

CAUSES AND INCIDENCE OF LAPAROSCOPIC CHOLECYSTECTOMY CONVERSION

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Abstract

Four hundred cases of laparoscopic cholecystectomy candidates were prospectively followed at the time of surgery by obtaining a data sheet for the patient's age, sex, time from the introduction of ports till decision of conversion and the cause of conversion if present in two years (2006 & 2007) period.

From 400 laparoscopic cholecystectomy, 20 conversions were obtained and the causes were; wide cystic duct, empyema of the gall bladder, severe obesity, liver tumor, abnormal position of gall bladder, vascular variation and dense adhesions with disturbed anatomy. The percentage of conversion was 5%. Eight conversion cases were males from the total 45 male patients underwent laparoscopic cholecystectomy. Twelve cases were females out of 355 female patients underwent laparoscopic cholecystectomy. The percentage of conversion for male patients was 17.7% while in female patients was 3.3%. Our results showed that the conversion rate in this study was 5% and the most common cause for conversion is dense adhesions. No biliary duct injury or severe bleeding that need conversion is found in this study and the rate for conversion is higher in male patients.

Introduction

Cholecystectomy was established as the surgical treatment for cholelithiasis in 1882. Carl Johan August Langenbuch was the first who performed the procedure. Open cholecystectomy became the gold standard for the treatment of cholelithiasis till the introduction of laparoscopic cholecystectomy in 1980, when Philip Mouret from France performed the first human laparoscopic cholecystectomy in 1987. There is no doubt that laparoscopic cholecystectomy replaced open cholecystectomy as a standard for the treatment of symptomatic cholelithiasis,

the advantages of this procedure includes reduced postoperative pain, shorter hospitalization, earlier return to normal activity and definitely better cosmetics¹. The spread of the procedure in almost all hospitals and the advancement in surgeon's experience and confidence has led to decrease the work with the open technique to be performed only in failures of the laparoscopically attempted ones. Conversion from laparoscopic cholecystectomy to open cholecystectomy is still required in certain circumstances²⁻⁴. Conversion is related to patient factors, surgeon factors and equipment failure

factors but most are converted because of difficulty in delineating the anatomy clearly or complications arising during the procedure⁵.

The aim of this study is evaluate the safety and efficacy of the laparoscopic cholecystectomy in our center as a sample for the work of laparoscopy in our locality comparing with other centers in the world and to rule out the main causes of conversion and the difficulties facing our surgeons during the procedure.

Methods

This is a prospective study aimed to rule out the incidence and causes of conversion in laparoscopic cholecystectomy in the period from January 2006 to November 2007. Four hundred cases were recorded in the study that was carried out in Al-Sadir Teaching Hospital in Basrah, all cases that were included in the study were diagnosed as a symptomatic gall stones disease clinically and by ultrasonic examination. All patients have no previous upper abdominal surgery, those with previous upper abdominal surgery started by the open procedure from the start. Post operative antibiotics used routinely. At the time of surgery the following data were obtained: age, sex, time from introduction of ports till the decision of conversion and the cause of conversion. Data sheet was prepared and data recorded by the researcher with the help of other colleagues. Operations carried out by different teams of surgeons.

A standard technique for laparoscopic cholecystectomy was practiced; nasogastric tube was not used routinely but occasionally. Following general anesthesia and positioning of the patient and draping, insufflation was achieved through a Veress needle. Carbon dioxide used as the insufflation gas. A 30 degrees camera used through 10 mm port. Standard procedure was done through four ports technique, but three ports technique also practiced by some surgeons. The instruments available could be described as the minimum of the standard that usually available in most other centers in different countries. Graspers, dissectors, spatula, L-shaped cauterization tool, suction irrigation machine, Babcock, and Veress needle are frequently and mainly used for the procedure. Intra operative cholangiogram is not available.

Results

From 400 cases underwent laparoscopic cholecystectomy, 45 cases were males (11.25%) and 355 cases were females (88.75%). Twenty conversions were obtained (conversion rate is 5%). Eight conversion cases were males and twelve cases were females so the percentage for conversion in males from the total conversions was 40% and for females was 60% . The conversion rate for male patients from the total male cases was 17.7% and for female patients from the total female cases was 3.3%. The average age for conversion was 51.16 years as shown in table I.

Table I: Age and sex distribution of the patients underwent laparoscopic cholecystectomy.

Total cases	Male	Female	Total conversions	Male conversions	Female conversions	Mean age of
400	45 (11.25%)	355 (88.75%)	20 (5%)	8 (17.7% from total male cases)	12(3.3% from total female cases)	51.16

The mean time needed from the introduction of ports till the decision of conversion was 27.5 minutes. The longest time was 45 minutes and the shortest time needed is 10 minutes. The causes of conversions were obtained depending on the decision of the surgeon according to the difficulty faced during surgery or technical faults and other associated causes.

