A FIVE YEARS ANALYSIS OF LAPAROSCOPIC CHOLECYSTECTOMY CONVERSION, WHEN AND WHY?

Issam Merdan*

ABSTRACT

Contraindications to laparoscopic cholecystectomy diminished over the last decade but still conversion rate is about 5-6% in elective cases and higher in acute cholecystitis. The aim of this study is to analyze the reasons for conversion in all patients laparoscopically operated on for cholecystectomy in our surgical department and to create strategies for critical moments when conversion needed.

From 2005 to 2010, the data sheets of all patients subjected for laparoscopic cholecystectomy had been analyzed regarding sex, age, intraoperative finding, the time and reason for conversion.

Of the 899 patients who underwent laparoscopy cholecystectomy (83 male and 816 female), *3.8% [34 patients (21 women, 2.5% and 13 men, 15.61%)]* were converted to open cholecystectomy. Difficulties with the anatomy in Calot's triangle (58.8%), difficulties in establishing pneumoperitoneum (8.8%) and bleeding (8.8%) have been the main reasons for conversion.

In conclusion, the scene keys for conversion are difficulties in Calot's triangle, intra-abdominal adhesions, and the creation of the pneumoperitoneum. Conversion should not be regarded as a complication.

INTRODUCTION

Since the beginning of laparoscopic cholecystectomy (LC) more than 20 years ago, the patients scheduled for LC have been well selected to avoid complications. Previous abdominal operations and liver cirrhosis or portal hypertension were seen as contraindications. Nowadays, these contraindications have almost disappeared. However, up to 15% of all attempted elective LC end up as open procedures and the percentage in acute cholecystitis is definitively higher depending on surgeons experience, patient's clinical findings, and surgeon's threshold for conversion.[1] The right moment for conversion is difficult to determine through guidelines or scoring systems. During LC, several key scenarios might appear which should lead to conversion before harming the patient. The aim of this study is to analyze data of our patients, in a 5 year period, who underwent LC regarding the reason and timing for conversion from laparoscopic to open cholecystectomy (CC) and also developing strategies for critical moments in case of conversion.

PATIENTS AND METHODS

From January 2005 to January 2010, a total of 899 laparoscopic cholecystectomies have been performed in the surgical department, Basrah Teaching Hospital. The patients were analyzed regarding sex, age, intraoperative findings, time and reason for conversion.

For the statistical evaluation, we used the nonparametric chi square test to analyze the differences in conversions between the female and the male group. $P<0{\cdot}05$ was considered statistically significant.

Operation technique

Laparoscopic cholecystectomy is performed, by most of surgeons, using 4 trocars, with the patient in supine position and the surgeon at the patients left side while the monitor at the patient's right shoulder. The pneumoperitoneum is created using the Veress needle (VN) via an infraumbilical incision after preparation and elevation of the fascia. The double click test and the waterproof test are carried out routinely. All operations are performed with CO_2 gas and 12 mm Hg pressure. The first trocar (10 mm) is placed after removing the needle infraumbilical; all others (10 mm epigastric and 2×5 mm in the right-sided mesochondrium) are placed under direct vision. In patients with previous median abdominal laparotomy, we placed the first trocar left side or right side subcostal after open access to the abdominal cavity. The preparation of the gallbladder is done by use of the electric hook, scissors or dissecting forceps. The dissection in Calot's triangle is performed meticulously until both the cystic duct and the artery are freed

