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Original Research Article

An evaluation of open versus laparoscopic cholecystectomy in tertiary centre

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ABSTRACT

Background: Cholecystectomy is a method of treatment for acute or chronic cholecystitis with cholelithiasis or any other diseases of gall bladder. The diagnosis of gall stone disease depends on an accurate history, physical examination, supporting lab investigations and a proper ultrasound of abdomen. After the advent of lap cholecystectomy there is revolution in minimally invasive surgery. Because of better technological innovations, the lap cholecystectomy has become gold standard presently.
Methods: This prospective observational study was performed in Surgery Department in SGT Medical College, Budhera, Gurugram, over a period of 2 years from January 2017 to January 2019. Patients were taken from both sexes and all age groups from different units of surgery. A total of 100 patients were taken for study who underwent cholecystectomy.
Results: Mean age of patients in our study was 38.64 years. Most patients were females. Procedure adopted was open in 18% patients and lap cholecystectomy in 74% patients. Conversion from laparoscopic to open was done in 8% patients. In 8% patients there were operative complications. Average hospital stay was much less for lap cholecystectomy.
Conclusions: After the advent of laparoscopic cholecystectomy, most of the surgeons are performing more and more of laparoscopic cholecystectomy. Here incision is small, pain is less, and hospitalization is shorter. Even in acute cholecystitis, in experienced hand, lap cholecystectomy can be performed safely. The author's inclination is totally in favour of lap cholecystectomy, except the cases where lap cholecystectomy is contraindicated.

Keywords: Open, Laparoscopic, Conversion, Cholecystectomy, Complications

INTRODUCTION

Cholecystectomy is a method of treatment for acute or chronic cholecystitis with cholelithiasis or any other diseases of gall bladder. It is most commonly performed for chronic cholecystitis with cholelithiasis. Gall stones are of various types. a) Cholesterol stones, are about 6% common and usually solitary, b) mixed stones, are about 90% common, made up of cholesterol and calcium salts of phosphate, carbonate, palmitate and proteins, c) pigment stones, are multiple small, black or greenish black. Gall stones are common in fatty, fertile, flatulent female of forty years of age.[1] The formation of gall stone is a complex process. Cholesterol is normally insoluble in water. It is secreted from phospholipid vesicle from its canalicular membrane. Formation of gall stone is dependent upon the concentration and types of phospholipid and bile acid. Phospholipid forms micelles which hold the cholesterol in a stable thermodynamic state. When there is increased concentration of cholesterol and decreased concentration of bile acid, the cholesterol crystal nucleate and stone may be formed.

The factors e.g. high-caloric diet, obesity, oral contraceptive, and resection of terminal ileum favour stone formation. The factors for formation of black type of pigment stone are spherocytosis, haemolysis, sickle cell anaemia and cirrhosis.[2] Gall stone may be asymptomatic. If symptomatic, patient present with pain in right hypochondrium or epigastrium. Pain usually radiates to the back. Pain is considered as colicky, but usually it is dull and constant. Intolerance to fatty food, flatulence, dyspepsia and some change in bowel frequency usually accompany. If there is severe pain in right upper quadrant which ebbs and flows and there is nausea and vomiting, this is called as biliary colic. Pain may last for several hours. If the stone from gall bladder migrates to common bile duct, jaundice may occur.[2] On examination, patient may be have fever, tenderness in right hypochondrium is a reliable feature. Murphy's sign is usually present. Boas's sign (hyperaesthesia on right side posteriorly between 9th and 11th ribs, is diagnostic.[3]

The diagnosis of gall stone disease depends on an accurate history, physical examination, supporting lab investigations (presence of leucocytosis, with high polymorpho- nuclear count, elevated serum bilirubin, and serum amylase) and a proper ultrasound of abdomen. Ultrasound is very sensitive, reliable and less expensive investigation. It can detect gall stones, pericholecystic fluid and thickened gall bladder. In atypical cases, HIDA scan is useful.[4] The management of gall stones is done by cholecystectomy. Cholecystectomy may be done by open approach known as open cholecystectomy or by laparoscopic approach known as laparoscopic cholecystectomy. The preparation, indications and the key for operation (identification and safe dissection of Calot's triangle) are same for open or laparoscopic cholecystectomy, but laparoscopic cholecystectomy is the operation of choice for most of the patients with gall bladder problems. The laparoscopic cholecystectomy is accompanied by small incisions, less pain and shorter duration of hospital stay. Open cholecystectomy is done if patient is unfit for general anaesthesia for laparoscopic surgery, if there is stone suspected in CBD, gall bladder malignancy is suspected and Mirizzi syndrome. Further if the anatomy of the Calot's triangle is disturbed then the operation may be converted to open approach.[1]

