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Study of factors necessitating conversion of laparoscopic cholecystectomy to open cholecystectomy

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Abstract

Now Laparoscopic Cholecystectomy is considered the treatment of choice for cholelithiasis. It has advantages over traditional open cholecystectomy in terms of minimal post-operative pain, shorter hospital stay, early recovery and better cosmesis. With increase in experience and skill selection criteria has become more liberal. All patients presenting with cholelithiasis without choledocholithiasis; and with no contraindication for general anesthesia were included in the study. Medical records of all patients who underwent LC were reviewed. Data recorded included demographic information, past medical history, indication for operation, duration of operation, reason for conversion and post-operative complications. Out of 200 patients studied 26 patients were had history of previous abdominal surgery. 3 out of 26 patients got converted to open surgery. The conversion rates among patients with previous abdominal surgery were found to be slightly higher (11.57%) compared to patients with no h/o abdominal surgeries (7.47%).

Keywords: Conversion, laparoscopic cholecystectomy, open cholecystectomy

Introduction

Gallstone disease is one of the most common problems affecting the digestive tract requiring hospitalization. The prevalence of gallstones is related to many factors, including age, gender, and ethnic background. The prevalence of gallstone varies widely in different parts of the world. Autopsy reports have shown a prevalence of gallstones from 11 to 36%. It is estimated that in India the prevalence to be around 4%. An epidemiological study showed that North Indians have 7 times higher incidence of gallstones as compared to South Indians. Changing incidence in India is mainly attributed to Westernization of diet, change in socioeconomic structure and availability of ultra sonogram as investigation in both rural and urban areas ^[1].

Certain conditions predispose to the development of gallstones. Obesity, pregnancy, dietary factors, Crohn's disease, terminal ileal resection, gastric surgery, hereditary spherocytosis, dyslipidemia, sickle cell disease, and thalassemia are all associated with an increased risk of developing gallstones.

Women are three times more likely to develop gallstones than men, and first-degree relatives of patients with gallstones have a twofold greater prevalence ^[2].

Majority of patients will remain asymptomatic from their gallstones throughout life. Some of the patients may develop clinical presentations like acute cholecystitis, chronic calculous cholecystitis, choledocholithiasis, recurrent cholangitis, and gallstone pancreatitis. However symptomatic gall stone disease may lead to development of complications like mucocoele, pyocoele, Gangrenous cholecystitis, mirizzi syndrome, obstructive Jaundice, gallstone ileus, and carcinoma gall bladder.

Gallstones in patients without biliary symptoms are commonly diagnosed incidentally on ultrasonography, CT scans, abdominal radiography, or at laparotomy. Several studies have examined the likelihood of developing biliary colic and the complications of gallstone disease. Approximately 3% of asymptomatic individuals become symptomatic per year (i.e., develop biliary colic). Once symptomatic, patients tend to have recurring bouts of biliary colic. Complicated gallstone disease develops in 3 to 5% of symptomatic patients per year.

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In 1992, The National Institute of Health (NIH) consensus development conference stated that laparoscopic cholecystectomy “provides a safe and effective treatment for most patients with symptomatic gallstones.”^[3] Now Laparoscopic Cholecystectomy is considered the treatment of choice for cholelithiasis.

It has advantages over traditional open cholecystectomy in terms of minimal post-operative pain, shorter hospital stay, early recovery and better cosmesis. With increase in experience and skill selection criteria has become more liberal. Most of the previous contraindications such as morbid obesity and previous upper abdominal surgery are no longer considered absolute contraindications. Attempts can be made in all cases of gall stone diseases with laparoscopic procedure except for patients with bleeding diathesis, carcinoma gallbladder and patients not fit for general anesthesia^[4].

However, of all Laparoscopic cholecystectomies, 1-13% of patients require conversion to an open for various reasons. The condition of the patient, the level of experience of the surgeon, and technical factors all can play a role in the decision for conversion.

Inability to define the anatomy and difficult dissection are the leading reasons for conversion followed by other complications like bleeding.

Methodology

All patients presenting with cholelithiasis without choledocholithiasis; and with no contraindication for general anesthesia were included in the study. Medical records of all patients who underwent LC were reviewed. Data recorded included demographic information, past medical history, indication for operation, duration of operation, reason for conversion and post-operative complications.

