

STUDY ON THE CONVERSION OF LAPAROSCOPIC CHOLECYSTECTOMY OWING TO PER OPERATIVE COMPLICATIONS

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ABSTRACT

BACKGROUND

In the modern medical era, laparoscopic approach to surgical conditions has reached to a height that it is performed even for malignant conditions. The minimal access surgery which has grown up from minimally invasive surgery has given us the faith that nearly all surgeries can be done by laparoscopy. The first laparoscopic cholecystectomy was done by Prof. Dr. Med Erich Muhe of Germany in the year 1985. About ten lakh cholecystectomies are performed ever year, of which 96% are done by laparoscopic method. Laparoscopic cholecystectomy is the most common laparoscopic procedure. By number of studies and research works, it is stated that laparoscopic cholecystectomy is superior to conventional open method because of its advantages like smaller incisions, early recovery, less post-operative pain and hospital stay with better cosmesis. However, laparoscopic cholecystectomy also has got its own disadvantages and complications. In 1992, an NIH consensus conference held in Bethesda approved laparoscopic cholecystectomy as the treatment of choice for symptomatic cholelithiasis. Conversion to open technique is a major morbidity of laparoscopy, as it loses its supremacy over open technique once the conversion takes place. With growing experience of laparoscopic cholecystectomy 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 minimised to as low as 2 - 6%. However, a substantial proportion of patients had to be converted to open surgery because of technical difficulties or intraoperative complications. Conversion rates of 2.6% to 14% had been described in different studies. The factor to be considered with conversion is that it should never be considered a complication, but rather a correct judgement by the surgeon.

The aims of the present study are:

1. To study the incidence of conversion of laparoscopic cholecystectomy.
2. To analyse the reasons for the conversion of laparoscopic cholecystectomy owing to per operative complications like-
 - a) Arterial injury,
 - b) Hepatobiliary tract injury,
 - c) Dense adhesions,
 - d) Aberrant anatomy,
 - e) Technical issues.

MATERIALS AND METHODS

This prospective observational study was conducted in patients who underwent laparoscopic cholecystectomy from November 2016 to November 2017 in the Department of General Surgery, Karpagam Faculty of Medical Sciences and Research, Coimbatore. There were totally 98 patients, of which 36 were males and 62 were females. The study has been done after the patient's informed consent. All these patients were evaluated in a proper manner as given in the proforma and had been assessed pre-operatively and operated under perfect anaesthetic fitness. This study mainly focussed on the patients who had been converted to open method. They were analysed further regarding the reasons for conversion to open method due to per-operative complications.

RESULTS

From November 2016 - November 2017, a total of 98 patients had undergone laparoscopic cholecystectomy in the Department of General Surgery, Karpagam Faculty of Medical Sciences and Research, Coimbatore. Out of 98 patients who underwent laparoscopic cholecystectomy, 13 patients (13.26%) were converted to open cholecystectomy owing to per-operative complications. All patients underwent cholecystectomy as an elective case. Though some morbidity was there in terms of post-operative complications, which we are not analysing, no mortality was reported.

CONCLUSION

After analysing the results of our study, we conclude that the incidence of conversion of laparoscopic cholecystectomy is 13.26%. The reasons for conversion in descending order of frequency are: 1. Dense adhesions (5.1%), 2. Difficult anatomy around Calot's triangle (3.06%), 3. Arterial injury (3.06%), 4. Hepatobiliary injury (1.02%) and 5. Technical issues (1.02%).

KEY WORDS

Laparoscopic Cholecystectomy, Cholelithiasis, Per-Operative Complications, Bile Duct, Cystic Artery, Adhesions, Calot's Triangle.

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BACKGROUND

In the modern medical era, laparoscopic approach to surgical conditions have reached to a height that it is performed even for malignant conditions. The minimal access surgery, which has grown up from minimal invasive surgery has given us the

faith that nearly all surgeries can be done by laparoscopy. The first laparoscopic cholecystectomy was done by Prof. Dr. Med Erich Muhe of Germany in the year 1985. About ten lakh cholecystectomies are performed ever year, of which 96% are done by laparoscopic method. Laparoscopic cholecystectomy

is the most common laparoscopic procedure that is done today in the modern medical era.