The first laparoscopic cholecystectomy was performed by Philip Mourret in Lyon in 1987.[5] In India first lap cholecystectomy was performed by Uduwadia in 1991. After the advent of lap cholecystectomy there is revolution in minimally invasive surgery. Because of better technological innovations, the lap cholecystectomy has become gold standard presently.

In our study we will evaluate open v/s laparoscopic cholecystectomy, to find causes for open cholecystectomy, conversion rate and causes for conversion from lap to open cholecystectomy and different complications of both types of cholecystectomies, in our tertiary centre.

METHODS

Study site

The study was performed in Surgery Department in SGT Medical College, SGT University, Budhera, Gurugram, Haryana, over a period of 2 years from January 2017 to January 2019.

Study design: Prospective observational study.

Patients were taken from both sexes and all age groups. We have five surgery units. Patients were taken from all surgery units. A total of 100 patients were taken for study who had undergone cholecystectomy. On the basis of accurate history, physical examination, supporting lab investigations (presence of leucocytosis, with high polymorpho- nuclear count, elevated serum bilirubin, and serum amylase) and a proper ultrasound of abdomen the diagnosis of gall stone was made. Patients were counselled. Details of open and lap cholecystectomy were told. Their advantages and disadvantages were told. It was also told that lap cholecystectomy is gold standard procedure, and open cholecystectomy is done for specific indications. Still their willingness was asked and it was noted why they opted for a particular type of cholecystectomy. Patients were worked-up. Required investigations like CBC, BT, CT, blood urea, serum creatinine, blood sugar, liver function tests, serum electrolytes, viral markers, urine complete examination, X-Ray chest and ECG were done. Patients were sent for physician check-up and pre-anaesthetic check-up. Consent for operation was taken from patients and attendants. The fundamentals for both types of operation for cholecystectomy was identification and safe dissection of Calot's triangle. Patients who were having acute cholecystitis or malignancy of gall bladder or perforation of gall bladder were excluded from this study.

For lap cholecystectomy, abdomen was prepared in a standard way. Pneumoperitonium was established. Operating ports were inserted. Fundus of gall bladder was retracted towards diaphragm and neck towards right iliac fossa. Cystic duct and cystic artery are defined and clipped and divided. After this gall bladder was separated from its bed by cautery dissection, and removed.

For open cholecystectomy, right upper transvers incision centred over lateral border of rectus muscle, was given. Packs were placed on hepatic flexure of colon, duodenum and the lesser omentum. Cystic artery and cystic duct exposed and the junction of cystic duct with CBD defined. Cystic artery is tied and divided, subsequently cystic duct is ligated and cut between ligatures. Gall bladder is then removed. Gall bladder was subsequently sent for histopathology examination.

Complete data was collected especially the reasons for open or lap cholecystectomies and the cause for conversion from lap to open cholecystectomy were noted.

Ethical considerations

The Institutional Ethics Committee's approval for Research on Human Subjects was taken. Throughout the study, strict ethical norms were maintained. Written informed consent was taken from patient in their local language (mother tongue).

Statistical analysis

The data were collected properly, and entries were made, and statistical analysis was carried out using simple mathematical expressions like, percentage. The data was subjected to appropriate statistical test wherever applicable. Statistical analysis was carried out using statistical SPSS version 23 software.

RESULTS

The age pattern revealed that the patients were of age 15 years to 66 years. Maximum patients were from age 36 years to 45 years. The mean age of patients in our study was 38.64 years (Table 1).

Table 1: Age distribution.

Age in years	Numbers of patients	Percentage of patients (%)
15-25	04	04
26-35	20	20
36-45	39	39
46-55	26	26
>55	11	11
Total	100	100

Table 2: Sex distribution.

