

Bile Duct Injury in Laparoscopic Cholecystectomy without On-table Cholangiography

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Abstract

Objective: To determine the safety of laparoscopic cholecystectomy without On-table cholangiography.

Study design: Quasi-experimental study.

Setting and duration: Surgical "D" ward Khyber teaching hospital Peshawar from January 2005 to December 2008.

Methodology: Patients of acute or chronic cholecystitis due to gallstones were included in this study while patients of obstructive jaundice and gallbladder mass were excluded. All patients were operated through laparoscopic cholecystectomy without On-table cholangiography. During procedure, bile duct injury were noted and evidences of bile duct injury were also collected postoperatively during hospitalization and follow-up visits. Data regarding complications in terms of bile duct injury were recorded and analyzed.

Results: A total of 7 (0.92%) bile duct injuries were noted in this series. There were two (0.26%) cases of partial injury to the common hepatic duct out of which 1 was a case of Mirizzi's syndrome. In the second case, a partial injury to the common hepatic duct occurred during an attempt to cauterize the avulse branch of cystic artery. In two (0.26%) patient's partial injury to common bile duct occurred due to tenting of common bile duct. Complete transaction of common bile duct occurred in two (0.26%) cases. In one (0.13%) patient post-operative leakage was found to be due to severed cholecystohepatic duct.

Conclusion: The results clearly show that there is hardly any difference as far as the CBD injury is concerned with or without On-table cholangiography, provided we have a good back-up by a radiologist for pre- and postoperative ultrasound and ERCP.

Keywords: Laparoscopic cholecystectomy (LC), common bile duct (CBD), On-table cholangiogram (OTC), ultrasonography (USG).

INTRODUCTION

The introduction of laparoscopic cholecystectomy has increased bile duct injuries by three to four folds.^{1,2} Bile duct injury can lead to bile leakage, peritonitis, stricture formation, cholangitis, jaundice, chronic liver disease and septicemia. These injuries are frequently amenable to delayed recognition and difficult reoperations due to inflammation, infection and malnutrition.³ A number of techniques have been devised to prevent such injuries and among these On-table cholangiography (OTC) is widely practiced. On-table cholangiography (OTC) was first recommended by Mirizzi⁴ in 1931 on the basis of high incidence of common bile duct

stones and thus reducing the incidence of unnecessary CBD exploration from 66% to < 5%.⁵ In cholecystectomy, the routine use of OTC is controversial as it is useful to map the anatomy of the biliary tree but on the other hand it increases the operation time, cost and unnecessary CBD exploration due to poor quality images and false-negative and false-positive results. The debate becomes further complicated with the advent of laparoscopic cholecystectomy which demands additional technical skills for OTC.⁶ Numerous studies have shown that Laparoscopic cholecystectomy was performed safely with minimal use of OTC.^{7,8} While others insist the routine use of OTC during laparoscopic cholecystectomy to minimize the CBD injuries.⁹⁻¹¹

In our setup, On-table cholangiography is not performed routinely while doing laparoscopic cholecystectomy. It is mainly due to technical difficulty and nonavailability of the equipment in most hospitals. In this study, we report the outcome of a series of patients undergone LC without On-table cholangiography.

PATIENTS AND METHODS

This study was carried out in surgical “D” ward Khyber Teaching Hospital, Peshawar from January 2005 to December 2008. A total of 760 patients were included in this study. Patients of known gallstone disease without clinically and radiological proven complications (obstructive jaundice) were subjected to laparoscopic cholecystectomy. Patients were admitted through outpatient or emergency department. After proper history and examination the gallstone diseases was diagnosed by ultrasonography and CT-scan where needed. Patients with complications like obstructive jaundice or gallbladder mass were excluded from the study. All patients were operated as elective cases with laparoscopic procedure. Three ports laparoscopic cholecystectomy was performed in majority of the cases while four ports technique was adopted in difficult cases. Meticulous concentration was adopted for hepatobiliary anomalies. On-table cholangiography was performed in none of the cases. At the completion of procedure biliary tracts were examined carefully for evidence of evident or potential damage. They were observed for a day or two and then were discharged home. They were advised to attend the follow-up clinics at four to six weeks interval. During postoperative course and follow ups, they were looked for evidence of bile duct injury (peritonitis, biliary leakage through drain or biliary fistula). Thus detected cases of bile duct injury were admitted for further work up. The data were entered into a proforma and was analyzed and results were drawn at the completion of study.

RESULTS

Out of the total 760 cases that underwent laparoscopic cholecystectomy bile duct injury was observed in 7 (0.92%) seven cases (Table 1).

