

Management of Bile Duct Injury after Laparoscopic Cholecystectomy

Islam MR¹, Ali MS², Azam SMG³

Abstract

Bile duct injury is one of a life threatening complication of laparoscopic cholecystectomy. It is a disaster for both patient and surgeon because of the associated morbidity, prolonged hospitalization and mortality. The complication can be minimized by early diagnosis and treatment. Minor injury can be managed by conservative treatment. Bile in drainage tube is diagnostic. Minimum bile leakage automatically sealed provided the natural passage remain patent. Further bile leakage can be reduced by stenting the common bile duct by ERCP. Major bile duct injury needs early diagnosis, categorization of level of injury, control of sepsis and some form of surgical intervention. Early referral to tertiary level hospital under experienced hepatobiliary surgeon will give the good result.

Keywords: Bile Duct Injury, Laparoscopic Cholecystectomy.

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Number of Correspondences: 03

1. Corresponding Author:
Dr. Md. Rafiqul Islam FCPS (Surgery)
Senior Consultant
Department of Surgery
General Hospital Khulna
2. Dr. Md. Showkat Ali FCPS (Surgery)
Junior Consultant
Department of Surgery
General Hospital Khulna
3. Dr. S. M. Golam Azam MS (Surgery)
Junior Consultant
Department of Surgery
General Hospital Khulna

Introduction

Gall stone disease is one of the most common digestive health problems. Laparoscopic Cholecystectomy is now the most commonly performed surgical procedures and since its introduction in the late 1980s has been the

standard procedure for the management of symptomatic gall bladder stones or acute cholecystitis¹. Although there are major benefits related to the procedure, such as reduced pain and shorter hospital stay, laparoscopic cholecystectomy also has a downside, it is associated with higher incidence of bile leaks and injuries to common bile duct than was observed in the open cholecystectomy².

The consequences of bile duct injuries might have some severe consequences for some of the patients. Apart from early post-operative complications there is also a risk of long term sequel as stricture of the common bile duct and repeated attack to cholangitis. In addition such injuries represent a vast economic burden to the society and also represent high rate of medico legal claims².

The management of patients following major bile duct injury is a surgical challenge often requiring the skills of experienced hepatobiliary surgeons at tertiary referral centers. Collaboration among surgeons, gastroenterologist and interventional radiologist is imperative in the care of such injuries.

The aim of the study is to analyze the presentation, characteristic, relevant investigations and treatment results of 3 cases with bile duct injury after laparoscopic cholecystectomy.

Case presentation

Case no 1:

Mrs. Salma aged about 40 years from Fakirhat, Bagerhat was admitted in a private clinic as a diagnosed case of cholelithiasis. After pre-operative checkup she was decided for Laparoscopic cholecystectomy. Operative procedure was clean, no abnormal situation was there. On 3rd post-operative period (POD), patient developed abdominal pain, distention and there was collection of bile about 200 ml indrainage bag (Fig. no 01). The amount of bile was increased between 200 ml to 500 ml. Ultrasonography of whole abdomen shows some amount of collection of fluid at sub hepatic region. From 7th POD the amount of bile gradually decreased. On 14th POD it was almost nil. Ultrasonography shows no collection of fluid at sub-hepatic region. The drain tube was removed and patient was discharged. On final follow up patient was good.

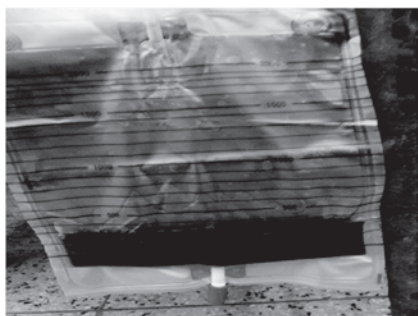


Figure-1: Showing bile in the drainage bag.

Case no 2:

Mrs. Sufia Begum aged about 37 years from Kaligang, Satkhira presents with asymptomatic cholelithiasis. After pre-operative checkup she was decided for Laparoscopic cholecystectomy. Operation was done as a routine case. There was no per-operative complication, operative procedure was clean. On 3rd post-operative period (POD), patient complaints of pain at right hypochondrium (RHC) with jaundice (Fig. no 02).

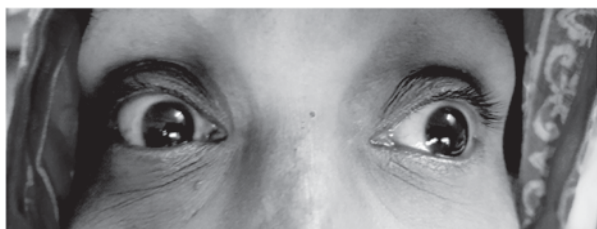


Figure-2: Showing jaundice.

On conservative treatment no improvement were there. Ultrasonography shows collection at right hypochondriac region. On 7th POD decision of laparotomy was taken, after laparotomy collection of bile found at RHC about 300 ml. Bile was removed. Abdomen was closed with a T-tube at CBD and a drain tube at hepatorenal angle. T-tube was managed accordingly. Post-operative T-tube cholangiogram was done. Normal patency of biliary tree was found. T-tube was removed and patient was discharged. Patient is good even after one year of operation.

