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Original Research Article

Prevalence of Cholelithiasis and To Evaluate the Advantages and Disadvantages of Laparoscopic Versus Open Cholecystectomy: A Comparative Study

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Abstract:

Background: One of the most common medical conditions requiring surgical intervention is gallstones. The frequency of cases has recently increased as a result of diet westernization. This study aims to understand the numerous presentational forms, their complications, and the various treatment techniques and their results. The aim of the study is to study the prevalence of cholelithiasis and to evaluate the advantages and disadvantages of laparoscopic versus open cholecystectomy surgical procedures.

Methods: This is a prospective study conducted at Upgraded Department of Surgery, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from December 2016 to December 2017. 100 consecutive cases of cholelithiasis were admitted, investigated and operated during this period and results analyzed.

Results: The majority of cases of cholelithiasis were in females in their fourth decade. Abdominal pain was the most frequent clinical manifestation. Each case was identified using abdominal ultrasonography. It was a diverse diet that was consumed. In 72 cases, laparoscopic cholecystectomy was performed, while in 28 cases, open cholecystectomy was performed. There was a 4% conversion rate. There weren't many issues. Laparoscopic cholecystectomy took 90 minutes on average, compared to 96 minutes for open cholecystectomy. For open cholecystectomy, the average hospital stay was 9 days, compared to 4 days for laparoscopic cholecystectomy.

Conclusion: Most patients with symptomatic cholelithiasis benefit from a safe and efficient procedure called laparoscopic cholecystectomy. Open cholecystectomy is preferred in situations where there are adhesions and inflammation.

Keywords: Cholelithiasis, Laparoscopic Cholecystectomy, Open Cholecystectomy, Complications.

Introduction

Gall stones, which can occur in patients in India between 10 to 20 percent of the time, are the main cause of morbidity. [1] The open cholecystectomy (OC), first carried out in 1882 by German surgeon Carl August Langenbuch, has been the cornerstone of treatment for cholelithiasis. [2] Although there are a number of alternate treatments, such as lithotripsy and oral dissolving agents, they rarely see use in clinical settings since they don't have the intended effect on the management of cholelithiasis. [3,4] However, there has been a gradual change in the approach to treatment since the introduction of laparoscopic cholecystectomy (LC), with the majority of surgeons favoring LC over OC. Philleppe Mouret carried out the world's first laparoscopic cholecystectomy in Lyon, France, and it has since grown to be the most popular laparoscopic procedure. [5-7]

Since it allows for an early return to regular activity after surgery, a shorter hospital stay, and lower costs, LC has a variety of benefits for patients. [8] Despite having many advantages, LC has some disadvantages as well. Increasing bile duct damage and prolonged surgery times are two of the key drawbacks of LC. [9]

In addition, there are limitations to three-dimensional depth perception, making it occasionally challenging to adequately visualize internal structures. [10] In cardiac patients, open cholecystectomy is preferred over laparoscopic cholecystectomy because carbon dioxide

insufflations might cause ventricular arrhythmias. [11] The initial cost for setup of laparoscopic surgery is high and the time taken to gain expertise over this procedure is also long as compared to open procedures. To study the prevalence of cholelithiasis with respect to age and sex also compare and evaluate the advantages and disadvantages of laparoscopic versus open cholecystectomy surgical procedures.

Materials and Methods

This prospective study conducted at Upgraded Department of Surgery, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from December 2016 to December 2017. During this time, 100 consecutive cases of cholelithiasis were admitted, examined, and treated. A thorough history was taken for each of the 100 cases. Age, socioeconomic position, type of symptoms, length of symptoms, history of prior complaints, dietary history, alcohol consumption, and diabetes were all revealed. Each subject had a thorough evaluation. Haemogram, ECG, LFT, blood sugar, blood urea, serum creatinine, urine analysis, blood grouping, chest x-ray, and abdominal ultrasound were among the tests carried out. The patient gave consent after being informed of the risks and potential problems. In the current study, there were 28 patients who had open cholecystectomy and 72 patients who received laparoscopic cholecystectomy. Gallstones that were symptomatic and either had or had no problems met the inclusion criteria. Asymptomatic patients with gallstones larger than 1.5 cm in size and those who have both gallbladder and common bile duct stones. Acalculous cholecystitis, primary CBD stones without gallstones, heart illness, renal failure, asymptomatic gallstones under 1.5 cm, and gallstones with congenital abnormality of the biliary tree and stricture of CBD were the exclusion criteria. Complications following surgery, the length of hospital stay, and postoperative problems were noted.

