

# Open Cholecystectomy Versus Laparoscopic Cholecystectomy: A Comparative Study

SAGHEER AHMED, TARIQ IQBAL, MUHAMMAD SHUAIB ABDULLAH

## ABSTRACT

**Aim:** To compare the frequency of post-operative wound infection in patients with cholelithiasis undergoing laparoscopic cholecystectomy versus open cholecystectomy.

**Methods:** This was a randomized clinical trial consisting of 100 patients undergoing cholecystectomy randomized in two groups – 50 patients in group Lap (Laparoscopic cholecystectomy) and 50 patients in group Open (Open cholecystectomy)

**Results:** This study consisted on 100 patients. 50 patients were underwent for Laparoscopic cholecystectomy 50 were underwent for Open cholecystectomy. Frequency of wound infection is much less 6% in LAP group as compare to OPEN group as 22%. Mean duration of hospital also muss less in LAP group as compare to OPEN group.

**Conclusion:** The results support the view that laparoscopic cholecystectomy is a safe and justified replacement for open cholecystectomy. There is a definite learning curve for surgeons who are newly exposed. The complication rates reduced as the surgeons become more experienced in this procedure to a level comparable with that of open cholecystectomy.

**Conclusion:** The study supports the view that laparoscopic cholecystectomy is safer and efficacious and offers definitive advantages over open cholecystectomy and should be an available option for all patients requiring elective cholecystectomy. Laparoscopic cholecystectomy can be considered the gold standard against which other procedures have to be compared.

**Keywords:** Open cholecystectomy; Laparoscopic cholecystectomy; Bile duct injuries

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## INTRODUCTION

Cholelithiasis is the commonest biliary pathology affecting females predominantly all over the world<sup>1</sup>. The prevalence of disease varies from 15-25% in U.K, U.S.A. and Australia whereas it is rare in Africa involving less than 1% of population<sup>2</sup>. Prevalence of gall stone disease in Pakistan is 15%<sup>3</sup>. Cholecystectomy, open or laparoscopic is one of the common operations performed in surgery. Open cholecystectomy was the gold standard for past 100 years and now the laparoscopic cholecystectomy is considered as first option for cholelithiasis<sup>2</sup>. Traditional biliary surgery has undergone some changes from conventional open to minilaparotomy cholecystectomy but since the introduction of laparoscopy into general practice in 1990 the surgical treatment of gallstones is changed and therefore elective laparoscopic cholecystectomy has almost replaced the open procedure<sup>4</sup>.

About 70-80% of cholecystectomies are done laparoscopically where as 20-30% are still completed by open cholecystectomy often performed in elderly

patients, cardiopulmonary compromised patients and patients with complicated gallstones where laparoscopic procedure is not feasible<sup>5</sup>. However it can safely be performed in cirrhotic patients and in cases of acute cholecystitis by experienced surgeon. The technical challenge and the risk of performing open cholecystectomy (OC) in patients with cirrhosis and symptomatic gallstone disease have been documented<sup>6,7</sup>. Laparoscopic cholecystectomy may offer a better option because the magnification and availability of newer instrument like Ligasure and the ultrasonic shears<sup>8,9</sup>. Clinically and financially laparoscopic cholecystectomy has advantages over open cholecystectomy and has become popular alternative to open procedure due to many advantages including shorter operative time, early recovery, short hospital stay, low morbidity, and low cost<sup>10</sup>.

This study will emphasize various operative and postoperative parameters of the two procedures in order to assess the better surgical option for patients with cholelithiasis. The criteria to be assessed will be postoperative complications and duration of hospital stay.

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*Department of Surgery, Bahawal Victoria Hospital, Bahawalpur*

*Correspondence to Dr. Sagheer Ahmed, MO, H.No.86/C, Medical Colony, Bahawal Victoria Hospital, Bahawalpur  
Email: dr.sagheer.bvh@gmail.com Cell: 03004553115*

## METHODOLOGY

This comparative study was conducted in the Department of Surgery Bahawal Vitoria Hospital, Bahawalpur from October 2011 to May 2012. All patients with acute cholecystitis, chronic cholecystitis, cholelithiasis, empyema, mucocele and gangrenous gallbladder were included in this study. Patients with choledocholithiasis, carcinoma of gallbladder, perforated gallbladder was excluded from the study. All the patients were admitted and a detailed history and clinical examination was carried out as per written proforma. Patients were divided into two groups (LAP group and OPEN group). Each group consisted on 50 patients. LAP group consisted on patients who underwent Laparoscopic cholecystectomy and OPEN groups consisted on patients who underwent open cholecystectomy. Laboratory testing and USG of gallbladder and CBD was done. CBD stone was ruled out by USG. A thorough preoperative anaesthetic evaluation was done and patient fitness for general anaesthesia assessed. A dose of antibiotics (I.V cephalosporin) was given 30 minutes before surgery. Injectable antibiotics and analgesics were given for 2-3 days postoperatively. Then they were given orally for another 3 days. Patients were followed up at day 10 to remove sutures to see the condition of wound. Findings were noted on proforma. Mean and standard deviation was calculated for age and hospital stay. Frequencies for post-operative wound infection was calculated and chi-square test was applied to compare the frequency of post-operative wound infection in both groups.

