

Outcome of open cholecystectomy and laparoscopic cholecystectomy- A comparative study**Yamuna V S¹, Rahul R Raikar², Sachin Kempegowda^{3*}**¹Assistant Professor, Department of General Surgery, AIMS, BG Nagara, Nagamangala Taluk, India²Assistant Professor, Department of General Surgery, AIMS, BG Nagar, Nagamangala Taluk, India³Assistant Professor, Department of General Surgery, AIMS, BG Nagar, Nagamangala Taluk, India

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Abstract

Background: Cholelithiasis, which continues to be one of the most common digestive disorders encountered, was traditionally being dealt by conventional or open cholecystectomy. With the introduction of laparoscopic cholecystectomy, the surgical community witnessed a revolution in basic ideology and the importance of minimal access surgery has suddenly impacted. **Materials and Methods:** 50 patients admitted at Adichunchanagiri institute of medical science with a diagnosis of calculous cholecystitis underwent open / laparoscopic cholecystectomy. 25 patients constituted each group. **Results:** The duration of Laparoscopic cholecystectomy was significantly more than for open cholecystectomy (median 95 min in LC and 80 min in OC). One patient of laparoscopic group required conversion to open procedure. The drains were required in less number of patients of Laparoscopic cholecystectomy group and for less number of days. No Wound infection was seen in Laparoscopic cholecystectomy patient when compared to 5 in OC patients. The Visual Analogue Scale for pain in the post op period was significantly less for LC patients compared to OC patients (median 7 in OC group as compared to 4 in LC group). The duration of hospital stay was significantly longer for OC group than for LC group (Mean of 7.84 days versus 3.68 days respectively). The cosmetic result was significantly better in LC group than OC group (Mean cosmetic score of 4.72 in LC group and 3.44 in OC group. Median score was 5 for LC group and 3 for OC group). **Conclusion:** Laparoscopic cholecystectomy is Superior to Open cholecystectomy. Therefore, laparoscopic cholecystectomy is considered the "Gold Standard" procedure for cholecystectomy.

Keywords: Outcome, Open Cholecystectomy, laparoscopic Cholecystectomy

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Introduction

Gastro-intestinal surgery has undergone a revolution in the recent years by the introduction of laparoscopic techniques. The concept of "keyhole surgery" created an immediate disparity between the potential of the new technique and training of surgeons to perform it. Now modern surgical methods are aimed at giving cure along with minimal invasive techniques with patient in mind, safety never being compromised.

Laparoscopic cholecystectomy (LC) stands for a gold standard for the treatment of gall stone disease. Open cholecystectomy has been the gold standard of treatment for cholelithiasis for more than 100 years. Since then, due to growing experience and development of specially adapted laparoscopic instruments the technique has improved immensely[1].

Laparoscopic cholecystectomy has revolutionized our approach to a number of problems and caused a reevaluation of clinical strategies. It is associated with minimal risk to the patient and a high degree of relief from symptoms. Now it has become the standard therapy for symptomatic gall stone disease, particularly in elective setting[2].

However, in the case of intra-abdominal adhesions, perforated gallbladder, untypical or uncertain anatomy, or when intra-operative complications occur and it's impossible to manage them laparoscopically, open method is still indicated[3,4].

In our study, we have made an attempt to compare the advantages and disadvantages of both the procedures in our hospital.

Aims and objectives

The aim of this study is to compare outcome of open cholecystectomy and laparoscopic cholecystectomy.

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E-mail: drsachin@bgsaims.edu.in**Comparison of the two techniques of cholecystectomy with regards to**

- Duration of the procedure.
- Complications encountered (per-operative and post-operative)
- Post-operative pain.
- Period of hospitalization.
- Cosmetic advantages

Materials and methods

This was a longitudinal study. 50 patients admitted at Adichunchanagiri institute of medical science with a diagnosis of calculous cholecystitis underwent open/laparoscopic cholecystectomy. 25 patients constituted each group. The study subjects were selected by convenience sampling during the study period with a diagnosis of cholelithiasis being operated for elective cholecystectomy.