Partial Injury to CHD

There were 2 (0.26%) cases of partial injury to the common bile duct. One case was that of the “Mirizzi syndrome”. The opening between the Hartman’s pouch and CHD (common hepatic duct) became evident during dissection. Hence immediate laparotomy was done and T-tube placed. In the second case, a small spurt occurred from a vessel running over the CHD during dissection of dense adhesions in Calot’s triangle, hence diathermy was used to coagulate the bleeder. Nothing happened during the operation. The patient recovered well and was discharged home. However, the patient returned with biliary peritonitis after one week, ERCP confirmed the leak in CHD. Laparotomy showed a hole at the site where diathermy was used, a T tube was placed.

Partial Injury to CBD

In 2 (0.26%) patients, the partial injury to CBD occurred due to tenting and both these injuries were detected preoperatively. The problem was rectified by conversion to open surgery and insertion of T-tube.

Complete Transaction of CBD

This occurred in 2 (0.26%) patients. In one, who had a very small gallbladder (hardly 2 cm), that was buried in the liver near porta hepatis. Besides the entire gallbladder was occupied by a large stone. Thus CBD was mistaken for cystic duct, clipped and divided. The gallbladder which was densely adherent with the under surface of liver and was separated by blunt and sharp dissection using scissors and diathermy hook, and removed. Drain was placed but next

Table 1: Management of complications

Type of injury	No. (%)	Action taken	Result
Partial injury to CBD	2 (0.26%)	Laparotomy and T-tube	No further complication
Partial injury to CHD	2 (0.26%)	Laparotomy and T-tube insertion	No further complication
Cholecystohepatic duct leak	1 (0.13%)	Drain placed under ultrasound control	Leak continued after two weeks Laparotomy and stitch applied to the duct
Complete transaction of CBD	2 (0.26%)	Hepatojejunostomy/choledochojejunostomy	Complete recovery after four weeks

day it showed 400 cc of bile which increased in amount over the next 48 hours. ERCP confirmed the block in the CBD. Laparotomy and hepatojejunostomy was performed, and the patient ultimately recovered. In second patient, this disaster happened because of a congenital anomaly (absent cystic duct). Conversion and choledochojejunostomy was performed.

Leak from Cholecystohepatic Duct

This was realized in a patient who returned on the 4th postoperative day with abdominal distension and pain. Ultrasound showed a huge collection under the liver and ultrasound guided drain was placed. As the leakage continued (around 1000 ml of bile daily), laparotomy was performed which revealed a cholecystohepatic duct which was ligated. The patient recovered uneventfully.

DISCUSSION

The spectrum of iatrogenic bile duct injuries ranges from clip impingements to complete transection of the common bile duct. We observed almost all of these injuries in our study.

It has been previously suggested that the high rate of biliary injury associated with laparoscopic cholecystectomy is the result of the learning curve.^{12,13} However, other authors have reported it an ongoing problem well beyond the learning period.^{14,15} In our study, all the cases were performed by experienced laparoscopic surgeons who had already performed more than 100 LC, yet the bile duct injuries occurred in 0.92% of cases which indicates that no surgeon is immune from bile duct injuries during LC. Carroll BJ et al¹⁶ also experienced that most of the injuries occurred from surgeons who were out of the learning curve.

In the current study, technical errors were the primary cause of bile duct injuries. In 4 (57.14%) cases, these injuries were the result of misidentification of the anatomy due to inadequate dissection and undue tension, resulting in the tenting of CBD. While in one case (14.28%), injury occurred due to cauterization. Carroll BJ et al¹⁶ observed misidentification of anatomy in 48% cases and cautery injury in 11% of the cases. According to Hunter JG¹⁷ these injuries can be avoided by the use of a 30° angle forward oblique viewing telescope, firm cephalic traction on the fundus and lateral traction on the infundibulum to place the cystic duct perpendicular to the common duct, dissection of the cystic duct where it joins the gallbladder, and routine fluoroscopic cholangiography.

On-table cholangiography (OTC) reduces the chances of bile duct injuries, therefore some authors advocate routine while other selective cholangiography during LC. However, due to lack of facility and expertise we perform LC without OTC. Experience of laparoscopic cholecystectomy in the United States, where OTC is either a routine or selectively performed, showed the incidence of bile duct injury as 0.6%.¹⁸ MacFadyen BV et al¹⁹ observed the incidence of bile duct injury as 0.5%, while Calvete J et al.²⁰ experienced injury rate of 1.3%. In our study, we found the rate of bile duct injuries as 0.92% which is comparable with incidence of centers where OTC is routinely or selectively performed. Archer SB et al²¹ in their study also reported better detection rate of bile duct injuries even without doing OTC.

CONCLUSION

Laparoscopic cholecystectomy can be performed safely without the use of OTC, provided that pre- and/or postoperative ERCP is available and performed when indicated.

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