Results

One hundred cases of cholelithiasis were examined in the current study. Despite the fact that the condition affected people of all ages, the fourth decade of the study saw an increased prevalence of cholelithiasis. The oldest patient was 75 years old and the youngest patient was 21 (Table 1).

Table 1: Age wise distribution of Cholelithiasis

Age Group (years)	No. of cases	Percentage
11-20	0	0%
21-30	17	17%
31-40	34	34%
41-50	22	22%
51-60	17	17%
>60	10	10%
Total	100	100%

Female's median age at presentation was 40.20 years, with a range of 23 to 68 years. According to the study's findings (Table 2), women with a male: female ratio of 1:1.5 is more likely to develop gallstones.

Table 2: Sex distribution of Cholelithiasis

Gender	No. of cases	Percentage
Male	40	40%
Female	60	60%
Total	100	100%

All of the patient's most prevalent initial symptoms were pain, 37% had nausea, 21% had jaundice, and 12% had fever. In the current investigation, 83 individuals exhibited right hypochondrium discomfort, 21% had icterus, and 4% had a mass there (Table 3).

Table 3: Clinical presentation of Cholelithiasis

Clinical symptoms	No. of cases	Percentage
Pain	100	100%
Vomiting	37	37%
Jaundice	21	21%
Fever	12	12%
Clinical Signs		
Tenderness	83	83%
Icterus	21	21%
Mass	4	4%

The primary method of inquiry was abdominal ultrasound. The most frequent ultrasonography finding was isolated cholelithiasis, with 66% having numerous stones and 34% having a single stone. 16% of cases of

cholelithiasis included choledocholithiasis. In 12% of instances, the bile duct was dilated, and in 26% of cases, the gallbladder wall was thickened (Table 4).

Table 4: Various Ultrasound Imaging Findings

Imaging Findings	No. of cases	Percentage
Stones in gallbladder	100	100%
Solitary stone	34	34%
Multiple stones	66	66%
Gallbladder with bile duct stone	16	16%
Dilated bile duct	12	12%
Gallbladder wall thickening	26	26%
Mass	4	4%

In the current study, the most common cholelithiasis complications were chronic cholecystitis in 76% of patients and acute cholecystitis in 24% of cases, of which 4% had empyema and 4% had perforation. All cases were handled using one of the surgical techniques listed below. Twenty individuals also had concomitant diseases such COPD, hypertension, and diabetes mellitus.

A total of 28% of patients had open cholecystectomy, four of whom also had common bile duct exploration; 72% of patients had laparoscopic cholecystectomy. Kocher's right subcostal incision was employed in 20 of the 28 open cholecystectomies. For four cases of acute cholecystitis that did not improve with conservative treatment and had peritonitis-like symptoms, the abdomen was opened in the middle, and the remaining patients with acute cholecystitis underwent surgery once their symptoms decreased.

Due to thick adhesions, laparoscopy in 4 cases had to be changed to an open cholecystectomy. Following the failure of ERCP stone extraction in 4 patients, common bile duct stones were treated with cholecystectomy and common bile duct exploration with T-tube insertion. In 12 cases, the patient underwent an elective laparoscopic cholecystectomy after the CBD stone was successfully removed by ERCP. The gallbladder was found to be fibrosed, constricted, and thickened in 76% of cases, 16% of patients had an inflammatory gallbladder, 4% had empyema, and 4% had perforation.

Out of 40 male patients, 30% had open cholecystectomy and 70% had laparoscopic surgery. Out of 60 female patients, 26.7% received open cholecystectomy while 73.3% underwent laparoscopic surgery. For open cholecystectomies, the average operating time was 96 minutes, while laparoscopic cholecystectomies took 90 minutes. It was determined that the difference was not substantial. The primary postoperative complications included stone spilling in 3 cases of laparoscopic cholecystectomy and 1 case of open cholecystectomy, as well as bile leak in 4 patients undergoing laparoscopic cholecystectomy and 2 patients undergoing open cholecystectomy. In neither group is there any evidence of common bile duct damage.