Inclusion criteria

All Patients of both sexes above 18 years of age with cholelithiasis proven by abdominal ultrasound and considered fit for cholecystectomies under general anaesthesia are included in the study.

Exclusion criteria

Patients with following conditions are excluded from the study:

1. Patients with CBD (common bile duct) stones.
2. Patient with acalculus cholecystitis.
3. Patients unfit for general anaesthesia

Written informed consent was obtained from all the patients before their enrolment in the study.

The patients were interviewed for a detailed clinical history according to the proforma. All the patients were examined and subjected to routine blood investigations & abdominal ultrasonography.

All operations were done under General Anaesthesia.

Open Cholecystectomy

A sub costal muscle transection incision was used for open cholecystectomy; the length of the incision was tailored to the individual patient and kept to the minimum necessary to allow safe and adequate access to the gall bladder. Dissection was started at Calot’s triangle and proceeded antegradely towards the fundus. “Fundus first method” was used in case of dense adhesions where anatomy of Calot’s triangle was not clear.

Laparoscopic Cholecystectomy

Laparoscopic cholecystectomy was performed with the operating surgeon on the left side of the table. Pneumoperitoneum was created using Verses needle and by Hassan’s technique in some cases. It involved two 10mm and two 5mm trocars. Peritoneal cavity was visualized and any adhesions if present were released. Calot’s triangle was visualized and dissection was carried out by means of electro cautery and the cystic duct and artery were secured with titanium clips.

The histopathology of the specimen was also noted.

The number of cases being converted from laparoscopic to open cholecystectomy was noted & the reason for conversion will be recorded.

Total duration of the procedure was calculated from the incision upto the completion of skin closure

Pain in the post-operative period was rated by each patient using a Visual Analogue Scale (from 0 to 10).

All patients were administered analgesics as required in oral or injectable form.

Procedure related complications like per-operative biliary injury, bowel injury and post-operative wound infection & dehiscence, reasons for prolonged hospitalization was recorded & compared.

Patients were discharged from the hospital once they are fully mobilized and able to tolerate a normal diet and pain relief is adequate.

Evaluation of post-operative complications were made during OPD follow up after 2 weeks.

Cosmetic Scoring[5] was compared after 6 weeks.

Observation and results

Twenty five patients were studied in each group. The results were:

Table 1: Age distribution

Age group	Lap	Open	Total
<20	1	0	1
21-40	10	10	20
41-60	11	13	24
>60	3	2	5
Total	25	25	50

(Rows 1 and 2 clubbed for analysis)

Chi square value:0.41p value:0.81 Interpretation: Not significant

The median age (range) of the patients were 42 (18-75) and 42 (24-65) years in LC and OC group respectively. Mean age of 41.88 and 43.8 in LC and OC respectively. The difference was not found to be statistically significant.

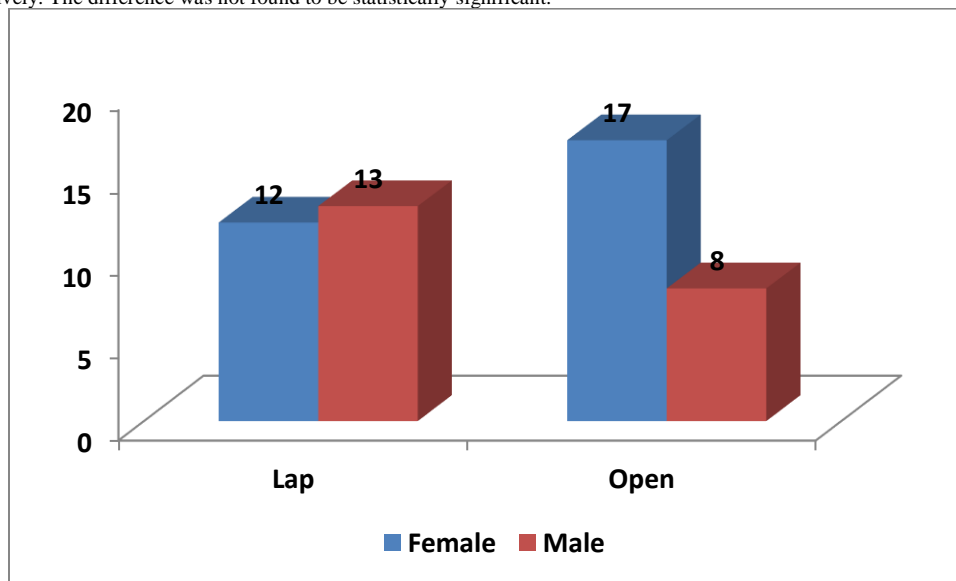


Figure 1: Sex distribution

8 patients of OC and 13 patients of LC were males. Among OC group 17 were females and among LC group 12 were females.