The general bio-data of patient regarding his name, age, sex, religion, occupation, socio-economic status and address was collected.

A detailed history was taken with special reference to duration of right upper quadrant pain or epigastric pain, its periodicity, its aggravation by fatty meals and relief by oral or parenteral analgesics. Any significant past history was also enquired. A relevant general physical examination, abdominal and systemic examination was done.

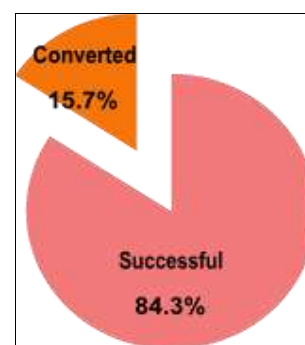
Pre-operative work up included a complete blood count, blood sugar, blood urea, serum creatinine, liver function tests, hepatitis profile, coagulation profile, X-ray chest, ECG, Urine routine and ultrasound of abdomen. Ultrasound was routinely performed on all patients to confirm the clinical diagnosis of cholelithiasis with number and size of calculus and CBD calculi or dilatation of CBD.

A routine pre-anesthetic checkup was done. A fully explained well informed consent was taken with explanation of risk of conversion to open cholecystectomy. A nasogastric tube was placed in all cases for gastric decompression. All patients received prophylactic pre operative antibiotics (Inj. Ceftriaxone 1gm IV).

The patients were operated by different senior surgeons. The operation was performed with standard four port technique, using carbon dioxide for peritoneal cavity insufflation. The Hasson's technique was used to obtain pneumoperitoneum. Cystic artery and cystic duct were skeletonized and clamped with metallic clips separately.

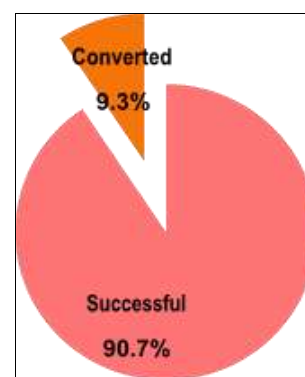
Following gall bladder removal, No.16 romovac suction drain was placed if required. All patients started on oral diet from the next day after surgery.

Results



Graph 1: Graphical representation of conversion among diabetic patients

Out of total 38 patients who were diabetic, 6 patients underwent conversion (15.7%). The conversion rate is found to be higher in Diabetics compared to non-diabetic population (6.1%).



Graph 2: Graphical representation of conversion among hypertensive patients

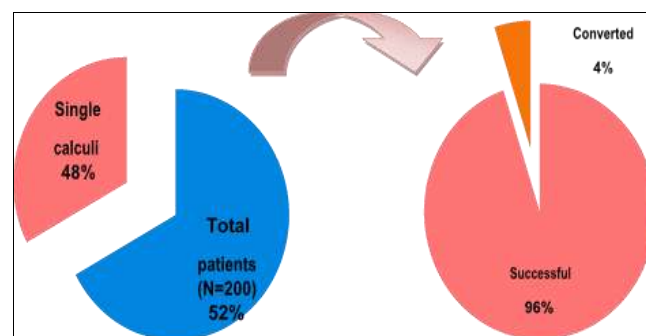
Out of total 32 patients who were hypertensive, 3 patients underwent conversion (9.3%). Which compared to non-hypertensive population is slightly higher.

Table 1: Ultrasound Findings

USG Finding	No. of cases	Percentage (%)
Single calculi	96	48.0 %
Multiple calculi	104	52.0 %
GB wall thickening	32	16.0%

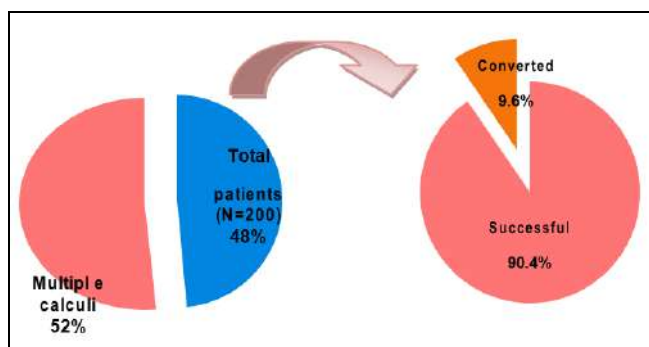
On ultrasound, single calculi were noted in 96 patients whereas remaining 104 patients presented with multiple calculi.