There were little problems following surgery. In one case of laparoscopic cholecystectomy and not at all in cases of open cholecystectomy, postoperative hemorrhage is observed. Surgery site infection occurred in 1 patient who underwent laparoscopic cholecystectomy and 3 patients who underwent open cholecystectomy. Two cases of protracted bile leak in laparoscopic procedures and one patient in an open operation were treated conservatively. Laparoscopic cholecystectomy required a 4-day hospital stay whereas open cholecystectomy required a 9-day hospital stay (Tables 5, 6).

Table 5: Operative Findings and complications

Operative Findings	Laparoscopic Cholecystectomy (n=72)	Open Cholecystectomy (n=28)	p-value
Operating time in mins.	90 mins.	96 mins.	>0.05 (NS)
Intraoperative complications			
Bile leak	4	2	>0.05 (NS)
Stone spillage	3	1	
CBD injury	0	0	
Adjacent organ injury	0	0	
Conversions	4	0	
Postoperative complications			
Haemorrhage	1	0	>0.05 (NS)
Wound Infection	1	3	
Retained stone	0	0	
Bile leak	2	1	

Table 6: Post-Operative Recovery

Post-Operative Recovery	Laparoscopic Cholecystectomy	Open Cholecystectomy	p-value
Duration of hospital stay in days	4 days	9 days	<0.001
Time taken to return to normal work	8 days	13 days	<0.001

On histology, chronic cholecystitis accounted for 76% of cases, whereas acute cholecystitis made up 5% of cases, gangrenous changes made up 4%, and acute cholecystitis made up 15% of cases. There were no instances of cancer (Table 7).

Table 7: Histopathology Report

Histopathology Report	No. of cases	Percentage
Acute cholecystitis	5	5%
Gangrenous gallbladder	4	4%
Acute on chronic cholecystitis	15	15%
Chronic cholecystitis	76	76%

Discussion

Gallstones and gallbladder cancer are two typical symptoms of gallbladder diseases. Epidemiological research must first determine the prevalence of disease in order to determine risk variables in a given community. Being a noninvasive, safe imaging method that can precisely detect the point prevalence of gallstones in a specific asymptomatic population, ultrasonography is an ideal way to quantify the frequency of gallstone disease.

Gallstones were most prevalent in patients' third and fourth decades, with a mean age of 38 years, according to an analysis of 180 individuals by Alok Chandra Prakash et al. [12] 1:3 male to female ratio. According to Battacharya et al. [13], 71.4% of the population was female and 28.6% was male. Tamhankar et al. noted similar sex preponderance in favor of females. [14] According to studies by Sharma and Thamil Selvi et al. [15] and Sharma and colleagues [16], patients with cholelithiasis made up 30% of the population and 70% of the population, respectively. Despite the fact that the condition affected people of all ages, the fourth decade of the study saw an increased prevalence of cholelithiasis. The study demonstrates that girls with a male: female ratio of 1:1.5 had a higher prevalence of gallstones.

Out of 180 patients with gallstones, Alok Chandra Prakash et al. [12] found that 90% of patients had mixed stones, 4% had pigment stones, and 6% had cholesterol stones. Chandran et al. [17] investigation in Haryana, however, found 26%, 38%, and 36%, respectively. According to a study by Pundir et al. [18], the prevalence in the Haryana region was 14.2%, 68.6%, and 17.2%, respectively. The most typical types of stones in northern and eastern India are mixed stones. Mixed stones were the most prevalent in the current investigation as well.

52 out of 180 patients in the study by Alok Chandra Prakash et al. [12] consumed a vegetarian diet, while 128 out of 180 patients followed a mixed diet (predominantly non-vegetarian diet). Cholelithiasis was discovered to affect non-vegetarians more frequently than vegetarians. Non-vegetarians tend to have higher cholelithiasis. High protein and fat consumption may be the root of the problem. The results concurred with those of a research conducted by Maskey et al. [19] the bulk of the patients in the current study ate a diversified diet.

