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 sepsis. These injuries are frequently amenable to delayed recognition and difficult re-operations due to inflammation, infection and malnutrition.1 In this context a number of techniques have been devised among these on table cholangiography (OTC)4 is widely practiced. First cystic duct cholangiography was performed by Mirirzi5 in 1937 on the basis of high incidence of common bile duct stones and thus reducing the incidence of unnecessary CBD exploration from 66% to < 5%. In cholecystectomy, the routine use of OTC is controversial5 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.8 Numerous studies have shown that Laparoscopic cholecystectomy was performed safely with minimal use of OTC9-11.

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 gall stones were included in this study while patients of obstructive jaundice and gall bladder 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 post operatively 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 Mirirzi'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: This study concludes that absence of OTC facility does not lead to alarmingly increased rate of bile duct injuries during laparoscopic cholecystectomies.

Key Words: Laparoscopic cholecystectomy (LC), common bile duct (CBD), on table cholangiogram (OTC), ultrasonography (USG)
While some insist the routine use of OTC during laparoscopic cholecystectomy and others recommend selective OTC to minimize the CBD injuries.

In our setup, on table cholangiography is not performed routinely while doing laparoscopic cholecystectomy. It is mainly due to technical difficulty and non-availability 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 & Methods
This study was carried out in surgical "D" ward Khyber Teaching Hospital, Peshawar from Jan 2005 to December 2008. A total of 760 patients were included in this study. Patients of known gall stone 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 gall stone diseases was diagnosed by ultrasonography and CT-scan where needed. Patients with complications like obstructive jaundice or gall bladder 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 post operative 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 the CBD:
In 2 (0.26%) patients, the partial injury to CBD occurred due to tenting and both these injuries were detected per operatively. 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 gall bladder (hardly 2cm), that was buried in the liver near porta hepatis. Besides the entire gall bladder was occupied by a large stone. Thus CBD was mistaken for cystic duct, clipped and divided. The gall bladder which was

<table>
<thead>
<tr>
<th>Type of injury</th>
<th>No. (%)</th>
<th>Action Taken</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partial Injury to CBD</td>
<td>2 (0.26%)</td>
<td>Laparotomy &amp; T-Tube</td>
<td>No further complication</td>
</tr>
<tr>
<td>Partial Injury to CHD</td>
<td>2 (0.26%)</td>
<td>Laparotomy and T-Tube insertion</td>
<td>No further complication</td>
</tr>
<tr>
<td>Cholecystohepatic duct leak</td>
<td>1 (0.13%)</td>
<td>Drain placed under ultrasound control</td>
<td>Leak continued after two weeks. Laparotomy and stitch applied to the duct</td>
</tr>
<tr>
<td>Complete transaction of CBD</td>
<td>2 (0.26%)</td>
<td>Hepatojejunostomy/choledochojejunostomy</td>
<td>Complete recovery after four weeks</td>
</tr>
</tbody>
</table>
densely adherent with the under surface of liver and was separated by blunt and sharp dissec-
tion using scissors and diathermy hook, and re-
moved. Drain was placed but next day it showed
400cc 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 recov-
ered. 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 post operative day with abdominal dis-
tension and pain. Ultrasound showed a huge
collection under the liver and ultrasound guid-
ed 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
transsection of the common bile duct. We ob-
served almost all of these injuries in our study.

It has been previously suggested that the high
rate of biliary injury associated with laparoscop-
ic cholecystectomy is the result of the learning
curve. However, other authors have reported
it an ongoing problem well beyond the learning
period. In our study all the cases were per-
formed 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
al also experienced that most of the injuries oc-
curred from surgeons who were out of the learn-
ing curve.

In the current study technical errors were the pri-
mary cause of bile duct injuries. In 4 (57.14%)
cases these injuries were the result of misident-
tification of the anatomy due to inadequate dis-
section and undue tension, resulting in the tent-
ing of CBD. While in one case (14.28%), injury
occurred due to cauterization. Carroll BJ et al. observed misidentification of anatomy in 48%
cases and cautery injury in 11% of the cases.
According to Hunter JG these injuries can be
avoided by the use of a 30-degree angle forward
oblique viewing telescope, firm cephalic trac-
tion on the fundus and lateral traction on the in-
fundibulum 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 au-
thors advocate routine while other selective cholan-
giography during LC. However, due to lack
of facility and expertise we perform LC without
OTC. Experience of laparoscopic cholecystecto-
my in the United States, where OTC is either a
routine or selectively performed, showed the in-
cidence of bile duct injury as 0.6%. MacFadyen
BV et al. observed the incidence of bile duct in-
jury as 0.5%, while Calvete J et al. experienced
injury rate of 1.3%. In our study we found the
rate of bile duct injuries as 0.92% which is com-
parable with incidence of centers where OTC is
routinely or selectively performed. Archer SB
et al. in their study also reported better detec-
tion rate of bile duct injuries even without doing
OTC.

Conclusion
Although per operative cholangiography has
got established role in minimizing the chances
of bile duct injury during laproscopic cholecys-
tectomy especially in case of anomalous extra-
hepatic bile ducts anatomy. But this small study
shows that careful dissection of the callot’s tri-
angle and defining the anatomy without on table
cholangiography is also safe.

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