## RESULTS

After compiling the data of all patients, results are as follows. Mean age of the patients in LAP group was  $45.32 \pm 9.76$  and in OPEN group was  $49.00 \pm 14.28$ . Out of 50 patients of Group LAP, there were male patients was 11(22%) and females were 39(78%). In Group OPEN, out of 50 patients there were 12(24%) patients were male and 38(76%) patients were females. As shown in Table 1, in LAP group out of 50 patients post-operative wound infection was found in 3(6%) patients and in OPEN group out of 50 patients postoperative was found in 11(22%) patients. Post-operative wound infection is significantly less in Group LAP when compared to Group OPEN with  $P=0.04$ . The total duration of hospital stay was shorter in Group LAP (mean  $2.49 \pm 1.49$  days) compared to patients in Group OPEN (mean  $5.66 \pm 1.72$  days). Duration of hospital stay is significantly less in Group LAP compared to Group OPEN with  $P$  value 0.0001 Shown in Table 2.

Table 1: Postoperative complications

Group	Postop wound infection		Total
	Yes	No	
Group LAP (n=50)	3(6%)	47(94%)	50
Group OPEN (n=50)	11(22%)	39(78%)	50

P value 0.04

Table 2: Hospital stay

Duration stay	Group LAP	Group Open
1-2 days	43(86%)	3(6%)
3-7 days	4(8%)	41(82%)
>7 days	3(6%)	6(12%)
Mean $\pm$ SD	2.49 $\pm$ 1.49	5.66 $\pm$ 1.72

P value 0.0001

## DISCUSSION

Cholelithiasis is a common disease entity. Frequent occurrence and serious complications of cholelithiasis have made this one of the most important surgically correctable diseases. Laparoscopic cholecystectomy has significantly changed the treatment of gallstone disease. Although this new technique has been adopted by many practicing surgeons, concern about the incidence of major complications still exists. The morbidity and mortality associated with laparoscopic cholecystectomy should be comparable to open cholecystectomy before it is accepted as the treatment of choice for gallstone disease. Several large published series have reported their experience with laparoscopic cholecystectomy.

The main sufferers of gallbladder disease in our study were females as compared to males. Out of total 100 cases, 23 cases were males, which are very much similar to those observed by Fraze and others<sup>11</sup> and U. Berggren and others<sup>12</sup>. The reason for the high incidence among females could be that pregnancy and child birth have a definitive influence on biliary tract disease, acting by causal stasis as well as weight gain and consequent hypercholesterolemia. Another reason could be the effect of female hormones i.e., estrogen and progesterone, especially progesterone acting on the gallbladder and reducing motility, causing stasis and thereby promoting gallstone formation.

In this study higher rate of post-operative wound infection was found in OPEN group as compare to LAP group. The large wound hematoma associated with a large incision can act as a nidus for infection thereby leading to wound infection and its associated complications like delayed wound healing, wound dehiscence, incisional hernia etc. Other complications like bile duct injury, major bleeding requiring conversion to open cholecystectomy,

visceral injury were not encountered probably due to improved visualization afforded by the laparoscope thereby facilitating better delineation of normal anatomy and also early detection of aberrant anatomy. There was no mortality in this study.

In present study post-operative wound infection was found in 6% patients in Group LAP and in Group OPEN wound infection was found in 22% patients. Siddiqui K et al<sup>13</sup> observed wound infection 2% and 6% respectively in laparoscopic cholecystectomy and open cholecystectomy group. These findings are in contrast with my study.

El-Awadi S et al<sup>14</sup> also found wound infection 1.8% and 18.2% respectively in laparoscopic cholecystectomy and open cholecystectomy. In another study by Luster F Williams et al<sup>15</sup> post-operative chest infection and wound infection was found in 12% and 7% patients in open cholecystectomy. These findings are in favour of my study. Solanki K et al<sup>16</sup> reported post operative wound infection 5.5% and 13.5% these results are in contrast with this study. An other study by Bruce M Wolfe<sup>17</sup> was also in contrast this study. Siddiqui K et al<sup>18</sup> is in favour with this study who observed post-operative wound infection in 2% patients after laparoscopic cholecystectomy. Post-operative wound infection 5.5% was also observed by Talpura K et al<sup>2</sup> in his study which is also in favour of my study. El-Awadi S et al<sup>7</sup> found wound infection 1.8% in LC group and 18.2% OC group which is in contrast with present study.

The period of hospital stay was taken from day of surgery to the day of discharge. The total period of hospital stay in our study was around 2 days for the lap group and around 7 days in the open group. Early discharge from the hospital has a positive influence on the patient as it decreases the convalescence period and also promotes early return to work and also prevents nosocomial infections. Early discharge also decreases hospital costs. Studies by Jeffrey S Barkun<sup>19</sup> Ahmed Assalea<sup>20</sup>, A W Majeed et al<sup>21</sup> and Tuula Kivilvoto et al<sup>22</sup> also showed a much shorter stay in both groups a postoperative hospital stay of 1.8 days (which is similar to that seen in our study) & 3-5 days in the open group which is slightly lesser than our study. The reason for longer hospital stay in the open group in our study could be that even though many of our patients could have been advised discharge earlier, because most of our patients were from rural background and came from far off places, they insisted on staying for few more days to avoid distant travel so early in the post-operative period.

## CONCLUSION

The results support the view that laparoscopic cholecystectomy is a safe and justified replacement for open cholecystectomy. There is a definite learning curve for surgeons who are newly exposed. The complication rates reduced as the surgeons become more experienced in this procedure to a level comparable with that of open cholecystectomy. The study supports the view that laparoscopic cholecystectomy is safer and efficacious and offers definitive advantages over open cholecystectomy and should be an available option for all patients requiring elective cholecystectomy. Laparoscopic cholecystectomy can be considered the gold standard against which other procedures have to be compared.

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