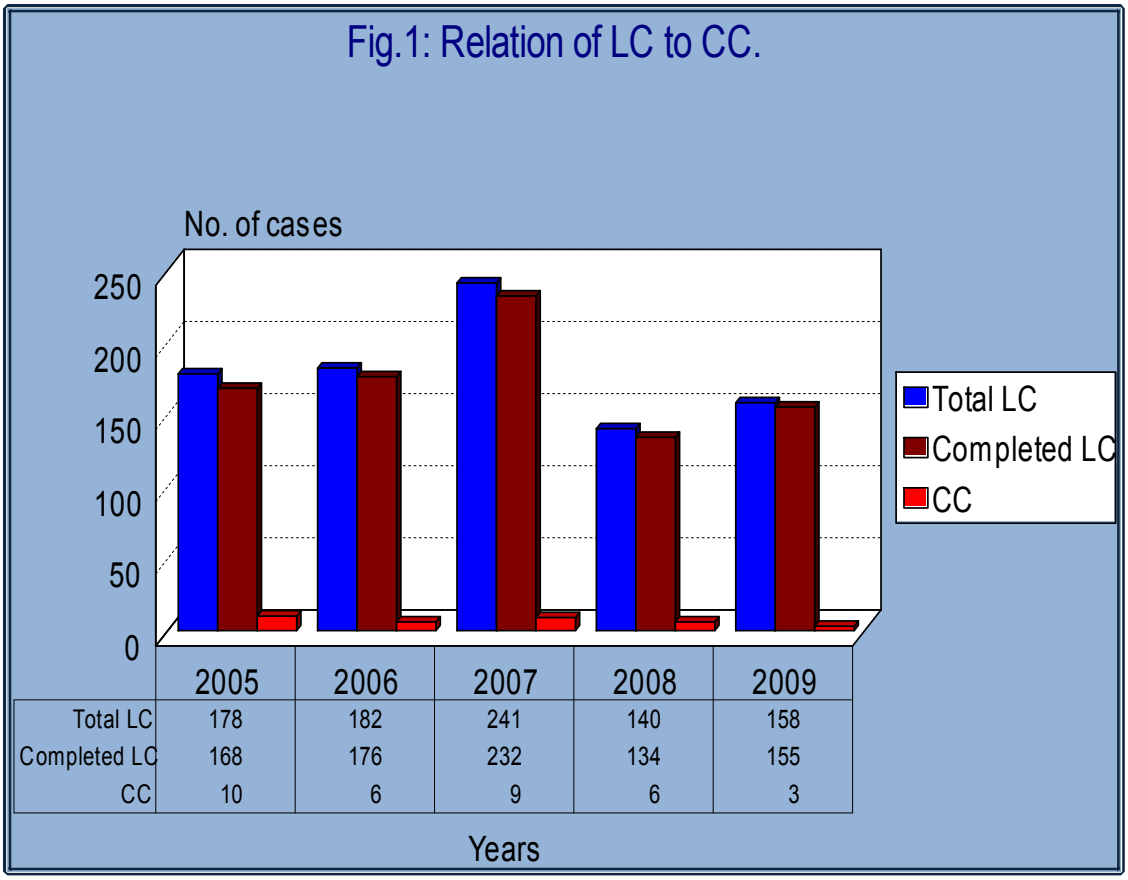
*MBChB, FICMS, CABS, Assist. Prof., Department of Surgery, College of Medicine, University of Basrah.

from surrounding tissue and secured with 2 clips central and 1 clip peripheral (STORZ Company). After retrograde dissection of the gallbladder, the specimen is excorporated through the epigastric port site. Converted cholecystectomy (CC) was performed by a right subcostal or right paramedian approaches.

RESULTS

LTS

Of the 899 patients who underwent laparoscopy cholecystectomy, (83 male and 816 female), 34 patients (3.8%) were converted to open cholecystectomy. The age of the patients ranged from 13-80 year. The distribution over the 5-year is shown in (Fig-1).



Complete LC: (865 Patients)

In all, 865 operations were completely performed by laparoscopy (96.2%), there were 70 male (70/83=84%) and 795 female (795/816=97.5%).

Converted Patients: (34 Patients)

Thirteen males (13/83=15.6%) and 21 female patients (21/816=2.5%) were in the group of patients where conversion had to be performed, which was significantly higher in male than female patients (P<0.05) (Table-1).

Table 1. Sex distribution in patients underwent LC.

	Completed IC	%	cc	%	Total
Male	70	84.4	13	15.6	83
Female	795	97.5	21	2.5	816
Total	865		34		899

The reasons for conversion to open cholecystectomy in those 34 cases are listed in (Table-2).

Table 2. Reasons for conversion.

Reasons	Total CC n=34	%	% of total n=899
Anatomy in Calot triangle	20	58.8	**2.2**
Difficulties in creation pneumoperitoneum	3	8.8	**0.33**
CBD stone (distended CBD)	3	8.8	**0.33**
Bleeding cystic artery	2	5.8	**0.22**
Bleeding liver bed	1	2.9	**0.11**
Perforation of GB	1	2.9	**0.11**
Mass	1	2.9	**0.11**
Hepatomegaly	1	2.9	**0.11**
Short and wide cystic duct	1	2.9	**0.11**
Technical failure	1	2.9	**0.11**
Total	**34**	**100**	**3.8**

DISCUSSION

Laparoscopy cholecystectomy improves major benefits to the patient compared with open cholecystectomy in treatment of cholecystolithiasis and cholecystitis. Nowadays, the majority of chole-cystectomies are performed laparoscopically. Most series reporting conversion rates from 5% to 14%.[2,3] In our series, the conversion rate of 3.78 % is low over a period of 5 years. A prospective study from Wolnerhanssen et al[4] reporting a 12-year period with a similar conversion rate results comparable with those of our study. The need for conversion should not be regarded as failure but as an attempt to avoid complications. It is the surgeon's responsibility to control the situation and convert at the right time. Out of the Analysis of Our Data, (Table-2); we conclude the following strategies for critical moments which may need conversion to open cholecystectomy:

