



## Conversion Rates of Laparoscopic Cholecystectomy in the Current Era of Laparoscopic Surgery

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### Abstract

**Background:** *Laparoscopic cholecystectomy is getting popularity in developing countries like India. Conversion from laparoscopic cholecystectomy to open is also becoming common. This study evaluates the causes and rate of conversion and establishes the efficacy and safety of the procedure.*

**Methods:** *This is a retrospective study, conducted in department of General Surgery, at NRI medical college and general hospital from January 2016 to December 2016. Patients of more than 20 years with symptomatic gall stones were included in the study. Patients with dilated CBD, choledocholithiasis, carcinoma gall bladder were excluded.*

**Results:** *A total of 85 patients with 33 males, 52 females, 5 patients with conversion were recorded. Most common cause of conversion was adhesions followed by obscured anatomy at CALOT'S triangle.*

**Conclusion:** *Most common cause of conversion was dense adhesions followed by obscured anatomy at CALOT'S TRIANGLE. Learning curve also contributes to conversion rates.*

**Keywords:** *laparoscopic cholecystectomy, complications, laparoscopy, conversion, CALOT'S TRIANGLE.*

### Introduction

Gall stones are a major health problem worldwide and most common cause of abdominal pain. Laparoscopic cholecystectomy has become the gold standard for surgical treatment of gall bladder disease over the past two decades replacing open cholecystectomy. It has been proved to be an effective and safe procedure both

in elective and emergency conditions. However conversion to open surgery is inevitable in some difficult cases and is for the safety of the patients. Though conversion is not only indicative for the technical failure, it should be considered as a better surgical practice by the patient and surgeon. The reason for conversion from Laparoscopic to

Open Conversion may be patient related or surgeon related or equipment related.

Patient related factors are distorted anatomy, dense adhesions or a frozen CALOT'S TRIANGLE, uncontrollable bleeding, trauma to bile duct or other viscera and other reasons.. Surgeon related such as less experience in handling difficult situations. Equipment related like Instrument failure, power break down with backup failure.<sup>1</sup> A conversion rate of 1.5 to 19% have been reported in different studies.<sup>2,3</sup> Laparoscopic cholecystectomy is considered to be the gold standard because of its shorter hospital stay, less post operative time, faster recovery and for its better cosmetic result.. Conversion is known to increase per operative time, costs ,hospital stay, complications like bile duct injury, bile leak including death.<sup>4</sup> In this study we determined various etiologies and incidence of conversion that has changed overtime in our institute and recommended measures to reduce the conversion. Advancement of technology has revolutionized field of surgery. Even work on robots through single incision laparoscopic surgery [SILS] is being done. Some centres perform laparoscopic cholecystectomy as day care surgery.<sup>5</sup> Although there are several studies reporting various causes of conversion which is a worldwide medical problem, every institution must have a thorough understanding of rate of conversion based on culture and geography, in addition to understanding of conversion within the institution.

### Aims and Objectives

1. Conversion rates of laparoscopic cholecystectomy and their causes in a period of one year.
2. Follow up of patients on conversion and their outcomes.

### Methodology

This is one year retrospective study conducted at NRI medical college and hospital, chinakakani, which includes all patients who underwent

laparoscopic cholecystectomy and also the patients who were converted to open cholecystectomy were also recorded between this period i.e., January 2016 to December 2016.

### Inclusion Criteria

All the patients who presented with cholelithiasis were included in this study.

### Exclusion Criteria

CBD dilatation (greater than 10mm on ultrasonography), Choledocholithiasis, Carcinoma Gall bladder.

The data of all the patients was recorded from hospital records and department. Also particulars like, demographic information, indications for surgery, duration of surgery, per operative findings, causes of conversion and postoperative complications with their outcomes were also recorded.