Table 2: Presenting complaints

Complaints	Open	Lap
Pain RUQ	25	25
Fever	3	2
Vomiting	8	9
Dyspepsia	6	5

All patients in both the groups [25 (100%)] presented with pain in the right upper quadrant. The other complaints seen were fever (3 in OC and 2 in LC), vomiting (8 in OC and 9 in LC) and dyspepsia (6 in OC and 5 in LC).

Table 3: Duration of surgery

Type of operation	Mean Duration of surgery	SD	p value
Lap	94.12	19.75	0.03
Open	82.4	17.14	

The mean duration of operative procedure was 82.4 min (40-125 min) for OC and 94.12 min (48-140 min) for LC. The difference was found to be significant (p=0.03).

Median duration was 80 for OC and 95 for LC

The more time required in LC was due to intra- operative gas leak, Calot’s triangle dissection, slippage of clip and delivery of gall bladder through the port site.

Table 4: Per operative complications

Per operative complications	Lap	Open	Total
Bile spillage	10	6	16
Stone spillage	6	3	9
Nil	15	19	34
Total	31	28	59

Chi square value:2.32p value:0.31 Interpretation: Not significant

All patients were operated under general anaesthesia. The main complications noted were bile spillage(4 patients in LC and 3 patients in OC group) and stone spillage (6 in LC and 3 in OC). There was no instance of CBD injury or adjacent organ injury in either group.

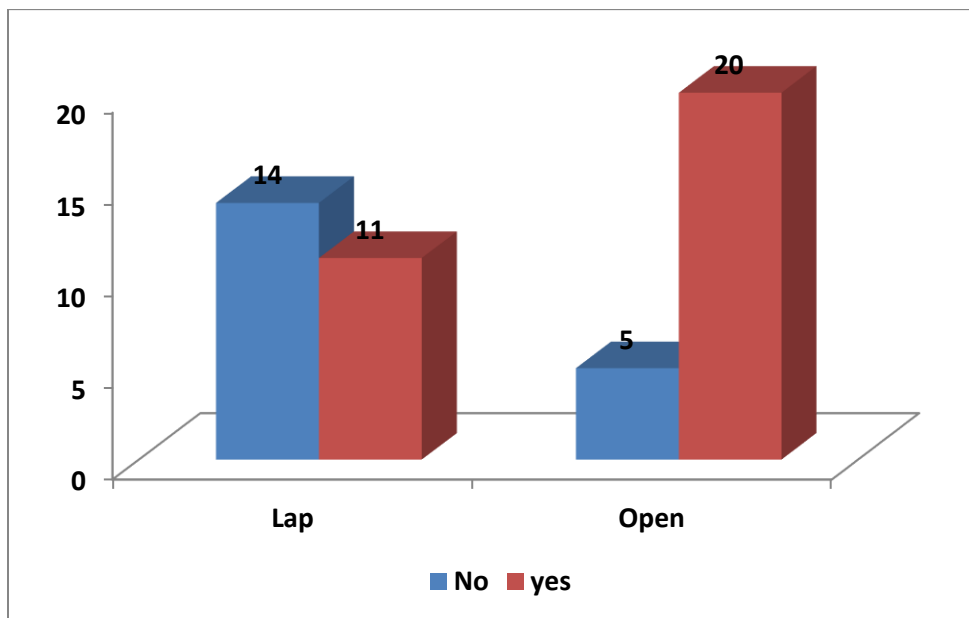


Figure 2: Drain used

The sub-hepatic drains were required in 20 patients in OC group and 11 patients in LC group. In other cases, drains were not kept as the haemostasis was found to be adequate.