Sex	Number of patients	Percentage of patients (%)
Male	22	22
Female	78	78
Total	100	100

Table 3: Findings on ultrasound.

USG findings	Numbers of patients	Percentage of patients (%)
Single calculus	14	14
Multiple calculi	74	74
Mucocoele	08	08
Empyema	04	04
Total	100	100

Out of these 22 (22%) patients were males, and 78 (78%) were female patients (Table 2). Most of the patients in our study were averagely built or mildly obese. Some were thinly built or having moderate obesity. The ultrasound study revealed that 14 (14%) patients had single calculus, 74 (74%) patients had multiple calculi, 8 (8%) patients had mucocoele, 4 (4%) patients had empyema (Table 3).

Procedure adopted was open cholecystectomy in 18 (18%) patients, lap cholecystectomy in 74 (74%) patients. Conversion from laparoscopic to open was done in 8 (8%) patients (Table 4). The reasons for conversion were like this, difficult Calot's triangle was found in 4 patients, dense adhesions were found in 2 patients. In one of these two patients, there were adhesions of fundus of gall bladder with transverse colon. By meticulous dissection, avoiding injury to any structure, gall bladder separated from transverse colon. Patient had smooth recovery. In one patient the cause was excessive bleeding. In one patient, the procedure was converted because of injury to gut (Table 5). Open cholecystectomy was done in 18 (18%) patients. The reasons for performing open cholecystectomy were like this; in 4 patients there was empyema of gall bladder, in 2 patients CBD stones were suspected, 2 patients were unfit for general anaesthesia and open cholecystectomy was done under spinal anaesthesia. In 6 patients, this was choice of operating surgeons. 4 patients opted for open cholecystectomy despite proper counselling (Table 6).

Table 4: Type of procedure done.

Type of procedure	Number of patients	Percentage of patients (%)
Open cholecystectomy	18	18
Lap cholecystectomy	74	74
Conversion from lap to open	8	8
Total	100	100

Table 5: Causes for conversion.

Causes for conversion	Number of patients
difficult Calot's triangle	4
dense adhesions	2
Excessive bleeding	1
Injury to gut	1
Total	8

Out of 100 patients, 92 (92%) patients had no problems. In 8 (8%) patients there were intra-operative or post-operative complications (Table 7). In 2 patients there was excessive intra-operative bleeding, because of dense adhesions. In 1 patient there was bile leak post-operatively. It was managed by conservative treatment. In 1 patient there was intra-operative injury to small gut. It was properly repaired with vicryl000 suture. Proper post-operative care of this patient was done, there was no problem. 4 patients had wound infections. These were managed with proper wound care. Average hospital stay

for lap cholecystectomy was 2.6 days, though the range of hospital stays varied from 1 to 7 days. Average hospital stay for open cholecystectomy was 4.7 days, the range varied from 3 to 10 days (Table 8).

Table 6: Revealing causes for open procedure.

Causes for open procedure	Number of patients	Percentage of patients (%)
Empyema of gall bladder	4	22.22
Suspected CBD stone	2	11.11
Unfit for general anaesthesia	2	11.11
Choice of surgeon	6	33.33
Choice of patients	4	22.22
Total	18	100.00

Table 7: Different types of complications.

Complication	Number of patients	Percentage of patients (%)
Nil	92	92
Excessive bleeding intra operatively	02	02
Bile leak	01	01
Injury to gut	01	01
Wound infections	04	04
Total	100	100

Table 8: Mean hospital stay.

Type of procedure	Mean hospital stay in days
Lap cholecystectomy	2.6
Open cholecystectomy	4.7

DISCUSSION

This prospective observational study was performed in Surgery Department in SGT Medical College, SGT University, Budhera, Gurugram, Haryana, over a period of 2 years from January 2017 to January 2019. Patients were taken from both sexes and all age. Patients were taken from all surgery units. A total of 100 patients were taken for study who had undergone cholecystectomy. On the basis of accurate history, physical examination, supporting lab investigations and a proper ultrasound of abdomen, the diagnosis of gall stone was made. Patients were counselled. Details of open and lap cholecystectomy were told. Their advantages and disadvantages were told. It was also told that lap cholecystectomy is gold standard procedure, and open cholecystectomy is done for specific indications. Still their willingness was asked and it was noted why they opted for a particular type of cholecystectomy. Patients were worked-up. Required investigations like CBC, BT, CT, blood urea, serum creatinine, blood sugar, liver function tests, serum electrolytes, viral markers, urine complete examination, X-ray chest and ECG were done. Patients were sent for physician check-up and pre-anaesthetic check-up. Consent for operation was taken from patients and attendants. The fundamentals for both types of operation for cholecystectomy were identification and safe dissection of Calot's triangle.