52 patients (29%) reported an acute start of pain, whereas the remainder patients had chronic pain, according to Alok Chandra Prakash et al. observations in 2012. Ganey et al. [20] and Sharma et al. [15] obtained similar results. The majority of spontaneous vomiting took place during pain bouts. Ganey and colleagues also observed this [20]. In the current study, pain was the most prevalent presenting symptom in all patients, followed by nausea (37%), jaundice (21%), and fever (12%). According to Kapoor et al. [13] and Karl et al. [22], 83% of patients had tenderness in the right hypochondrium.

Only 175 patients in the study by Alok Chandra Prakash et al.12 had gallbladder calculus, and 5 of those patients also had stones in their common bile duct. On sonography, 65 (36%) patients had a single calculus; however, on intraoperative correlation, three of these patients had multiple calculi. As a result, the USG solo calculus accuracy percentage is 92.1%. Abdominal ultrasound was the primary area of examination in the current study. The most frequent ultrasonography finding was isolated cholelithiasis, with 66% having numerous stones and 34% having a single stone. 16% of cases of cholelithiasis included choledocholithiasis. In 12% of cases, the bile duct was dilated, and in 26% of cases, the gallbladder wall thickened.

In the Alok Chandra Prakash et al. [12] study, 25 patients underwent open cholecystectomy with CBD exploration, while 7 patients who developed CBD calculi underwent open cholecystectomy. A total of 155 patients underwent laparoscopic cholecystectomy. In the current study, 72% of participants underwent laparoscopic and 28%, open cholecystectomy.

The mean operation time for laparoscopic cholecystectomy was substantially longer than for open cholecystectomy in the study by Karim T et al. The median (range) operating time for a laparoscopic cholecystectomy was 50-175 minutes (mean: 103.98 minutes), whereas an open cholecystectomy took 35-95 minutes (mean: 70 minutes). After a laparoscopic cholecystectomy, the average postoperative hospital stay was 3.7 days, but an open cholecystectomy required 5.46 days. Three of the fifty patients had their laparoscopic cholecystectomy converted to an open procedure. Due to common bile duct damage in two patients and an intraoperative hemorrhage in one, laparoscopic cholecystectomy procedures were changed to open surgery. According to Lujan et al. [24], a laparoscopic cholecystectomy took 88 minutes on average, while an open cholecystectomy took 77 minutes. Inpatient recovery times for open and laparoscopic cholecystectomy were 8.1 and 3.3 days, respectively. The median operating time in the current study was 90 minutes for laparoscopic cholecystectomy and 96 minutes for open cholecystectomies. It was not determined that the difference was substantial. Due to thick adhesions, laparoscopy in 4 cases had to be changed to an open cholecystectomy. For open cholecystectomy, the hospital stay was 9 days; for laparoscopic cholecystectomy, it was 4 days.

According to Karim T. et al. [23], compared to laparoscopic cholecystectomy, the majority of problems in the open cholecystectomy group were caused by wound infections. Five patients in the open cholecystectomy group had postoperative ileus, which made it necessary to continue nasogastric decompression. Postoperative chest infections were reported in four patients from the open group. Open surgery has a 3 times higher risk of wound infection than laparoscopic surgery. [24-27]

The primary postoperative issues in the current study included bile leak in four patients undergoing laparoscopic cholecystectomy and two patients undergoing open cholecystectomy, as well as stone spillage in three instances undergoing laparoscopic cholecystectomy and one case undergoing open cholecystectomy. In neither group is there any evidence of common bile duct damage. There were little problems following surgery. In one case of laparoscopic cholecystectomy and not at all in cases of open cholecystectomy, postoperative hemorrhage is observed. Infection at the surgical site occurred in one patient undergoing laparoscopic and three individuals undergoing open cholecystectomy.

Conclusion

We draw the conclusion from the current study that the fourth decade had the largest prevalence of cases, with a female majority. The most typical symptom was abdominal pain, with tenderness as an indication. The preferred imaging modality is ultrasonography. A laparoscopic cholecystectomy is a quick recovery and cosmetically advantageous procedure that is safe and effective. If severe adhesions or inflammation are found during laparoscopy, one shouldn't be reluctant to convert to open cholecystectomy.

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