### Observations and Results

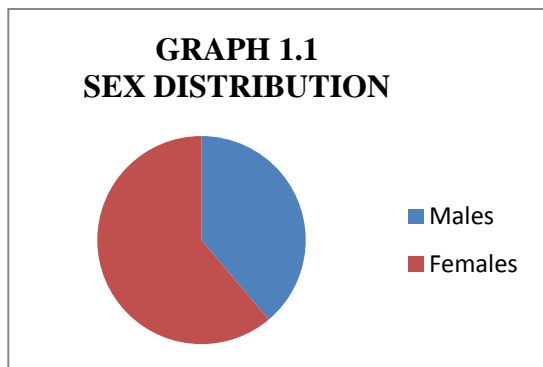
In all cases standard laparoscopic cholecystectomy was performed with four ports. Open Hassan's technique was used for umbilical port of 10mm. A 5mm port was inserted at the anterior axillary line below the umbilicus. A 10mm port was inserted at the epigastrium and A 5mm port was inserted in the mid clavicular line 2 inches below sub coastal margin. Adhesions of gall bladder were separated by blunt, sharp and hydro-dissection as well as with the help of suction cannula and gauze. Distended gall bladder (especially mucocele and empyema) were decompressed by suction and aspiration. Cystic duct and artery skeletonized, clipped and divided. Subtotal cholecystectomy was done in patients with unclear CALOT'S anatomy. Drains were placed selectively in difficult cases with the risk of postoperative bleeding or biliary leakage. Prophylactic antibiotics (second or third generation cephalosporins) were used. Details of the patients who underwent conversion to open surgery were analysed and the factors concerned were noted.

**Results**

Total number of cases studied were – 85

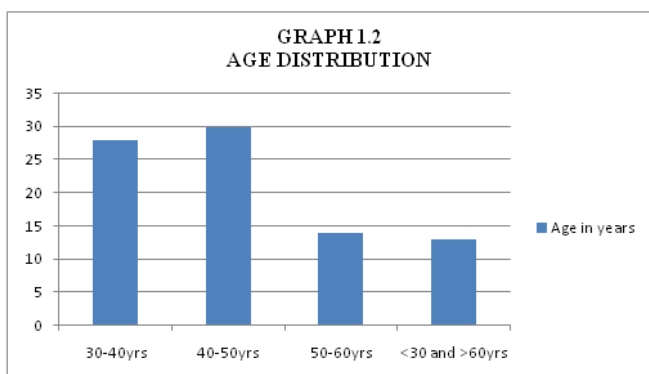
**Table-1.1 Sex Distribution**

Sl.no	Sex	No of cases
1	Males	33
2	Females	52



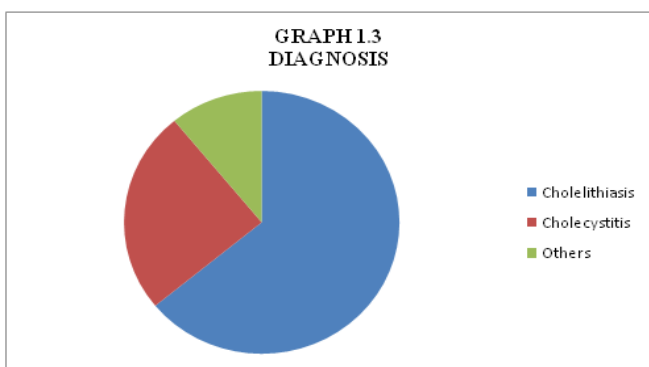
**Table 1.2 Age Group**

Sl.no	Age group(in yrs)	Number of cases
1	30-40 yrs	28
2	40-50 yrs	30
3	50-60 yrs	14
4	<30 and >60	13



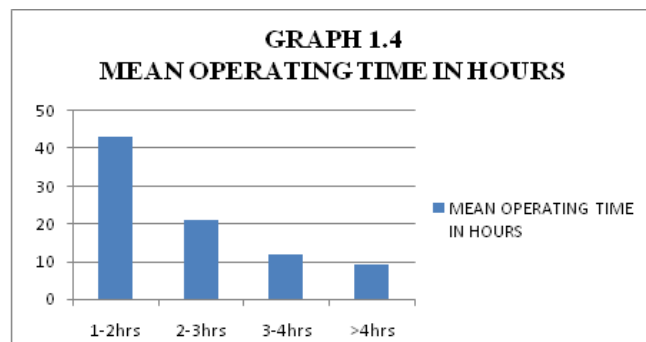
**Table 1.3 Diagnosis**

S.no	Cases diagnosed	Number
1	Cholelithiasis	80
2	Cholecystitis	3
3	Others	2



**Table 1.4 Mean Operating Time**

Sl.no	Mean operating time(in hrs)	No of cases
1	1-2hrs	43
2	2-3hrs	21
3	3-4hrs	12
4	>4hrs	9



**Table 1.5 Causes of Conversion.**

Sl.no	Causes of conversion	No.of cases
1	Frozen calot's triangle	1
2	Gangrenous gall bladder	1
3	Dense adhesions	1
4	Bleeding that obscured the vision	1
5	Choledochal cyst	1

The mean age of patients undergoing laparoscopic cholecystectomy was 45 years. Male to female ratio was 1:2.<sup>6</sup> The mean operating time was 1 hour 30 minutes. Average hospital stay was 3 days. 5 out of 85(5.8%) patients in the study had to be converted to open surgery. Rest of the cases had successful laparoscopic cholecystectomy with minimal complications. One case of choledochal cyst type I was followed up with MRI abdomen and was operated with hepaticojejunostomy after 6 weeks.

