IATROGENIC BILE DUCT INJURIES; EXPERIENCE AT ALLIED HOSPITAL, FAISALABAD

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ABSTRACT

This retrospective study was conducted in Surgical Unit-III, Allied Hospital, Faisalabad. AIMS & OBJECTIVES: This study was conducted in order to define the frequency and type of bile duct injury during open and laparoscopic cholecystectomy and to suggest most feasible method of managing these patients with the facilities available. RESULTS: Total number of fifteen cases was collected. Twelve patients were female and three were male with a median age of 38 years. Ten cases were operated at some other hospital and five cases had biliary injury at Allied Hospital. Eight patients had biliary tract injury during open cholecystectomy while seven patients sustained such injury during laparoscopic cholecystectomy. Injury was recognized in three patients while operating whereas in 12 cases it went unrecognized. Unrecognized injuries presented in the postoperative period as obstructive jaundice in 03, increased drain output in 04, peritonitis in 03 and cholangitis in 02 patients. Ultrasound, CT, drain contrast studies were the main radiological investigations used in addition to essential biochemical profile of the patients. Classification of the injury was according to Strasberg classification. Primary repair over T-Tube was done in 03 patients whose injury got recognized at the time of primary surgery. Roux-en-Y hepaticojejunostomy was performed in 07 patients, T-Tube drainage was provided in 04 and simple intraperitoneal drainage was offered in 01 patient. OUTCOME: Cholangitis occurred in 02 patients requiring systemic antibiotics. One patient died due to intraabdominal sepsis. FOLLOW UP: Follow up ranged from 6-18 months. Liver function tests, T-Tube cholangiogram and HIDA Scan were used in selected patients. CONCLUSION: Tear in CBD is the most common type of injury recognized. Roux-en-Y hepaticojejunostomy is the choice. The prevention is in identifying the anatomy during operation.

KEYWORDS: Iatrogenic bile duct injuries, hepaticojejunostomy, laparoscopic cholecystectomy

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INTRODUCTION

Cholecystectomy is one of the most commonly performed surgical procedures. Laparoscopy has revolutionized the biliary tract surgery. During the surgical learning curve of this new technique there was an initial spurt in the reports of bile duct injuries resulting mainly from the surgeon’s inexperience and misinterpretation of anatomy. The mechanism and pattern of injuries differed in some ways from the traditional ones. Operative bile duct injury is one of the serious complications of hepatobiliary surgery. It is feared because of the substantial morbidity, occasional mortality, additional expenditure and possible litigation that accompany it. Bile duct is prone to be damaged by use of diathermy and the excessive dissection required to delineate the anatomy of Calot’s triangle, resulting in ischemic injury to the biliary tract. Other risk factors include difficulty in dissection due to acute or severe chronic inflammation, morbid obesity, unexpected bleeding, and presence of anomalous duct or vessel. These biliary injuries include leaks, transactions, or ligation of major bile duct and stricture formation later on.

The management of various complications consists of variety of interventional procedures including simple drainage, T-Tube drainage, Roux-en-Y hepaticejojunostomy.

The objectives of the study were to define the frequency and type of bile duct injury both during open and laparoscopic cholecystectomy and to suggest most feasible method of managing these patients.

MATERIALS AND METHODS

This is a retrospective study of iatrogenic extrahepatic bile duct injuries conducted in Surgical Unit-III, Allied Hospital, Faisalabad. All patients who got iatrogenic bile duct injury were included, regardless of gender or age. Patients with preoperative or peroperative hepatobiliary malignancies were excluded from the study. Data regarding number of cases, gender, age, and type of procedure was collected on a set proforma. Ultrasound, CT and drain contrast studies were the main radiological investigations used for diagnosis of injury, and to define the type and site of injury. In addition to these, essential biochemical profile of the patients was also obtained. Classification of the injury was according to Strasberg classification.