One patient were converted from laparoscopy to open surgery due to dense adhesions in the Calot’s triangle in a case of acute cholecystitis.



Post operative pictures

Figure 3:Post-operative pictures

Table 5: Post operative pain score

Post op pain (VAS)	Lap	Open	Total
2--3	2	1	3
4--5	18	14	32
6--7	5	10	15
Total	25	25	50

Chi square value:2.50p value:0.28 Interpretation: Not significant
 The VAS was median 7 grade in OC group as compared to median 4 in LC group.

Table 6: Post operative outcome

Post op complications	Lap	Open	Total
Nil	25	20	45
Wound infection	0	5	5
Total	25	25	50

There was difference in wound infection rate, 5 patients in OC group compared to only 0 patients in LC group. One patient in OC group had wound dehiscence which was sutured later under anaesthesia.

Table 7: Post operative recovery

Type of operation	Mean duration of hospital stay	SD	p value
Lap	3.68	1.18	<0.001
Open	7.84	1.49	

The duration of hospital stay was for a mean period of 3.68 days (2-5days) in LC group and 7.84 days (6-12days) in OC group. The difference was statistically significant, p < 0.001. It was more in OC group due to increased pain, wound infection, and less mobilization due to pain.

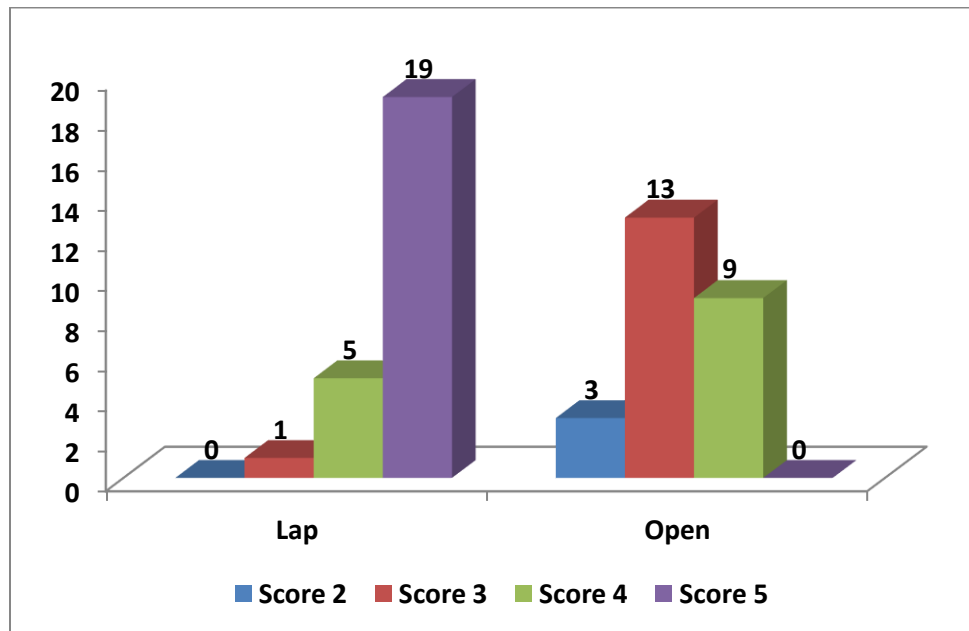


Figure 4: Cosmetic scale

Table 8: Mean cosmetic score

Type of operation	Mean Cosmetic score	SD	p value
Lap	4.72	0.54	<0.0001
Open	3.44	0.66	

25 patients who underwent LC had a mean cosmetic score of 4.72 and 25 patients who underwent OC had a mean cosmetic score of 3.44. p < 0.0001 (highly significant)
 Median score was 5 for LC and 3 for OC.