The causes of conversion were as follow: wide cystic duct in one case that the surgeon was not sure of complete clamping of the cystic duct (5%). In two other cases, the cause was empyema of the gall bladder (10%). In one case, conversion was due to severe obesity that it was very difficult to negotiate the

dissection by the standard ports (5%). vascular variation in one case (5%), an aberrant artery crossed along the gall bladder passing through the liver and could not isolated from the gall bladder assumed to be aberrant right hepatic artery. Other case was converted due to discovering a hepatic tumor so to deal with it (5%) [small tumor at the inferior edge of the liver, local resection done]. One case had conversion due to anatomical malposition of the gall bladder with very long cystic duct (5%). In the other 13 cases, conversion was due to dense adhesions and disturbed anatomy that could not guaranteed safe dissection and clipping (65%) as demonstrated in table II.

Table II: Causes of conversion.

No.	Cause of conversion	Percentage
1	Wide cystic duct	5%
1	Vascular variation	5%
1	Abnormal position of the gall bladder	5%
1	Severe obesity	5%
2	Empyema of the gall bladder	10%
1	Liver tumor	5%
13	Dense adhesions	65%

The most common cause for conversion in this study is disturbed anatomy due to dense adhesions with the difficulty to carry out a clear and safe dissection. There were no bile ducts injuries discovered during surgery.

Discussion

The well-documented advantages and safety of laparoscopic cholecystectomy have made it standard of care for the management of patients with symptomatic gallstones. Despite these

advantages, conversion to open procedure is required in a varying proportion of patients which ranges from 2% to 15% in different studies^{6,7}. It is important to realize that the need for conversion to laparotomy is neither a failure nor a

complication, but an attempt to avoid complications and to ensure patient safety. In our study the conversion rate is 5% which is within the usual rates of conversion in different studies as shown in table III.

Table III: Conversion rates in different studies.

Study	Rate of conversion
Georgia Baptist Medical Center(1989-1991) ⁸	2.3%
Aga Khan University/ Karachi/Pakistan(1997-2001) ⁶	7.5%
University of Texas, The National Hospital(1998-2001) ⁷	5%
RIPAS Hospital/Bandar Seri Begawan/Brunei(1992-1996) ⁹	4%

This approximate rate of conversion in our study with those from different studies may indicate increasing in the skills of our doctors and a success in laparoscopic surgery in our centers although it is still in its first steps. The results showed higher rate of conversion in male patients and some previous studies considered male sex as a risk factor for conversion. Regarding the causes of conversions in the study and beginning with the wide cystic ducts that standard clip that used in our center was not enough for complete and safe clipping of the cystic duct. The use of larger size clips as it is available in other centers may solve this problem. Vascular variations are common in biliary system; aberrant right hepatic artery, anterior cystic artery, replaced right and left hepatic arteries and unusual origin of cystic artery may need excessive care to avoid vascular injuries and clipping that may cause significant blood compromisation. In a case in this study, aberrant right hepatic artery was assumed and it was severely adherent to the gall

bladder that conversion needed for safe separation.

The third case of conversion had very long cystic duct with abnormal position of gall bladder in the most right lateral margin of the liver, the surgeon prefer shifting to open surgery because of doubt of the anatomy. Although laparoscopic surgery is very suitable for obese patients by decreasing the risk and the need for large incisions that usually needed in obese patient, a severe obesity caused a conversion in the study because of the difficulty in handling and negotiation of the field by the ports because of the very thick abdominal wall. In other two cases empyema of the gall bladder was the cause for conversion with difficulty in grasping the gall bladder and risk of perforation during manipulation. A case of liver tumor discovered during one procedure and opening done to deal with the tumor and local resection done.

The major cause of conversion in our study is dense adhesions and frozen triangle of Calot. Thirteen cases recorded to have dense adhesions, attempts to

release the adhesions by cauterization and dissection failed to ensure clear anatomy. A study carried out in Georgia between 1989-1991 by the Georgia Baptist Medical Center, had a conversion rate of 2.3%, also dense adhesion was the main cause for conversions and they face no trocar injury or biliary ducts injury and they consider dense adhesions as a technical cause.

Another study in Pakistan by Aga Khan Hospital in Karachi between 1997-2001, conversion rate was 7.5% and also dense adhesions was the main cause for conversion (56.3%) and the second cause was empyema of the gallbladder.

In USA, Texas a study carried out by Texas University and North Texas Health Center between 2003-2004, conversion rate was 5% and they consider male sex, severe obesity and acute cholecystitis as the major risk factors for conversion.

Between 1992-1996 a study carried out in Brunei by the RIPAS Hospital to evaluate the efficacy of laparoscopic cholecystectomy as a new procedure in their country, conversion rate was 4% and adhesions from acute cholecystitis was the main cause for conversion.

From our results and comparing with the other results we can consider the followings as the main causes of conversion respectively: dense adhesions (65%), obscure anatomy (15%), empyema of the gallbladder (10%), and other associated findings (10%).

Conversion rate is higher in male sex with no specific cause and other studies consider male sex as risk factor for conversion. We attribute the acceptable rate of conversion to the fact that we follow the basic rules of surgical technique strictly; like use of Veress needle, adequate vision, minimal use of electrocautery at the triangle of Calot, displaying the structures at the triangle of Calot before clipping, adequate traction in proper direction, use of gauge dissection in difficult cases and reconfirming the anatomy from time to time. In conclusion, major causes for conversions in the study is due to disturbed anatomy either from dense adhesions or anatomical variations, although this result is compatible with similar studies, facilities like intraoperative cholangiogram may be of help in dealing with this problem.

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