RESULTS

Total fifteen cases were collected. Twelve patients were female and three patients were male with median age of 38 years (25-60). Ten cases were referred from other hospital and five cases had biliary injury at Allied Hospital. Eight patients had biliary injury during open cholecystectomy at some other hospital while seven patients sustained such injury during laparoscopic cholecystectomy.

Injury was recognized in three patients while operating whereas in 12 cases it went unrecognized.

Unrecognized injuries presented in the postoperative period (3rd to 14th day) as obstructive jaundice in 03, increased drain output (400-500ml per day) in 04, peritonitis in 03 and cholangitis in 02 patients. No patient presented with stricture formation.

Ultrasound, CT, drain contrast studies were the main radiological investigations used in addition to essential biochemical profile of the patients.

Classification of the injury was according to Strasberg classification (Table No: I)

<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>Number</th>
<th>Percentage</th>
<th>Strasberg Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tear in CBD</td>
<td>08</td>
<td>53.2</td>
<td>D</td>
</tr>
<tr>
<td>Tear in CHD</td>
<td>03</td>
<td>20.2</td>
<td>D</td>
</tr>
<tr>
<td>Tear involving confluence</td>
<td>02</td>
<td>13.3</td>
<td>D</td>
</tr>
<tr>
<td>Cystic duct leak</td>
<td>02</td>
<td>13.3</td>
<td>A</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Primary repair over T-Tube done in 06 patients, Roux en Y hepaticojejunostomy was performed in 07 patients, simple intraperitoneal drainage was offered in 02 patients (Table No: II)
<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>Number</th>
<th>Treatment</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tear in CBD</td>
<td>08</td>
<td>Roux-en-Y Hepaticojejunostomy Repair over T-tube</td>
<td>03</td>
</tr>
<tr>
<td>Tear in CHD</td>
<td>03</td>
<td>Roux-en-Y Hepaticojejunostomy Repair over T-tube</td>
<td>02</td>
</tr>
<tr>
<td>Tear involving confluence</td>
<td>02</td>
<td>Roux-en-Y Hepaticojejunostomy</td>
<td>02</td>
</tr>
<tr>
<td>Cystic duct leak</td>
<td>02</td>
<td>Drainage</td>
<td>02</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

**OUTCOME**

Cholangitis occurred in 02 patients requiring systemic antibiotics. One patient died due to intraabdominal sepsis. No anastomotic leak occurred.

**FOLLOW UP**

Follow up ranged from 6-18 months. Liver function tests, T-Tube cholangiogram and HIDA Scan were used in selected patients.

**DISCUSSION**

Many factors have been incriminated in occurrence of bile duct injuries during cholecystectomy, both open and laparoscopic. These are mainly anatomical misidentification of main hepatic duct, right hepatic ducts or of aberrant right hepatic duct as ductus cysticus, other anatomical variations or unidentifiable anatomy, surgeon’s experience (a surgeon who is at the beginning of his learning curve), technical difficulties, poor visualization of the operative field, acute inflammation of the gall bladder and local factors such as excessive haemorrhage and fat tissue. On the other hand, the problems related to the equipment have been accused. However, misidentification of the anatomy and surgeon’s experience seems to be preliminary.

Bile duct injuries are associated with significant morbidity, prolonged hospitalization, increased financial burden, potential litigation and occasional mortality. It is the third most commonly litigated general surgical complication in United States and it has been also reported that on the average two procedures (1 to 8) are required for definitive repair of bile ducts. If bile duct injury is noticed preoperatively and repaired in the best way, morbidity and mortality rates would be significantly reduced. Unfortunately majority of these injuries escape detection at the time of primary operation. Such injuries then present after a few days as increased drain output, intraabdominal biliary collection, diffuse biliary peritonitis, jaundice or cholangitis. All the 05 cases having biliary injury at Allied hospital sustained such injury during laparoscopic cholecystectomy. Injuries were recognized in three patients at the time of surgery and escaped detection in 02. In all the 10 referred cases (02 laparoscopic, 08 open cholecystectomy) biliary injury went unrecognized during surgery.