Difficult Anatomy in Calot's Triangle

In 20 patients (20/34=58.8%) (2.2% out of all attempted LC), conversion was necessary because of the impossibility to identify the cystic duct and the cystic artery properly. Difficult anatomy in Calot's triangle is the first most frequent reason for conversion in our study. It is not requested to demonstrate the junction between the cystic duct and the common bile duct, however; it is of great importance that all structures are identified as heading straight into the gallbladder before cutting them. There are no data available how long a surgeon should proceed with the laparoscopic approach when there is still no progress due to adhesions or difficult anatomy. Alponat et al[5] suggested that conversion should be attempted after 15 to 30 minutes if there is no progress in dissection of Calot's triangle. Early conversion shortens operation time and decreases morbidity.[6] The surgeon should be aware that most errors occur during dissection of the Calot's triangle, and that the combined sharp and blunt dissection is safer than the blunt/teasing technique.[7] Predictive factors8 and several scoring systems[9,10] might be helpful to select patients having a certain risk for conversion, patients suffering from acute cholecystitis are at higher risk for conversion. These patients should be informed appropriately before the operation about possible conversion and an experienced surgeon should be selected to operate on them.

Creation of Pneumoperitoneum

The techniques of creation of Pneumoperitoneum vary from the open Hassan technique[11] to different closed techniques mostly by the use of the VN. The closed approach is more popular[12] although it is known that injuries during the creation of the pneumoperitoneum are responsible for 50% of all complications during laparoscopy.[13] There is evidence that the VN has a higher risk for injuries[14] and two randomized trials could not show any timesaving effect by its use.[15,16] In our series, the rate of conversion out of 34 patients owing to the impossibility of a safe pneumoperitoneum was 8.8% (0.3% of all attempted LC) and there was no small bowel injury induced by the use of VN. These data strengthened our strategy to use the VN but we preferred open technique in patient with prior abdominal operation.

Dissection near Vascular Structures

Bleeding during the dissection might occur from the cystic artery, the right hepatic artery, or the liver bed. We counted 3 patients (8.8%) with

arterial bleeding. The most difficult situation is when the cystic artery bleeds due to strong traction on the right hepatic or the common hepatic artery. The endoscopic view might get difficult to survey rapidly leading to conversion for proper repair of the artery. Clipping without proper vision of the bleeding area should be omitted to avoid complete obstruction of the arterial liver blood supply. Partial or complete necrosis of the liver resulting in a mortal liver failure has been described[17]. If there is an arterial bleeding and the stump of the cystic artery can be identified clearly a clip should be placed under direct vision.

Bleeding from the liver bed is most likely in patients with liver cirrhosis

Yeh demonstrated in his trial that the morbidity in cirrhotic patients is not higher than in non cirrhotic patients.[18] However, patients with liver cirrhosis should be operated only if the indication is proven by an experienced surgeons and the threshold for conversion should be low. Bleeding from other major vessels like the iliac artery or the cava vein are usually laparoscopy related and not LC related. An open repair is required in most of these cases.

Finding of common bile duct stone (CBDS)

We converted 2 patients (5.8%) due to unsuspected CBDS (finding dilated CBD intraoperatively). In case of intraoperative diagnosed CBDS, there are 3 available options:

(1) the laparoscopic bile duct clearance: the surgeon should be familiar with this technique and the equipment must be available including a choledochoscope. This technique is safe and effective in the hand of an experienced surgeon.[19]

(2) Conversion and open duct clearance: this option is justified if the patient requires an immediate clearance of the bile duct and laparoscopic clearance is not possible owing to the lack of experience in laparoscopic bile duct clearance or an endoscopist for ERCP is not available.

(3) ERCP with papillotomy: an experienced endoscopist can perform ERCP intraoperatively or postoperatively.

Dissection near the Common Bile Duct

The new approach to the gallbladder changed the mechanism of injury compared with OC. Common bile duct injuries (CBDI) during LC seem to be more severe and more central to the liver.[20,21] It is nowadays a well-known problem that the detection of CBDI in LC might be delayed if an intraoperative cholangiography (IOC) is not performed routinely. Only approximately one third of all CBDI are diagnosed intraoperatively without IOC.[22] In complex cases (partial resection, complete dissection, and combined vascular injury), a biliodigestive anastomosis is required; conversion is mandatory. Repair should be done as early as possible by a hepato-biliary surgeon to achieve best possible outcome.

In conclusion: the scene keys for conversion from laparoscopic to open cholecystectomy are the difficulties in Calot's triangle, intra-abdominal adhesions and difficulties in creation of the pneumoperitoneum and conversion should be performed at an early stage to prevent the patient from iatrogenic damage. The patient should be informed about the risk for conversion and conversion should not be regarded as a complication.

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