By number of studies and research works, it is stated that laparoscopic cholecystectomy is superior to conventional open method because of its advantages like smaller incisions, early recovery, less post-operative pain and hospital stay with better cosmesis. However, laparoscopic cholecystectomy also has got its own disadvantages and complications. In 1992, an NIH consensus conference held in Bethesda approved laparoscopic cholecystectomy as the treatment of choice for symptomatic cholelithiasis. Conversion to open technique is a major morbidity of laparoscopy, as it loses its supremacy over open technique once the conversion takes place. With growing experience of laparoscopic cholecystectomy 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 minimised to as low as 2 - 6%. However, a substantial proportion of patients had to be converted to open operation, because of technical difficulties or intraoperative complication. Conversion rates of 2.6% to 14%^[1,2,3,4] had been described in different studies. The factor to be considered with conversion is that it should never be considered a complication, but rather a correct judgement by the surgeon.

Aim of the Study

The Aims of the Present Study are-

1. To study the incidence of conversion of laparoscopic cholecystectomy.
2. To analyse the reasons for the conversion of laparoscopic cholecystectomy owing to per operative complications like-
 - a) Arterial injury.
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 - c) Dense adhesions.
 - d) Aberrant anatomy.
 - e) Technical issues.

MATERIALS AND METHODS

This prospective observational study was conducted in the patients who underwent laparoscopic cholecystectomy from November 2016 to November 2017 in the Department of General Surgery, Karpagam Faculty of Medical Sciences and Research. There were totally 98 patients, of which 36 were males and 62 were females. The study has been done after the patient's informed consent. All these patients were evaluated in a proper manner and have been assessed pre-operatively and operated under perfect anaesthetic fitness.

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This study focusses only on the patients who have been converted to open method. They were analysed further regarding their reasons for conversion to open method due to per operative complications.

Inclusion Criteria

1. All patients with symptomatic gallstone disease.
2. Asymptomatic gallstone disease in patients with type 2 DM.
3. Benign gall bladder disease like gallbladder polyp.

Exclusion Criteria

1. Patients who had undergone previous upper GI surgeries.
2. Patients with known liver diseases.

All the patients admitted in ward with a diagnosis of cholelithiasis in Department of General Surgery, Karpagam Faculty of Medical Sciences and Research in the time period of November 2016 - November 2017 were included in this study. Thorough history and clinical examination was done. Admission baseline blood investigations were done. Liver function test was done in all patients. As per the standard protocol, all patients were treated with medical and surgical care as available in the Institution. All patients were subjected to ultrasonogram abdomen and upper GI endoscopy. CECT abdomen was done in patients with suspected pancreatic/common bile duct pathology. MRCP was done in patients with elevated alkaline phosphatase and dilated CBD/associated CBD pathology. Consent regarding conversion if necessary was also obtained in all cases.

RESULTS

From November 2016 - November 2017, a total of 98 patients underwent laparoscopic cholecystectomy in Department of General Surgery, Karpagam Faculty of Medical Sciences and Research. Out of 98 patients who underwent laparoscopic cholecystectomy, 13 patients 13.26% were converted to open cholecystectomy owing to per-operative complications. Of these 98 patients 36 were males and 62 were females, out of which 6 males and 7 females were converted into open cholecystectomy, i.e. 6.12% males and 7.14% females of total cases. When taken in terms of number of males and females who got converted, male and female percentages were 16.66% and 11.29% (Table 2 and Chart 2) respectively. The least age patient in our study is 16 and the highest age patient is 70. The conversion was higher in 40 - 50 years' age group (46.15% of total conversion) and was low in 30 - 40 years' age group (15.38% of total conversion) patients. Conversion was not done in 10 - 20 years' age group and 60 - 70 years' age group patients. Highest number of patients who underwent laparoscopic cholecystectomy were in 30 - 40 years' age group (Table 3).

All patients underwent cholecystectomy as an elective case. Though some morbidity was there in terms of post-operative complications which we are not analysing, no mortality was reported.