1500-2500 bile duct injuries occurred annually in USA. In this study out of fifteen, eight patients had biliary injury during open cholecystectomy while seven patients sustained such injury during laparoscopic cholecystectomy. This signifies that besides laparoscopic cholecystectomy being considered as gold standard, open cholecystectomy is still more commonly performed procedure. Hence iatrogenic injury of bile ducts is slightly commoner during laparoscopic cholecystectomy than open cholecystectomy.

We have used Ultrasound, CT, drain contrast studies as the main radiological investigations in addition to essential biochemical profile of the patients. Wei Liang et al also reported clinical examination and USG as most sensitive diagnostic test(97.5% sensitivity). Intraperative cholangiography (IOC) has not been used as a routine investigation during cholecystectomy. It has been claimed that routine use of IOC does not have a significant practical advantage. Additionally, the operation room conditions should be suitable for IOC. Other disadvantages of IOC are the necessity of some disposable equipment, the need of surgical experience, the inevitable prolongation of the operation time and the need of interpretation by an experienced radiologist.

Most common site of injury was CBD (53.2%) in our study. Wei Liang reported almost the same incidence (55.4%) in their study. The best treatment of these injuries is the prevention by careful surgical technique. If they occur, the proper time to repair them is during surgery. If noticed after the operation, various surgical or endoscopic procedures, e.g., ERCP with papillotomy, stent placement, or bypass procedures, may be
employed. In this series, only three patients were diagnosed immediately and underwent intraoperative repair.

Hepatico-jejunostomy is the gold standard procedure for repairing iatrogenic bile duct injuries. In the current study 10 patients (66.6%) had Roux-en-Y hepaticojejunostomy. Eight patients recovered uneventfully while in 02 patients there was anastomotic leakage which required revision of anastomosis with successful outcome. This is to emphasize that hepatico-jejunostomy is the commonest procedure, as is similar to other studies including a reported 21-year review of iatrogenic bile duct injuries in Mexico.

CONCLUSION

Common Bile Duct is the most common site of injury. Bile duct injuries can be prevented by careful dissection at Calots triangle, identification of cystic artery, accurate ligation and surgical experience. Hepatico-jejunostomy is the procedure of choice for such injuries.

Strasberg Classification of Bile duct Injuries

<table>
<thead>
<tr>
<th>Type</th>
<th>Description of Injury</th>
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<tbody>
<tr>
<td>A</td>
<td>Bile leak from injured minor ducts (cystic duct or duct of Lushka)</td>
</tr>
<tr>
<td>B</td>
<td>Occlusion of part of biliary tree mostly aberrant sectorial hepatic duct</td>
</tr>
<tr>
<td>C</td>
<td>Transaction without ligation of right sectorial hepatic duct</td>
</tr>
<tr>
<td>D</td>
<td>Lateral injury to an extrahepatic bile duct</td>
</tr>
<tr>
<td>E</td>
<td>Biliary strictures</td>
</tr>
<tr>
<td>E1</td>
<td>Stricture &gt;2cm from confluence of hepatic ducts</td>
</tr>
<tr>
<td>E2</td>
<td>Stricture &lt;2cm from confluence of hepatic ducts</td>
</tr>
<tr>
<td>E3</td>
<td>Stricture flush with the confluence of hepatic ducts</td>
</tr>
<tr>
<td>E4</td>
<td>Stricture involves the confluence of hepatic ducts</td>
</tr>
<tr>
<td>E5</td>
<td>Stricture involving right sectorial hepatic duct with or without concomitant CHD stricture</td>
</tr>
</tbody>
</table>

REFERENCES


THE MIND IS LIKE A PARACHUTE
IT DOES NOT WORK UNLESS
IT IS OPEN

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