Figure 5: Open cholecystectomy scars

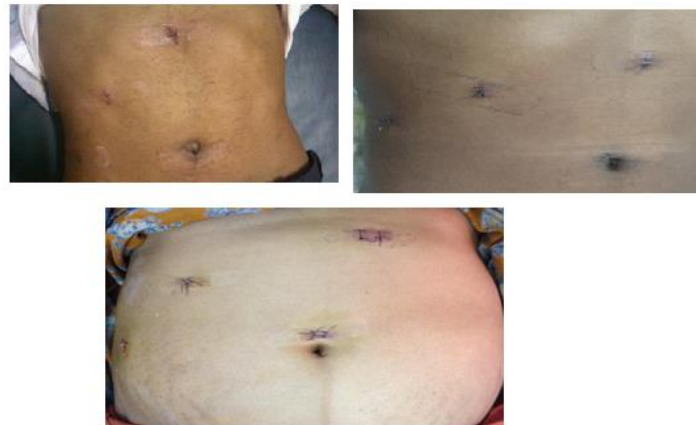


Figure 6: Laparoscopic cholecystectomy scars

Discussion

Traditional cholecystectomy is an integral part of every surgical training programme and is performed by most general surgeons. The advent of laparoscopic cholecystectomy has created an excitement and a flurry of activity in the medical community.

This study showed that morbidity rate is more with open cholecystectomy than laparoscopic cholecystectomy. The open procedure was associated with a shorter operating time (LC 48-140 min and OC 40-125min). This is comparable with that of Trondsen[6] and Porte[7]. This “learning curve” represents adapting to operating in the 2-D screen, becoming familiar with the instrumentation and becoming accustomed to the technique.

In this study, there were no major complications and several minor ones. There was no peri-operative mortality and no CBD injury. The complications observed were bile leak and stone spillage which were found to be comparable in both the groups. Fewer drains were used in the laparoscopic group but the difference was not found to be significant. Harris[8] in his study found similar results. [Bile leak (LC-2%, OC-1%) and bleeding requiring transfusion (LC-1%, OC-2%)]. Other studies also reported similar results[9,7].

The conversion was necessary in 1 patient out of 25. One patient required conversion due to difficult dissection in view of acute cholecystitis. Conversion rate was also found to be higher in acute cases in other studies (0-45%)[10,11,12].

The wound infection rate in this study was found to be less in laparoscopic group being (0% in laparoscopic group versus 20 % in open group). This was due to the reduced size of the incision and lesser wound. This also reduced the need for post-operative

antibiotics in the laparoscopy group. Due to the severe wound infection and wound dehiscence 1 patient in the OC group developed incisional hernia in the follow up period. Harris[8] also noted 1 wound infection in 100 OC patients and 0 in LC group.

The VAS for post-operative pain was significantly less for LC group [Grade2 (median) for LC and Grade3 (median) for OC; $p=0.024$]. Kum[13] also found a mean VAS score of 3.8 v/s 7.7 between LC and OC. This was due to the lesser incision size in LC. Other studies have also shown similar results[9,13,14,15].

The two most beneficial aspects of LC are the short hospital stay and the rapid recovery[16]. In this study, the median duration of hospital stay was 3.68 days for LC group and 7.84 days for OC group. The difference was found to be statistically significant ($p=0.001$). Porte[7], Trondsen[6] and Lujan[11] also found similar results. This was also confirmed in various other series[11, 14, 15,117].

The cosmetic outcome was found median score of 4.72 in LC patients and 3.44 in OC patients.

Conclusions

Laparoscopic cholecystectomy is a considerable advancement in the treatment of gall bladder disease.

The advantages of laparoscopic cholecystectomy are several: Technically, the dissection of the cystic artery and cystic duct is very precise therefore bleeding and bile leakage is less with less drain usage. Laparoscopic cholecystectomy is associated with less chances of wound infection and there is no risk of wound dehiscence. The degree of post-operative pain and its duration is less. Laparoscopic cholecystectomy patients tolerate early oral feeds and are mobilized

faster. The duration of hospital stay is less and patients can be discharged quickly from the hospital. Patients of Laparoscopic cholecystectomy group can resume their work earlier. The cosmetic advantage in LC is obvious.

Hence to conclude that Laparoscopic cholecystectomy is Superior to Open cholecystectomy. Therefore, laparoscopic cholecystectomy is considered the "Gold Standard" procedure for cholecystectomy.

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