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Laparoscopic cholecystectomy versus open cholecystectomy in gall bladder stone patients: A hospital based comparative study

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Abstract
Objectives: This present study was to evaluate the incidence, and compare the laproscopic cholecystectomy versus open cholecystectomy in gall bladder patients.
Methods: A total of 50 patients of gall bladder stone were enrolled in this study. Out of 50 patients, 35 patients were undergone for laproscopic cholecystectomy (LP) procedures and 15 patients were undergone open cholecystectomy (OC) procedures.
Results: Data was analysed by using IBM SPSS version 26 software. Chi-square and Mann-Whitney test were applied. P value was considered less than or equal to 0.05 for significant differences ($p \leq 0.05$).
Conclusions: Gall bladder stone was commonly seen in middle age group patients. Female was more preponderance than male. Guarding was the most common symptoms and nausea, vomiting, jaundice were second common symptoms. On ultrasonic findings, most of the patients had multiple stone. Operative time was significantly lesser in LC than OC. Wound infection was commonly seen in OC. On histopathological reports, chronic cholecystitis was commonly seen in gall bladder stone patients. Short duration in hospital stay and time taken to return to normal work were significantly lesser in LC than OC. Hence, LC is associated with less chance of wound infection and there is no risk of wound dehiscence. The degree of post-operative pain and its duration is less. The duration of hospital stay is less and patients can be discharged quickly from the hospital. Patients of LC group can resume their work earlier. So that, laproscopic cholecystectomy should be as the best choice procedure for gall bladder stone patients.

Keywords: gall bladder stone, laproscopic cholecystectomy, open cholecystectomy, gender, age group

Introduction

Gall stones are one of the major causes of morbidity and mortality all over the world [1]. In India, gall bladder stones are a leading cause of morbidity with prevalence ranging from 10-20% [2].
Laparoscopic cholecystectomy is recognized as the gold standard for the surgical management of gallstone diseases. Surgery for cholelithiasis is more common in elderly patients as the incidence of gallstones increases with age (13–50%) [3]. Age is one of the critical factors affecting the mortality and morbidity rates after cholecystectomy [4]. The use of a laparoscopic procedure in elderly patients may cause problems because comorbid conditions are very common with advanced age and may increase the postoperative complications and the frequency of conversion to open surgery [5]. It has been reported that laparoscopic cholecystectomy in the elderly has comparable safety and efficacy to those in younger populations [6]. Objective of this present study was to compare the clinical profile of laproscopic cholecystectomy (LC) versus open cholecystectomy procedures in gall bladder stone patients.

Materials & Methods

This present study was conducted in Department of Surgery, Government Doon Medical College and Hospital, Dehradun, Uttarakhand, India during a period from March 2018 to December 2018. Attendants/Entire subjects signed an informed consent approved by institutional ethical committee of Government Doon Medical College, Dehradun. A total of 50 patients of gall bladder stone were enrolled in this study. Out of 50 patients, 35 patients were undergone for laproscopic cholecystectomy (LP) procedures and 15 patients were undergone open cholecystectomy (OC) procedures.
A detail history (age, sex, presenting features, intraoperative events, postoperative course, complications) clinical examinations and relevant investigations (haemogram, ECG, LFT, blood sugar, blood urea, serum creatinine, urine analysis, blood grouping, chest x-ray, ultrasound scan of the abdomen) were performed to all gall bladder stone patients.
The follow up was done for each patient for a period of one to two years.

Inclusion Criteria of this study were symptomatic gall stones disease with or without complication, asymptomatic gall stones of size more than 1.5 cm and patients with stones both in the gall bladder and the common bile duct.
Exclusion Criteria were a calculous cholecystitis, primary CBD stones without gallstones, comorbid conditions like cardiac disease and renal failure, asymptomatic gallstones of size less

than 1.5 cm and gall bladder stones with congenital malformations of the biliary tree or stricture of the CBD.

Procedures

Open Cholecystectomy

A sub costal muscle transection incision was used for open cholecystectomy: the length of the incision was tailored to be individual patient and kept to the minimum necessary to allow sage an adequate access to the gall bladder.

Laparoscopic Cholecystectomy

Laparoscopic cholecystectomy was performed with the operating surgeon on the left side of the table. Pneumoperitoneum was created using Veress needle and by Hassan's technique in some cases. It involved two 10 mm and two 5 mm 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 electrocautery and the cystic duct and artery were secured with titanium clips. The completion of the operation, a sub hepatic drain was inserted as required in both the groups.

Statistical Analysis

Data was analysed by using IBM SPSS version 26 software. Chi-square and Mann-Whitney test were applied. P value was considered less than or equal to 0.05 for significant differences ($p \leq 0.05$).

Observations

In this present study, we were enrolled a total of 50 gall bladder patients with age group 20 years to 65 years. Male and female ratio was 1:4. 35 patients were selected for Laparoscopic Cholecystectomy (LC) procedure and 15 patients were selected for Open Cholecystectomy (OC) procedures.

Table 1: Age wise distribution of gall bladder stone patients.

