IATROGENIC BILE DUCT INJURIES: EXPERIENCE AT PIMS

Rasool Bakhsh, Zahid MA, Faisal Saud Dar, Zafar Iqbal Malik, Noor Akhtar, Samia Akhtar

Pakistan Institute of Medical Sciences, Islamabad

Background: Cholecystectomy is one of the most familiar and commonly performed elective operation in general surgery. However, bile duct injury is a rare but one of the worst complications of this procedure. Although infrequent in expert hands, it is usually encountered when comparatively inexperienced surgeons are operating. These injuries present at variable time after the primary surgery. The prompt recognition and active management affects the morbidity and mortality associated with it. We evaluated the data of the hospital to find out the nature of injuries inflicted to extra hepatic bile duct and its management. **Methods:** This is a study of 20 cases of iatrogenic bile duct injury managed at the Department of Surgery Unit 1, PIMS. The study includes cases that had undergone cholecystectomy, open or laparoscopic in previous 11 years and sustained injury to the biliary tree and were managed accordingly. Patients with hepatobiliary malignancy were excluded. **Results:** Twenty cases were found to have various types of bile duct injuries. All patients were females, and their average age was 35 years. In four cases the injury occurred during surgery at our hospital, while remaining 16 cases were referred from other hospitals. All the patients were explored and managed accordingly. They had uneventful recovery and had good outcome at 6 months. **Conclusion:** Although the fact is that, the sooner an injury is recognized and treated, the better is the outcome. However, in this study the duration of injury had no effect on final outcome.

KEYWORDS: Bile duct injuries, Cholecystectomy, Iatrogenic.

INTRODUCTION

Cholecystectomy is the most common gastro-intestinal operation performed and since the introduction of laparoscopic surgery the number has increased further. Post cholecystectomy syndrome which is seen in as many as 20% cases of gallbladder surgery is manifested by symptoms of pain right hypochondrium, vomiting, jaundice, dyspepsia, and fever [1]. Iatrogenic bile duct lesions are serious complications during laparoscopic cholecystectomy and include biliary leakage and major bile duct injury. The incidence of biliary lesion following laparoscopic cholecystectomy has been found up to threefold higher than that of open procedure [2, 3]. The trends have changed now and elective laparoscopic cholecystectomy is established as the treatment of choice for symptomatic cholecystitis and is now proposed for the treatment of acute cholecystitis [4, 5]. The bile duct is prone to be damaged by use of diathermy and the excessive dissection, required to delineate the anatomy of Calot's triangle, results in ischemic injury to the biliary tract [6]. 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 [7]. These biliary injuries include leaks, strictures, transactions, or ligation of major bile duct. But various authors have advocated a distinction in bile leaks and bile injuries [8]. The pattern of bile duct injuries has changed and has become more complicated in recent years [9]. Certain preoperative steps and peroperative techniques have protective effects for these complications [10]. Magnetic resonance cholangiogram is the most sensitive and accurate test for the diagnosis of complications of cholecystectomy although percutaneous transhepatic cholangiography has been considered preferred investigation [11]. Other investigations in use are ERCP and ultrasonography. Routine intra-operative cholangiography (IOC) may itself also cause bile duct injury if the anatomy in Calot's triangle is not clear [11]. On the other hand, IOC is helpful for defining anatomy and detecting bile duct stones; and even preventing, recognizing or decreasing the severity of biliary tract injury [12]. However, still many surgeons do not recommend routine intra-operative cholangiography for fear of injury.

The management of various complications consists of variety of interventional procedures including simple drainage to stricturoplasty, and others like Roux-en-Y hepaticojejunostomy [13].

So the objective of the study was to find the frequency of different complications, difference in complications in open and laparoscopic chole-cystectomy, investigations done pre- and post-operatively, management of these complications, and its outcome.

PATIENTS AND METHODS

This was a study of cases with iatrogenic bile duct injury. Hospital record of previous 11 years, from January 1990 to July 2002, was sorted out to find cases of extra hepatic bile duct injury.

All patients who had iatrogenic bile duct injury were included, regardless of gender or age while patients with hepatobiliary malignancies were excluded from the study. Data regarding number of cases, gender, age, and type of procedure was collected on printed proforma. Various investigations done for diagnosis of complications and type or site of the complication were also noted. Data showing the management strategies applied at that time were also collected. Later on, this data was processed on Microsoft Excel. The tables were also made with the help of Excel.

RESULTS

Twenty patients in the last twelve years had been diagnosed to have iatrogenic bile duct injury and were included in this study. All of them had sustained injury to the extra hepatic bile ducts during the primary surgical procedure. All of these patients were female. Mean age of the patients was 35 years.

Out of these 20 cases, five cases had undergone laparoscopic cholecystectomy, while the remaining 15 had had open cholecystectomy. The exact site of lesion varied (Table-1).

Table-1: Type or site of lesion

Site/Type of Lesion	No.	Percentage
Per-operative identification	2	10
Tear in common bile duct	6	30
Tear in common hepatic duct	1	5
Cystic duct injury and leak	1	5
Stricture	2	10
Fibrosed common bile duct	8	40
Total:	**20**	**100**

In four of the patients the injury had occurred at our hospital. During the study period, a total of 3120 cholecystectomies were performed; i.e., the rate of iatrogenic injury to the bile duct was 0.128%. In two of them, the injury was identified during the operation, and end-to-end anastomosis over T-tube was done. One case had postoperative biliary peritonitis due to tear in the common hepatic duct and the other had cystic duct leakage. The patient with tear in common bile duct was treated by T-tube while the other was treated with simple drainage.