Reasons for Conversion of Laparoscopic Cholecystectomy

Reasons	No. of Cases	% of Total (98) Cases	% of Converted (13) Cases
Dense adhesions	5	5.1%	38.46%
Difficult anatomy around Calot's	3	3.06%	23.07%
Arterial injury	3	3.06%	23.07%
Hepatobiliary injury	1	1.02%	7.69%
Technical problems	1	1.02%	7.69%

Table 1

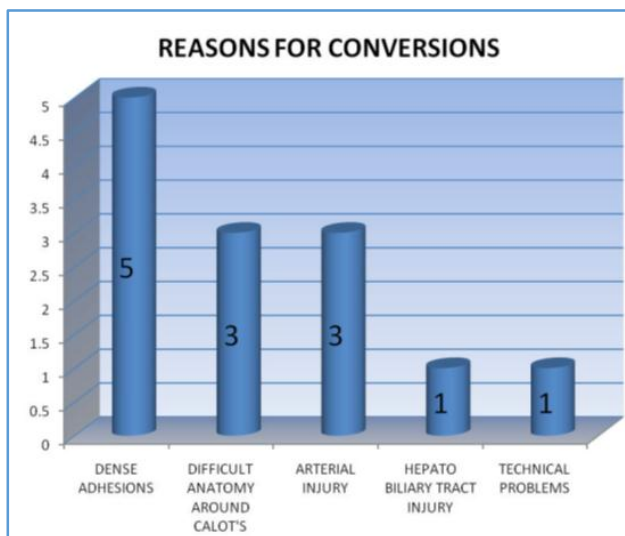


Chart 1

	Converted Cases	% of Total Cases
Males	6	6.12%
Females	7	7.14%

Table 2. Incidence of Conversion among Males and Females

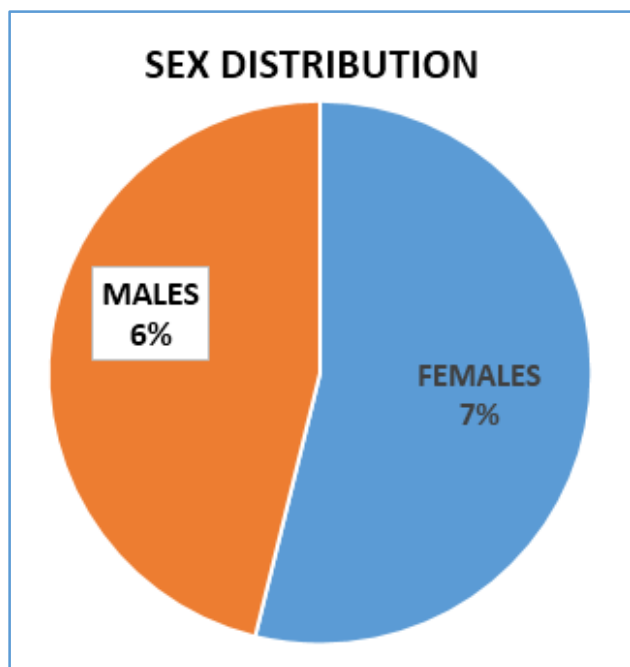


Chart 2

Age Group	Number of Cases Converted	% of Converted Cases
10-20	0	0%
20-30	3	23.07%
30-40	2	15.08%
40-50	6	46.15%
50-60	2	15.38%
60-70	0	0%

DISCUSSION

Studies from various countries reported a conversion rate of 5 to 14%.^{5,6,7,8,4,9,10,11} In our study, 98 patients were operated over a period of 1 year from November 2016 - November 2017 and the conversion rate was 13.26%. Several prospective studies [12,13,14,15,16,9,10,11,17,18,19] have drawn results similar to our study.

Dense Adhesions

The conversion of laparoscopic cholecystectomy due to dense adhesions in our study is 5.1% of total cases that were operated and is 38.46% of cases that got converted. Even though the patients in our study have not undergone any previous upper abdomen surgeries, adhesions remained the most common cause for conversion. Studies by Ajay Anand, Raad S Al-Saafar et al of Al-Najaf Nadim Khan et al, NEJM Surgical Study Group and Saeed Hadi Al-Bahlouli^[20,21,12,22,3] quoted that adhesions are the most common cause for conversion of laparoscopic cholecystectomy. In our study group, adhesions were found in 5 cases, of which adhesions between gall bladder and hepatic flexure of colon was found in 1 case, gall bladder and duodenum in 1 case, greater omentum and anterior abdominal wall in 2 cases and adhesions around porta hepatis in 1 case.