Age group (years)	No. of patients	% of patients
20-35	12	24%
35-50	33	66%
51-65	5	10%
Total	50	100%

Most of the patients 33(66%) were in age group of 35-65 years. Second common age group patients 12(24%) were belonged in 20-35 years.

Table 2: Symptoms wise distribution of gall bladder stone patients.

Symptoms	No. of patients	% of patients
Nausea and vomiting	20	40%
Jaundice	12	24%
Fever	6	12%
Guarding	43	86%
Mass in the right hypochondrium	2	4%

Most common symptom of gall bladder stone patients were seen as guarding 43(86%). Nausea and vomiting 20(40%) and jaundice 12(24%) were seen in gall bladder stone patients.

Table 3: Ultrasonic findings in gall bladder stone patients.

Ultrasonic findings	No. of patients	% of patients
Multiple stones	32	64%
Solitary stone.	18	36%
Cholelithiasis with choledocholithiasis	9	18%
Dilated bile duct	7	14%
Gall bladder wall thickening	28	56%

Ultrasound abdomen was the main investigation performed for gall bladder stone. In this present study. On ultrasonic findings, most of the patients had multiple stone 32(64%). And solitary stone was seen in 18(36%) patients. Gall bladder wall thickening, Cholelithiasis with choledocholithiasis and dilated bile duct were seen in 28(56%), 9(18%) and 7(14%) patients respectively.

Table 4: Operative findings

Operative findings	LC (N=35)	OC (N=15)	P- value
Operating time (in minutes)	92 (60-130)	98 (60-150)	0.069
Intra - operative complications			
Bile leak	2(5.71%)	2(13.33%)	0.079
Stone spillage	1(2.86%)	`1(6.67%)	
CBD injury	0	0	
adjacent organ injury	0	0	
Conversions	2(5.71%)	0	
Post-operative complications			
Haemorrhage	1(2.86%)	0	0.15
Wound infection	1(2.86%)	2(13.33%)	
Retain stone	0	0	
Bile leak	1(2.86)	1(6.67%)	

Average operative time in LC procedure was 92 (60-130) minutes. And average operative time in OC procedure was 98 (60-150) minutes. It was not statistically significant (p=0.069). During LC procedure, intra-operative complications were bile leak and conversions 2(5.71%) and stone spillage 1(2.86%). During OC procedures, intra-operative complications was seen bile leak 2(13.33%) and Stone spillage 1(6.67%) patients. And it was not statistically significant differences (p=0.079).

Post-operative complication in LC procedure was haemorrhage, wound infection and bile leak 1(2.86% patients. Similarly, post-operative complication in OC procedures was wound infection 2(13.33%), bile leak 1(6.67%) patients. And it was not statistically significant (p=0.15).

Table 5: Showing post- operative recovery

Post-operative Recovery	LC	OC	P-value
Duration in hospital stay	5 (2-7)	10 (5-13)	<0.01
Time taken to return to normal work	9 (5-13)	14 (9-20)	<0.01

In this present study, average time taken for recovery in after LC procedure was 5(2-7) days. Similarly, average time taken for recovery in after OC procedure was 10(5-13) days. And it was statistically significant differences (p<0.01). Average time taken to return for normal work after LC procedure was 9(5-13) days. In OC procedure was 14(9-20) days. It was also significant differences p<0.01).

Table 6: Histopathological findings

Histological findings	No. of patients	% of patients
acute cholecystitis	4	8%
chronic cholecystitis	39	78%
acute on chronic cholecystitis	5	10%
gangrenous changes	3	6%

According to histopathology report, 39(78%) of patients were reported as having chronic cholecystitis. 4(8%) of patients had acute cholecystitis and 5(10%) had acute on chronic cholecystitis and 3(6%) patients showed gangrenous changes. And no case of malignancy was noted in this study.

Discussions

Gallstones (GS) are a common occurrence in northern India. However, this trend is now showing pan India presence probably because of migration and blending of cultures and lifestyle. As many as 16% and 29% of women above the age of 40-49 years and 50-59 years, respectively, had gall stones [7].

In this present study, gall bladder stone was commonly seen in females 40(80%) than males 1(20%). Male and female ratio was 1:4. Patients with age group 35 to 50 years were commonly seen gall bladder stone. These above findings are consistent with results of similar studies [8, 9].

For every patient with symptomatic gallstone disease (GSD) there are many more with asymptomatic gallstones. Various studies performed on mortals suggest that most of the gallstones are asymptomatic. In a study of 9,332 post mortem reports performed over 10 years, only 14% of those with GS had undergone cholecystectomy, indicating that up to 86% were asymptomatic. Karl langenbuch in 1882 quoted. "The gallbladder should be removed, not because it contains stones, but because it forms them" [10, 11]. In this present study, most common symptom of gall bladder stone was guarding 43(86%) followed by Nausea and vomiting 20(40%) and jaundice 12(24%).