Sixteen patients (80%) had primary surgery elsewhere, and later presented at PIMS with iatrogenic bile duct injury. They had various complaints that started at a variable time after surgery. Time between the first operation and presentation with symptoms ranged from immediately after the first surgery to 3 months later. Common signs and symptoms were fever with rigor, pain in epigastric and right hypochondriac region, jaundice, and pruritis in all but two patients; these two cases had only elevated alkaline phosphatase.

Ultrasonography revealed collection in the peritoneal cavity in all except in 5 patients (75%). Ultrasonography and CT showed biloma in three patients (15%). Endoscopic retrograde cholang-iopancreaticography (ERCP) was done in 14 patients and showed the exact site of blockage of CBD.

Four had minor tears in common bile duct (CBD); these were treated by stenting of CBD by T-tube. In another two cases, the rent was repaired over T-tube. Two patients had stricture at the level of confluence of hepatic ducts: these were treated by stricturoplasty. Eight patients had fibrosed common bile duct on exploration: these were treated by Roux-en-Y hepaticojejunostomy. One patient was treated by simple drainage, and another one with left hepaticojejunostomy. (Table-2).

Table-2: Procedure employed for management

Procedure	No.	Percentage
End-to-end anastomosis	2	10
T-tube repair	3	15
T-tube stenting	2	10
Simple drainage	2	10
Stricturoplasty	2	10
Roux-en-Y hepaticojejunostomy	8	40
Left hepaticojejunostomy	1	5
Total:	20	100%

T-Tube cholangiogram of 7 patients was done ten days after surgery. Five patients showed minor leakage with clear out lining of biliary tree, and was managed conservatively. In these cases, T-tube was removed after about 7 days, and the patients were discharged. Recovery in all our patients was uneventful. Follow up of all patients in surgical out-patient department was for at least six months and showed good recovery. (Table 3)

Table-3: Diagnostic modalities

Investigation	*No. of cases*
Ultrasound	15
Computed tomography scan	3
ERCP	14
T-Tube cholangiography	7

DISCUSSION

The risk of bile duct injury during open cholecystectomy ranges from 0.1–0.2%. To begin with, laparoscopic cholecystectomy was associated with greater than 2% risk of injury to the biliary tract, but nowadays it has dropped to less than 0.5%, demonstrating that as the experience increases, the risk of injury drops [6, 14]. Our study showed similar trends in which overall complication rate was just 0.128%. Laparoscopic cholecystectomy is now considered the gold standard for uncomplicated gallstones [7]. In our study 25% of complications occurred in patients who had undergone laparoscopic cholecystectomy while rest of the complications were

seen in open cholecystectomy cases. The reason for this was that the total number of open chole-cystectomy procedures itself was much larger. Nevertheless, iatrogenic injury of bile ducts is still more likely to result from laparoscopic cholecys-tectomy than open cholecystectomy [3].

The best treatment of these injuries is the prevention by careful surgical technique. If they occur, the best moment 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 [13]. In this series, only two patients (10%) were diagnosed immediately and underwent intraoperative repair. This is significantly less than that reported in literature of 29.4% [15].

Percutaneous transhepatic cholangiography (PTC) has been the preferred investigation to delineate the anatomy of the biliary tract in a patient with a bile duct stricture after cholecystectomy. Recently magnetic resonance cholangiography (MRC) has been used to evaluate the obstructed biliary tract with all the inherent advantages over ERCP. This could be significant in that 14 patients in this study underwent ERCP, although no post procedure complications were noted in this small series.

Studies in teaching hospitals have shown the helpful role of routine IOC practice in early identification of biliary tract injury, and dealing successfully with associated duct stones [16]. Hepatico-jejunostomy is the gold standard procedure for repairing iatrogenic bile duct injuries. Outcome result have been classified into excellent outcome if the patient never experiences jaundice or cholangitis; good outcome if the patient develop symptoms, but subsequently has been asymptomatic for the following 12 months. This outcome has been shown to be commensurate with level of the injury, Bismuth level Ⅲ and Ⅳ injuries requiring access loop [17]. However, in the current study 9 patients (45%) had hepaticojejunostomy and all of them recovered uneventfully and until 6 months follow up, all of them had excellent outcome. This illustrates that hepaticojejunostomy is the commonest procedure, as is similar to other studies including a reported 21-year review of iatrogenic bile duct injuries in Mexico [18]. The role of stenting along with the hepaticojejunostomy is debatable, and there is no study that compares the results between stenting and not stenting the anastomosis although 2 (10%) patients in our study had stents implanted.

The endoscopic management of iatrogenic biliary tract injuries is still anecdotal. Drainage of post-cholecystectomy bilomas has been reported, but laparoscopic primary repair of biliary injury has not been mentioned [19]. In our study post cholecystectomy biloma drainage was done in 2 (10%) cases.

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Address for correspondence:

Dr. M. A. Zahid, House # 190, Street 19, F-10/2, Islamabad.