Case No 3:

Mrs. Aleya Khatun aged about 35 years from Shaikhpara, Khulna presents with cholelithiasis. It was asymptomatic and was diagnosed incidentally during Ultrasonography of whole abdomen due to pain at the lower abdomen. She was decided for Laparoscopic cholecystectomy. She was non-diabetic, non-hypertension and all other investigations were found within normal limit. Laparoscopic cholecystectomy was started under General Anesthesia with endotracheal intubation, cystic duct, cystic artery with all structure were identified clearly. During the procedure slipping of cystic artery causes sprouting. Attempt of arrest of bleeding was done, several clips were applied. Procedure was completed with a drain at operation site. On 3rd POD, patient developed mild

jaundice, fluctuation of level of bilirubin between 4-6 mg/dl. Pain at operation site gradually become aggravated. Patient was referred to higher center for further management. Laparotomy was done on 14th POD, collection of bile at sub hepatic region was found which was drained and abdomen was closed in layers keeping a drain at hepatorenal angle and a T-tube at porta-hepatis. After 3 months MRCP followed by T-tube cholangiogram was done.

There was no continuity between the biliary channel and duodenum. Intra hepatic biliary channel were visualized up to the confluent of the right and left hepatic duct. Patient gradually become non-icteric. Further laparotomy followed by hepaticojejunostomy with roux-en-y anastomosis was done. Abdomen was closed with a drain. The patient was discharge after 7th POD without any postoperative complication. On follow up after one year, patient was completely all right.

Discussion

Biliary injuries include biliary leakage, hemobilia, and biliary fistula. It usually occurs due to slipping of clip or ligature, diathermy injury or improper identification of biliary tree in the presence of acute inflammation or chronic fibrosis³. The treatment of patients with major bile duct injury (MBDI) after laparoscopic cholecystectomy (LC) is a difficult problem and depends on the time of diagnosis after the initial injury and the type, extent and level of the injury. There have been a few proposals to classify postoperative strictures and bile duct injuries. The Corlette-Bismuth classification (Table-I) is based on the length of the proximal biliary stump but not on the nature and length of the lesion. Another classification is by Strasberg (Table-II), and this is the most detailed classification as all types of injury, including leaks can be classified. The aim of the treatment is immediate management of the associated sepsis, fistula, and obstruction of the biliary system.

The reported incidence of MBDI after laparoscopic cholecystectomy has been shown to be higher (0.6%) than that after open cholecystectomy (0.1%)⁴. Several risk factors have been identified, mainly dangerous pathology, dangerous anatomy, and dangerous surgery⁵. A good practice is that the cystic duct should not be separated until the junction of the common hepatic and cystic ducts is positively identified.

Proper diagnosis and appropriate treatment of MBDI, are paramount in preventing life-threatening complications of cholangitis, biliary cirrhosis, portal hypertension, end-stage liver disease, and death. The problem is not recognized at the time of the initial procedure, particularly in the presence of acute inflammation or chronic fibrosis. Usually diagnosed post operatively due to presence of bile in the drainage tube, abdominal pain and distention, jaundice.

Table-I: Corlette -Bismuth classification

Type 1	Low common hepatic duct stricture, with a length of the common hepatic duct stump of > 2cm
Type 2	Middle stricture; length of common hepatic duct < 2 cm
Type 3	Hilar stricture, no remaining common hepatic duct, but the confluence is preserved
Type 4	Hilar stricture, with involvement of confluence and loss of communication between right and left hepatic duct
Type 5	Combined common hepatic and aberrant right hepatic duct injury, separating from the distal common bile duct

Table-II: Strasberg classification

Type A	Bile leak from cystic duct or liver bed without further injury.
Type B	Partial occlusion of the biliary tree, most frequently of an aberrant right hepatic duct.
Type C	Bile leak from duct (aberrant right hepatic duct) that is not communicating with the common bile-duct.
Type D	Lateral injury of biliary system, without loss of continuity.
Type E	Circumferential injury of biliary tree with loss of continuity.

Post-operative imaging studies such as ultrasonography (US), magnetic resonance cholangiography (MRC), ERCP, and PTC correctly delineate the location and nature of MBDI^{6,7}. Once the sepsis and leaks have been controlled and the MBDI is classified, a hepaticojejunostomy should be constructed to a roux-en-y jejunal limb, or less commonly an end to side roux-en-Y choledochojejunostomy. This data support the concept of early referral to a tertiary care center with experienced hepatobiliary surgeons and skilled interventional radiologists to assure optimal short-term and long-term outcomes.

Conclusion

The case of biliary injury is usually not detected at the time of operation. They present postoperatively as abdominal pain, distension, fever with jaundice, and collection of bile at drainage bag. Diagnosis of biliary injury depends on clinical findings and some relevant investigations. Bile in the drainage tube is diagnostic. Supportive investigation includes ultrasonography (us) shows collection of fluid at gall bladder fossa. In severe case bile may occupy whole peritoneal cavity, computed tomography (CT) shows dilatation of biliary tree with collection of fluid. Others investigations are MRCP, ERCP, PTC in order to delineate the biliary anatomy. In a few cases conservative treatment is sufficient provided a drain is kept at the site of operation during the operative procedure (case no.1). Slipping of ligature or minimum

injury of CBD can be managed if the natural passage is remain patent. In some cases endoscopic stenting of CBD is sufficient. Majority of cases some form of surgical interventions are required. Initially drainage of bile and control of sepsis either by open or laparoscopic procedure can be done, then planning for permanent procedure should be done in the form of choledochojejunostomy or hepaticojejunostomy (case no. 3).

These data support the concept of early referral to a tertiary care center with experienced hepatobiliary surgeons and skilled interventional radiologists to assure optimal short-term and long-term outcomes.

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All photographs are taken from the reporting cases with the prior permission of patient parties.

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