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Case Report

Laparoscopic Management of Bile Duct Injury Strasberg Type D

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Abstract

Introduction: The incidence of bile duct injuries (BDI) has approximately doubled (0.5%) since laparoscopic cholecystectomy became the standard of care for the management of gallstone disease. The BDI rate has been shown to decrease with the increasing surgeon's experience.

Case Presentation: We present a patient with a laceration on the lateral border of the common bile duct (CBD), with no completely loss of duct (Strasberg type D/Stewert Way Classification Class 1). A laparoscopic approach was performed with a primary CBD repair with Kehr bile duct tube and abdominal drainage.

Discussions: The biliary injuries can occur even if the operator is an experienced laparoscopic surgeon. In this case the origin of the injury is not the non-perioperative reconnaissance of the biliary structures but most likely a termic injury during laparoscopic cholecystectomy.

Conclusion: Even on experienced surgical hands a common bile duct injury can happened and its cause is not an anatomical difficulty but a technical complication. Cautions have to be considered especially when case appears easy to be performed.

Keywords: *Bile Duct Injuries (BDI); Common Bile Duct (CBD)*

Introduction

The incidence of bile duct injuries (BDI) has approximately doubled (0.5%) since laparoscopic cholecystectomy became the standard of care for the management of gallstone disease [1]. The BDI rate has been shown to decrease with the increasing surgeon's experience [2]. However, it remains a daunting complication of laparoscopic cholecystectomy. Also experienced laparoscopic surgeon can be at risk of BDI, due to the setting of aberrant anatomy and inflammation of Calot's triangle.

There have been numerous classifications of BDI. The initial system was firstly described by Bismuth [3]. However, the most commonly quoted the Strasberg classification system. Although the aim of these classification systems are to unify the management of BDI, the ideal management of BDI is still debated. The type of management is dependent upon time of diagnosis, type of injury, patient's clinical state and overall expertise of the hepatobiliary surgeon.

The role and effectiveness of indocyanine green (ICG) cholangiography has been recently evaluated by several studies [3-5]. ICG is given at a dosage of 0.15 - 2 mg/Kg, one hour preoperatively. A near infrared camera is then use to identify the fluorescent structures of Calot's triangle. This procedure does not increase the operative time and mitigates the radiation risk associated with conventional IOC. There is some disparity in the timing of ICG infusion, and optimal visualization. Some authors have removed this problem by directly injecting the ICG into the gallbladder [6]. This technique was shown to provide immediate visualization of the biliary tree.

Case Presentation

A 51-year-old female was admitted to the Emergency Department with a complaint of persistent abdominal pain in the right hypochondrium, six (6) days after an elective laparoscopic cholecystectomy. An abdominal computed tomography (CT) scan showed a collection of free fluid at the cystic bed, besides a normal enhancement of the right hepatic lobe, on the arterial CT phase. No intrahepatic or extrahepatic duct dilation was evident (Figure 1). The patient was scheduled for an emergency laparoscopic exploration.

Figure 1: *Illustrating perihepatic collections.*

Operative technique

The patient was placed in a supine position with the legs apart. Four (4) trocars were used, in a classical position for laparoscopic cholecystectomy. Infra hepatic bile was noted after the introduction of the 30° scope. There were significant adhesions between the omentum and the cystic bed, with a perihepatic collection extending into the infra-hepatic and infra-phrenic spaces. These adhesions were taken down by blunt dissection and the biloma was suctioned.

The vena porta was visualized and appeared to be inflamed. A laceration on the lateral border of the common bile duct (CBD), with no completely loss of duct (Strasberg type D/Stewert Way Classification Class 1) was found. The cystic stump was visualized and the clips appeared correctly in place. There were no other clips and no associated vascular injuries (Figure 2).