Conversion in Patients with Single Calculi



Graph 3: Graphical representation of conversion in patients with single calculi

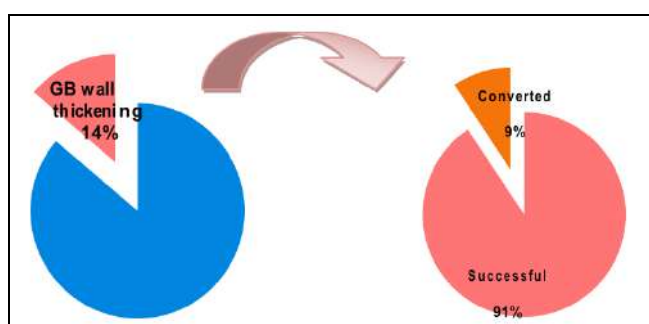
Out of total 96 patients who had single calculi, 5 patients underwent conversion (4%).



Graph 4: Graphical representation of conversion in patients with multiple calculi

Out of total 104 patients who were having multiple calculi, 10 patients underwent conversion (9.4%).

Conversion in Patients with GB Wall Thickening



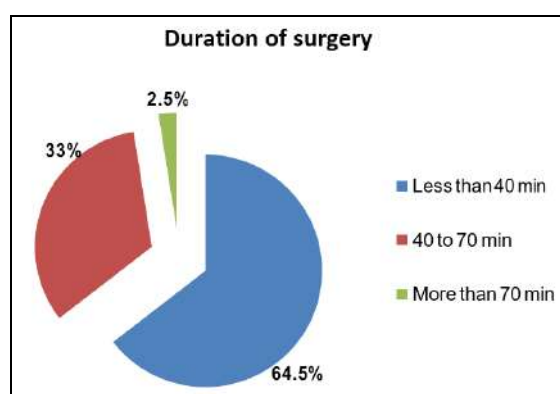
Graph 5: Graphical representation of conversion in patients with GB wall thickening

Out of 32 patients who had thickened GB wall, 3 patients underwent conversion (9.3%).

Table 2: Duration of Surgery

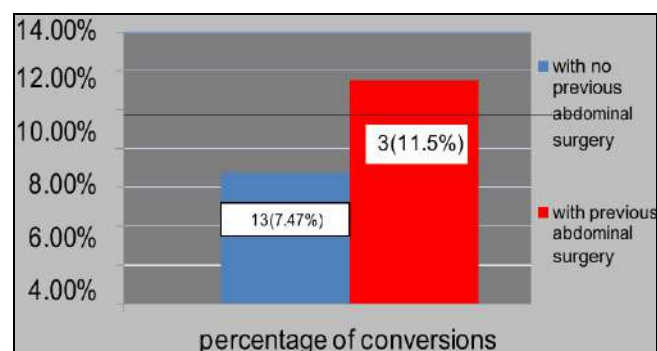
Duration of surgery	No. of cases	Percentage (%)
Less than 40 min	129	64.5 %
40 to 70 min	66	33.0 %
More than 70 min	05	2.5 %

The average duration of surgery was 37.89 minutes. The duration of surgery was prolonged in cases of previous abdominal surgery due to dense adhesions, also cases with frozen calot's triangle.



Graph 6: Graphical representation of duration of surgery

Out of 200 patients studied 26 patients were had history of previous abdominal surgery. 3 out of 26 patients got converted to open surgery. The conversion rates among patients with previous abdominal surgery were found to be slightly higher (11.57%) compared to patients with no h/o abdominal surgeries (7.47%).