Difficult Anatomy around Calot's Triangle

The conversion of laparoscopic cholecystectomy due to difficult anatomy around Calot's triangle in our study is 3 cases (3.06%) of total cases that were operated and is 23.07% of cases that got converted. The conversion of laparoscopic cholecystectomy is extremely important when there is difficult anatomy around Calot's triangle, as there is more chance of bile duct and cystic artery injury in this situation. In studies by Volkan Genc et al, Muhammed Shamim et al, SK Biswas et al, Singh Kuldhip et al, Saeed Hadi Al Bahlouli,^[23,1,24,15,24,3,26] it was concluded that the conversion of laparoscopic cholecystectomy due to difficult anatomy around Calot's triangle is the most common cause for conversion of laparoscopic cholecystectomy. Anatomy can get altered due to any cause like acute cholecystitis, aberrations in cystic artery, right hepatic artery, common hepatic duct and common bile duct. In our case series there was excessive fat near the Calot's triangle in two cases, cystic artery identification was difficult.

Arterial Injury

The conversion of laparoscopic cholecystectomy due to arterial injury in our study is 3 cases (3.06%)^[20,12,24,25] of total cases that were operated and is 23.07% of cases that got converted. It is one of the most important causes for conversion, as it produces immediate hypotension and even death if immediate intervention was not done. Usually, laparoscopic repair of the bleeding site is not done, because the field will become filled up with blood and most of the times

it is impossible to identify the bleeding vessel in such a situation. Therefore, the only option that saves the patient in such condition is conversion. Blind application of clips or cauterisation in unclear area is absolutely contraindicated because of the potential danger of misplacing the clips or cautery to vital structures, the results of which may go hazardous to the patient's life. In our study cystic artery was injured in 2 cases because of difficult dissection near Calot's triangle and 1 case is due to aberrant origin of cystic artery from common hepatic artery. Another case is converted due to torrential bleeding from the liver bed after dissection of the gall bladder.

Hepatobiliary Injury

The conversion of laparoscopic cholecystectomy due to hepatobiliary injury in our study is 1 case (1.02%) of total cases^[1,12,24,21] that were operated and is 7.69% of cases that got converted. It occurs mostly due to blind dissection near Calot's when anatomy is unclear. It requires high level of expertise and experience to identify hepatobiliary injury, as most of the times it is not identified per-operatively and diagnosed only in the post-operative period. But when there is suspicion intraoperatively, intraoperative cholangiogram is to be done whenever there is a possibility and repair to be done in the most appropriate way. At any cost bile leak should be prevented, as it possess a significant level of mortality when it causes biliary peritonitis.

Technical Issues

The conversion of laparoscopic cholecystectomy due to technical issues in our study is 1 case (1.02%) of total cases that were operated and is 7.69% of cases that got converted. Very few of the conversions were due to technical issues like poor lighting, insufflator defects, unclear monitor/ cameras, defective dissectors/ graspers and diathermy handles. Conversion due to technical issues are going down even in the developing countries like ours. It assumes importance because it is one of the easily correctable causes to avoid a conversion. Studies from the eastern part of the world showed technical issues as a reason for conversion in some of the cases. In our study one case got converted to open technique, because of the problem with insufflator and non-replacement can be done at that time and hence proceeded to open method even before the dissection of gall bladder and cystic duct artery. It is entirely hazardous to operate with defective instruments and conversion is the better option in terms of patient safety.

Again, it is highlighted that the conversion of laparoscopic cholecystectomy should be viewed as a good cause in terms of patient safety rather than as a failure in terms of the surgeon skills.

CONCLUSION

After analysing the results of our study, we conclude that the incidence of conversion of laparoscopic cholecystectomy is 13.26%.

The Reasons for Conversion in Descending Order of Frequency are-

1. Dense adhesions (5.1%).
2. Difficult anatomy around Calot's triangle (3.06%).
3. Arterial injury (3.06%).
4. Hepatobiliary injury (1.02%).
5. Technical issues (1.02%).

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