**Discussion**

Laparoscopic cholecystectomy is a revolution in the field of modern surgery and considered as the gold standard treatment for gall stones. With growing experience of laparoscopy and completion of the learning curve, the indications for laparoscopic cholecystectomy have been extended approaching that of open cholecystectomy. Complications of laparoscopic cholecystectomy have been minimized to as low as 2-6%. However, a substantial proportion of patients had to be converted to open because of

technical difficulties or intra operative complications. The conversion rate has been reported in different studies from 2 to 15%. The conversion rate in the present study is 5.8%, which is within the limits of rates reported in the literature. In our study, the most common cause of conversion was dense adhesions (60%).<sup>7,8,9,10</sup> While the other causes were lack of experience in technical advances like managing intra-operative bleeding and CBD injuries laparoscopically. Jaffary et., al. in their study of 93 patients undergoing laparoscopic cholecystectomy found a conversion rate of 7.53%, instrumental failure being the commonest cause and instruments that failed during surgery included insufflators, camera and clip applicator. Most conversions occurred after a simple inspection or a minimum dissection. Hence, the decision to convert should be considered as a sign of surgical maturity and safety of patient rather than a failure.<sup>11</sup> Conversion should be opted in the beginning at the time of recognition of a difficult dissection rather than after the occurrence of complications.<sup>12,13,14</sup> Experience of surgeon is directly proportional to conversion. However the risk of conversion appeared notably higher in men.<sup>15</sup> Most common cause was difficult dissection of CALOT'S TRIANGLE. One study demonstrated that symptomatic gallstones, inflammation, fibrosis, were more extensive in men which explain higher conversion rates.<sup>16</sup> It has been postulated that a longer history of cholelithiasis and increased number of attacks or chronic cholecystitis may have contributed to higher conversion rates.<sup>17</sup> However multiple studies argued that laparoscopic cholecystectomy was still feasible and effective, provided a more careful selection of patients was performed.<sup>18,19</sup> Surgeons can apply manual pressure, experience better tactile feedback, have better exposure and movements and there is less restriction on number of instruments.<sup>20</sup> Low risk patients could also safely be operated in day surgery facilities.<sup>21</sup> Appropriate training under supervision can also be planned for junior residents requiring training in high risk

cases or in open surgery.<sup>21,22,23</sup> Mattiole. et., al in his study reported a decrease in conversion rate from 10% (learning curve) to 2.8% (skill curve). In the national studies, Pervaiz reported 2.38% and Tanveer reported 1.78% conversion rate because of adhesions.<sup>24,25</sup> Le VH reported conversions because of adhesions in 0.71% patients.<sup>26</sup> Nizam, Tanveer and volkan reported 0.65%, 0.39%, 0.27% conversion rates because of bleeding.<sup>27,28,29</sup> Instrument failure is not a cause of conversion in developed countries now a days, however in initial era of laparoscopic surgery, there are some cases reported in literature.<sup>30</sup> However, previous upper abdominal surgery is associated with an increased need for adhesiolysis and higher conversions.<sup>19,20</sup> Spillage of stones as a cause of conversion was observed by Frazee RC et al. We used self designed retriever bag (plastic bag) for retrieval of stones and gall-bladder. Bile duct injury can be prevented by lateral retraction of the infundibulum, precise identification of CALOT'S TRIANGLE, avoiding blind use of titanium clips or ligature and the use of bipolar cautery and harmonic scalpel. Equipment/instrument failure and power breakdown should be prevented and managed by proper back up.

### Conclusion

In this study 5.8% was conversion rate and the commonest cause of conversion was the presence of dense adhesions and then obscured anatomy at CALOT'S TRIANGLE. In difficulty situations, a surgeon should seek senior consultation and if not available, then the decision of conversion should be made at earlier for the safety of patient.

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