of postoperative complications is generally lower, especially

those related to the wound such as dehiscence, infection, cellulitis and incisional hernia.<sup>2</sup>

Performance of the operation within the body cavity avoids the cooling, drying, excessive handling and retraction of internal organs associated with conventional 'open' techniques—possibly reducing postoperative peritoneal adhesions with their hazard of later bowel obstruction.<sup>3</sup>

Whereas open surgery retains a clear lead, in certain respects. Procedures performed laparoscopically are generally slower, especially when the setting-up time is included. And there are some potential complication seen in laparoscopy which were less as compared to open surgery including bile duct injury, postoperative cystic duct leak,

postoperative bile leak, peritoneal abscess, bowel injury and postoperative hemorrhage.

This study was undertaken to determine whether laparoscopic cholecystectomy can be recommended over open cholecystectomy as the procedure of choice for the treatment of cholecystitis with cholelithiasis.

**MATERIAL AND METHODS**

A total of 100 consecutive cholecystectomies were performed by one surgical team over a 10 month period (Table I).

**Inclusion and exclusion criteria:**

The age and sex distribution were similar as was their average weight, cardiorespiratory fitness and medical and surgical history. Patients with cholelithiasis proven by USG with at least one attack of upper abdominal pain and considered fit for elective cholecystectomy shall be included in the study.

The patients with following conditions shall be excluded from the study:

- History or investigations suggesting CBD stones.
- History of prior abdominal surgery.
- Patient’s age above 70 years.

Patients shall be randomly distributed into two groups of (laparoscopic cholecystectomy and open cholecystectomy) 20 each by sealed envelope method. One group shall be subjected to laparoscopic cholecystectomy and the other to open cholecystectomy. All patients shall be kept nil by mouth overnight prior to surgery and will be given antibiotic prophylaxis. Nasogastric tube shall be inserted depending on individual basis and all patients shall be asked to empty the bladder prior to entering the operating room.

**PROCEDURE**

The open cholecystectomy was performed through a 12-15 cm right subcostal incision which involved cutting the rectus muscle to give access to the peritoneal cavity. In the laparoscopic approach we insufflated the peritoneum through a Veress needle placed below the umbilicus and then introduced a 10 mm trocar to allow insertion of a telescope carrying a video camera. We then placed instruments through three further points, one under the xiphisternum, one under the costal margin in the midclavicular line and another on the anterior axillary line. Positions varied depending on the size and shape of the patient and on the relative position of the gallbladder. The operative technique was very much the same for each procedure. The anatomy of Calot’s triangle was clearly identified, the cystic duct and artery isolated separately, clipped and divided, and the gallbladder was then dissected from the liver with diathermy and removed via the umbilical stab incision.

The intraoperative and postoperative findings are noted and analyzed using the student’s t test and Chi square test.

**RESULTS**

**Table 1: Intraoperative complication**

Operative finding	LC	OC	P value
Gall bladder perforation with spillage	3 (16%)	1(6%)	>.05%
CBD injury	0(0)%	0(0%)	>.05%
Liver injury	4(20%)	3(15%)	>.05%
Vascular injury	3(15%)	1(6%)	>.05%

**Intraoperative complications:**

We have compared the intra-operative findings and complications of both groups. Out of the 40 patients, not a single patient having significant anatomical variation in the gall bladder or extra hepatic biliary apparatus. The commonest intra-operative complication for both the groups is that of liver injury 4 (20%) cases of the LC group and 3 (15 %) cases of OC group having liver injury while dissecting the gallbladder fossa from liver bed. The other complications include gallbladder perforation in 16% cases of LC and 6% cases of OC group; vascular injury in 3 (15%) in LC and 6% in OC group. No bile duct injury was reported in any of the groups . There is no statistically significant difference in rate of complication in both the group.

**Table 2: Post operative complication**

Complication	LC	OC	P value
Bile leak	1(6%)	3(16%)	>.05%
Wound infection	1(6%)	4(20%)	>.05%
Fever	1(6%)	5(25%)	>.05%

Bile leak, wound infection and fever were included as postoperative complications for laparoscopic and open cholecystectomy group . Among these three-bile leaks is the most significant, which observed in 1(6.%) cases of LC group and 3 (16%) cases of OC group. 1 patient with wound infection in LC group was observed as compared with 4 cases of OC group. Fever was present in 1 case of LC group and 5 cases of OC group. The difference regarding rate of postoperative complication among laparoscopic and open cholecystectomy group are not statistically significant.