In our study the age pattern revealed that the patients were of age 15 years to 66 years. Maximum patients were from age 35 years to 45 years. The mean age of patients in our study was 38.64 years. The average age in study by Zahid, et al was 44.42 years, study by Rivas et al was 33.8 years.[6,7] There is no significant difference in mean age in our study as compared to above mentioned studies. In our study 22 (22%) patients were males, and 78 (78%) were female patients. Our study is comparable to Zahid, et al.[6] Where there were 15% male and 85% female patients. Most of the patients in our study were averagely built or mildly obese. This and age part of our study is in accordance with the dictum that gall stones are common in fatty, fertile, flatulent female of forty years of age. In our study procedure adopted was open cholecystectomy in 18 (18%) patients, lap cholecystectomy in 74 (74%) patients. Conversion from laparoscopic to open was done in 8 (8%) patients. The reasons for conversion were like this, difficult Calot's triangle was found in 4 patients, dense adhesion was found in 2 patients. In one patient, the procedure was converted because of injury to gut. It has been well mentioned by Bhat that problems occurs in lap cholecystectomy due to difficult Calot's triangle, dense adhesions, bleeding, and anomalies of cystic duct, cystic artery.[1] The conversion reate in our study is 8%. Conversion rate of studies by Guraya et al, Lim et al, Tarcoveanu et al, Butt et al, are respectively 2.9%, 11.5%, 3.2%, and 4% respectively.[8-11] Open cholecystectomy was done in 18 (18%) patients. The reasons for performing open cholecystectomy were like this; in 4 patients there was empyema of gall bladder, in 2 patients CBD stones were suspected, 2 patients were unfit for general anaesthesia and open cholecystectomy was done under spinal anaesthesia. In 6 patients, open cholecystectomy was choice of operating surgeons. 4 patients opted for open cholecystectomy despite proper counselling (Table 6). As we know that in acute cholecystitis for lap cholecystectomy operative time required is much more and the conversion rate to open procedure is much higher.[4] Empyema gall bladder is an acute cholecystitis, where gall bladder is full of pus. Hence in empyema of gall bladder, open cholecystectomy is justified. When there is suspicion of CBD stone, again, open cholecystectomy is justified. Some patients even after proper counselling opted for open cholecystectomy, probably because of illiteracy and fixed ideas, preferring open procedure. For lap cholecystectomy general anaesthesia with good muscle relaxation is must. If a patient cannot tolerate general anaesthesia, it becomes contraindication to lap cholecystectomy. That was why in two patients who were unfit for general anaesthesia, open

cholecystectomy was done. Average hospital stay for lap cholecystectomy was 2.6 days, though the range of hospital stay varied from 1 to 7 days (Table 8). Average hospital stay for open cholecystectomy was 4.7 days, the range varied from 3 to 10 days (Table 9). Average hospital stay in studies by Gupta et al is 4 days for open and 3 days for lap cholecystectomy, for Lujan et al, it is 8.1 and 3.3 days, for Chau et al, it is 10.1 and 7.1 days for open and lap cholecystectomy respectively.[12-14]

After the advent of laparoscopic cholecystectomy, most of the surgeons are performing more and more of laparoscopic cholecystectomy. We have seen that the incision is small, pain is less, and hospitalization is shorter. Even in acute cholecystitis, in experienced hand, lap cholecystectomy can be performed safely. The author's inclination is totally in favour of lap cholecystectomy, except the cases where lap cholecystectomy is contraindicated e.g. patient unfit for general anaesthesia, patient having severe chronic obstructive airway disease, congestive heart failure, end-stage liver disease with portal hypertension, coagulopathy and severe acute cholecystitis.

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