There has been lot of debate whether to operate asymptomatic gallstones or not. A century ago, in 1904, Mayo wrote 'there is no innocent gallstone', but today we know there are plenty of evidences to support that not only there are asymptomatic gallstones but most of these incidentally found stones remain asymptomatic throughout life, and do not require treatment. Gallstone disease is a benign condition because 70-90% of patients remain asymptomatic. Several studies have shown that the natural history of incidentally discovered gallstone is not only benign but even when they do develop complications; it is usually preceded by at least one episode of biliary pain. Studies on long-term follow-up of individuals with asymptomatic gallstones have shown that over a 20- year period only 20% will develop biliary pain and the mean probability of developing pain is only 2% during the 1st five years, 1% during the 2nd, 0.5% in the 3rd and 0% during the 4th five years. In other words, the longer the stones remain asymptomatic, the less likely it is that complications will occur. In about 30%, patients who have had pain do not have further episodes of pain. Thus, for persons with asymptomatic gallstones, the natural history is so benign that not only treatment but also a regular follow-up is not recornrnended [12, 13].

Ultrasound abdomen was the main investigation for diagnosis for gall bladder stone. In this present study. Isolated cholelithiasis was the commonest finding in ultrasound, 32(64%) patients had multiple stone 32(64%). And 18(36%) had solitary stone. Gall bladder wall thickening, Cholelithiasis with choledocholithiasis and dilated bile duct were seen in 28(56%), 9(18%) and 7(14%) patients respectively.

In this present study, average operative time taken in LC procedure was 92 (60-130) minutes. In OC procedure was 98 (60-150) minutes. And, it was not statistically significant (p=0.069). Similar findings were also observed by Pessaux P *et al* who in their study on 139 patients found that duration of surgery was shorter in LC group than OC group (103.3 min versus 149.7 min) [14]. Waldner H *et al*, found that there was no significant difference in the duration of surgery among both the procedure [15]. However, most of the other studies which evaluated the time taken by both the procedures reported OC to take lesser time than LC [16, 17]. LC requires special training and longer learning curve. The more a surgeon gains experience the lesser the time taken by him to complete the surgery.

In this present study, During LC procedure, intra-operative complications were seen bile leak and conversions 2(5.71%) and stone spillage 1(2.86%). During OC procedures, intra-operative complications was seen bile leak 2(13.33%) and Stone spillage 1(6.67%) patients. And it was not statistically significant (p=0.079). Post-operative complication in LC procedure was haemorrhage, wound infection and bile leak 1(2.86%) patients. Similarly, post-operative complication in OC procedures was wound infection 2(13.33%), bile leak 1(6.67%) patients. And it was not statistically significant (p=0.15).

Wound infection was merely seen in open procedure. Jatzko *et al*. in their study observed that grade I complications rate is lower in laparoscopic cholecystectomy group (0.3%) as compared to open cholecystectomy group (5.1%). Barkun JS *et al*. in Toronto group study also observed that number of complications in laparoscopic cholecystectomy were significantly less than number of complications in open cholecystectomy. Siddiqui *et al*. in their study observed that frequency of wound infection was three times common in open cholecystectomy as compared to laparoscopic cholecystectomy in acute cholecystitis [18].

In our study, there were no major complication and several minor ones. There was no perioperative mortality and no CBD injury. Average time taken for recovery in after LC procedure was 5(2-7) days and OC procedure was 10(5-13) days. And it was statistically significant differences (p<0.01). Average time taken to return for normal work after LC procedure was 9(5-13) days and in OC procedure was 14(9-20) days. It was also significant differences p<0.01).

In a study by Anmol N *et al* the median duration of hospital stay was three days for LC and seven days for OC which is in concordance with our study [19]. Among the 100 patients studied by Karim T *et al*, OC was associated with a mean post-operative hospital stay of 5.46 days, considerably greater than 3.7 days seen in patients undergoing LC [20].

In this present study, histopathological report shoes that 39(78%) patients having chronic cholecystitis, 4(8%) acute cholecystitis and 5(10%) chronic cholecystitis and 3(6%) gangrenous changes. And no case of malignancy was noted in this study. In our study, the two most beneficial aspects of LC were seen the shorter hospital stay and the rapid recovery.

Schietrroma *et al* were [21] found that the average hospital stay was 4.4 days for LC group and 7.6 days for OC group. Our study

was comparable to their study that was significantly lesser in LC compared to OC [P<0.000].

Conclusions

This present study concluded that the gall bladder stone was commonly seen in middle age group patients. Female was more preponderance than male. Guarding was the most common symptoms and nausea, vomiting, jaundice were second common symptoms. On ultrasonic findings, most of the patients had multiple stone. Operative time was significantly lesser in LC than OC. Bile leak as intra-operative complication was more seen in OC than LC. Conversion was merely seen in LC procedure. Wound infection was commonly seen in OC. On histopathological reports, chronic cholecystitis was commonly seen in gall bladder stone patients. Short duration in hospital stay and time taken to return to normal work were significantly lesser in LC than OC. Hence, LC is associated with less chance of wound infection and there is no risk of wound dehiscence. The degree of post-operative pain and its duration is less. The duration of hospital stay is less and patients can be discharged quickly from the hospital. Patients of LC group can resume their work earlier. So that, laproscopic cholecystectomy should be as the best choice procedure for gall bladder stone patients.

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