**Table 3: Post operative pain**

Site	LC	OC
Epigastric	16	10
Generalized	4	11
Chi square : p value <.05%		

Postoperative pain evaluated with two separate parameters. The site of postoperative pain is epigastric region in 16 cases of LC group and 10 cases of OC group as compared with generalised pain in abdomen in 4 cases of LC group and 11 cases of OC group. This difference is statistically significant.

**Table 4:** Postoperative pain and average duration of analgesic requirement

VAS grade	LC Grade 2	OC Grade 3	P value
Duration of pain (in days)	3	6	0.001
Analgesics used (in days)	4	7	0.016

The VAS was median Grade 3 in OC group as compared to median Grade 2 in LC group. The pain was more in the initial 2 days in both groups and it lasted for median duration of 6 days in OC group compared to 3 days in LC group,  $p = 0.001$ . The NSAID's were used for more days in OC group (median-7days) compared to LC group (median - 4days),  $p = 0.016$ .

**DISCUSSION**

In the present study we have intra-operative findings and complications of both groups were compared. No significant anatomical variation in the gallbladder or extra hepatic biliary apparatus was notice in any of the patient. The commonest intra-operative complication for both the groups is that of liver injury and gall bladder spillage and both the complications were noticed more while operating laproscopically and open surgery. But there is no statistically significant difference in rate of complication in both the group.

The results are not comparable with the results of Talpur et al<sup>4</sup> who shown that variation in about 20% cases mainly involving cystic artery followed by cystic duct, right hepatic artery and gallbladder in descending order. The less sample size could also be attributed to the discrepancies in results. The results of the present study were not comparable with the study of Buanes and Mjaland<sup>5</sup> which shown significantly less complications in the laparoscopic group as compared to open surgery group (3.6 versus 10.4%). Review of recent literature shows that the incidence of injuries to the common bile duct is 0.1-0.6%.<sup>6</sup> Postoperative complications for both the group included bile leak, wound infection and fever. Among these open surgery dominated in all the three complications taken in account then laproscopic cholecystecctomy. The difference regarding rate of postoperative complication among laparoscopic and open cholecystectomy group are not statistically significant. The results of our study was in accordance with randomized clinical trial of OC v/s LC for acute cholecystitis by Johansson et al<sup>7</sup> where also no significant difference in the rate of post operative complications, pain score at discharge and sick leave was observed Koperna et al<sup>8</sup> in a study to compare found that complication rate after LC was found to be lesser in respect to wound infection ( $p=0.07$ ).

The reason for higher percentage of complication rate in our study was mainly due to the small sample size. The decreased wound infection after laparoscopic surgery was

one of the main benefits of minimally invasive surgery. The wound infections occurred in open surgery were tackled with adequate antibiotic coverage and daily dressings which in turn resulted into increased hospital cost and postoperative hospital stay.

Postoperative pain evaluated with two separate parameters. The pain in generalized and epigastric regions were noted and compared for both the group and difference was statically significant which was in accordance with the various studies performed in past. The VAS scale was used for evaluating the intensity of the pain. The pain was more in the initial 2 days in both groups and it lasted for median duration of 6days in OC group compared to 3 days in LC group,  $p = 0.001$ . The NSAID's were used for more days in OC group (median-7days) compared to LC group (median - 4days),  $p = 0.016$ .

Our results were in accordance with the study performed by Enes et al<sup>9</sup> in which he concluded that the pain intensity was significantly lower in patients treated with local anaesthetic ( $p<0.05$ ). In a study, Doke A, Gadekar N et al<sup>10</sup> found that the need for analgesics was more in open cholecystectomy than in laparoscopic cholecystectomy. Similar results were demonstrated by Karim T et al in over 100 patient of cholecystectomy.<sup>11</sup>

**CONCLUSION:**

On the basis of the above results, it could be concluded that laparoscopic cholecystectomy is an easy to perform, less time-consuming procedure, with low complication rates as compared to open cholecystectomy.

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