Graph 7: Percentage of conversions in patients with previous abdominal surgeries

Total laparoscopic cholecystectomies performed – 200 Total cases converted to open procedure – 16 (8.0%)

Table 3: Reasons for conversion

Reason for conversion	No. of cases	Percentage %
Difficult anatomy due to		
▪ Dense adhesions of Calot's triangle	10	62.5%
▪ Anatomical variations	-	
Bleeding from		12.5 %
▪ Calot's triangle (Cystic artery)	2	25.0%
▪ Bleeding from GB bed	2	
Intra operative injury	1	6.25 %
Common bile duct injury		
Pyocoele	1	6.25 %

Discussion

In our study, 32 out of 200 patients showed a thickened gall bladder wall on ultrasonography, of which 3 patients (9.3%) were converted. The remaining 168 patients in whom the gall bladder wall wasn't thickened, 13 patients (7.6%) were converted.

In a study by PN Agarwal *et al.*⁵, they found a good correlation between gall bladder thickness and conversion to the open procedure (sensitivity of 41.18%) and a positive predictive value of 70 which was in accordance with the reports of other studies by Daradkeh *et al.*^[6] and Kum CK *et al.*^[7].

In another study by Ahsan RS *et al.*^[8], 58% of the patients with gallbladder wall thickness of more than 3mm were converted to open cholecystectomy, suggesting gall bladder thickness as a good predictive factor for conversion.

Previous abdominal surgery is not a contraindication for laparoscopic surgery, however it is associated with higher conversion rate and prolonged operative time. In our study the conversion rate in patients with previous abdominal surgery was found slightly higher (11.5%) compared to patients without previous abdominal surgeries (7.47%). Similar presentations were noted in Akyurek N *et al.* Series.

In our study, the mean duration of surgery in converted cases was 62.87 min and successful laparoscopic operated was on average found to be 36.46 min.

The period of hospital stay was taken from day of surgery to discharge. The total period of post-operative hospital stay in our

study was around 4.02 days.

Compared to our series, the study conducted by Gordh *et al.* [9] and Faryal Gul Afridi *et al.* [10] showed a post-operative hospital stay of 1.8 days and 2.06 days respectively which is shorter than seen in our study.

The reason for longer hospital stay in our hospital could be that even though many of our patients could have been suggested discharge earlier, because most of our patients were from rural background and no treatment cost they insisted on staying till sutures were removed and hence majority of cases discharged after a week.

A comparative comparison of rates of conversion with other studies as mentioned above shows that the rate of conversion is high (7.5-16%) amongst studies from the Asian countries, whereas studies from Europe, USA and Australia are showing a decline in their conversion rates (2.6-4.2%).

With the passage of time the experience has grown, the laparoscopic technique has been understood and thus the conversion rate has reached a remarkably low level of 1- 6%. In our series, the conversion to open cholecystectomy was required in 16 patients with conversion rate of 8.0%. This rate is comparable to the results of most international studies published in early years of LC (2-15%), but remains higher than those results reported recently in last five years (1-6%) [12]. This may be due to differences in institutional and individual practice including experience of operating team.

Difficult anatomy at Calot's triangle accounted for more than one half of conversions (62.5%); the reason of obscured anatomy is acute inflammation causing dense adhesions (80%). Al Salamah [11], Hean TK *et al.* [12] and Richards ML *et al.* [13] also found it as the most common reason for conversion observed in 41.5%, 48.5% and 50% of patients respectively.

Al-Bahloli SH *et al.* [14] and Khanzada TW *et al.* [15] claimed that commonest cause of conversion was frozen Calot's triangle which was true in our study also. Frozen Calot's triangle means dense adhesion around the Calot's triangle. In 4(25.0%) cases, conversion was enforced due to intraperitoneal bleeding. In 2 (12.5%) cases, there was uncontrolled bleeding from Calot's triangle, which occurred during dissection of cystic duct and artery. In another 2 (12.5%) case, there was uncontrolled bleeding from the GB bed. Conversion to OC was required to achieve successful haemostasis, as they could not be controlled laparoscopically.

Conclusion

- The main cause of conversion from laparoscopic cholecystectomy to open was difficult anatomy secondary to dense adhesions followed by bleeding.
- Diabetic patients had a higher rates (15.7%) of conversion than non-diabetic patients (5.9%) i.e, 6 out of 38 patients as compared to 10 out of 168 non diabetic patients got converted. Thus diabetes being one of the important factor for conversion.
- The complication rate in our series is 4%
- With growing experience in laparoscopic technique, it is possible to bring complications and conversion rate to minimum.

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