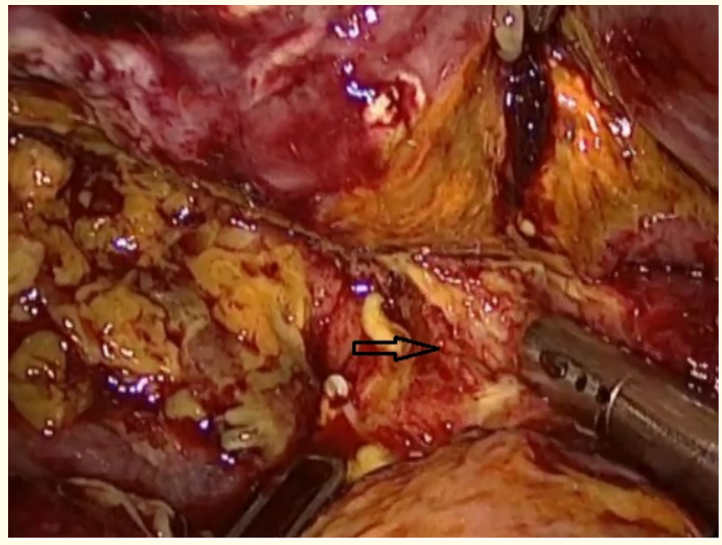

Figure 2: *Intraoperative image showing the biliary injury.*

A decision to perform a primary CBD repair with Kehr bile duct tube in place was taken. The Kehr tube was placed through the laceration and the duct was sutured around the tube by 4-0 PDS sutures in a figure of 8 (Figure 3).

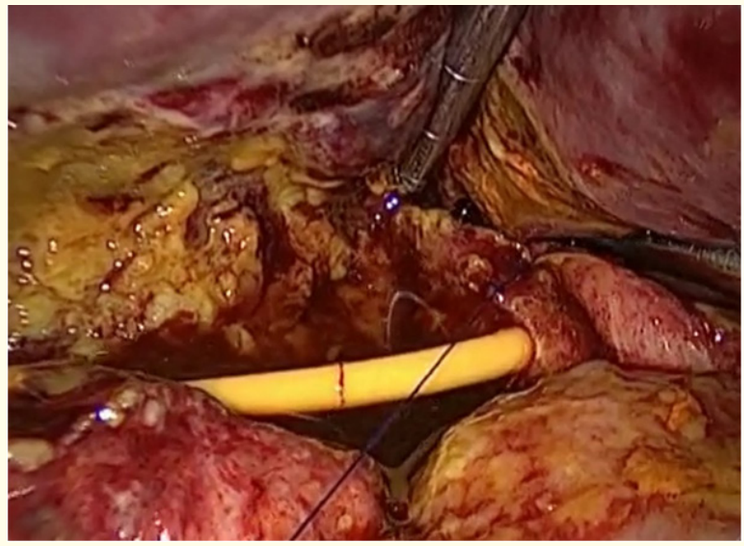

Figure 3: *Intraoperative image that reveals the Kehr tube in place.*

Intra-abdominal sepsis was controlled by adequate lavage of the peritoneal cavity, and a drain was left in the infra-hepatic space.

Results

Operative time was 90 minutes and the blood loss were 10cc. The patient had a favorable post-operative course. After the multidisciplinary Counseling, on the fifth post-operative day the patient underwent to endoscopic retrograde cholangiopancreatography (ERCP), sphincterotomy and biliary stenting (Figure 4). Postoperatively there have been no deranged laboratories or clinical parameters. The discharge was allowed on 15 postoperative days. On the last follow up, the patient continues to do well.

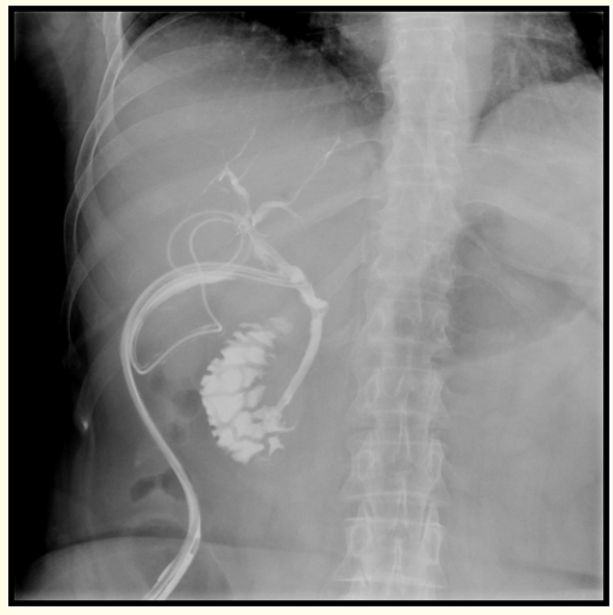

Figure 4: *Post-operative fistulogram, illustrating adequate opacification of the biliary tree with free flow into the duodenum. Kehr tube in situ.*

Discussions

The biliary injuries can occur even if the operator is an experienced laparoscopic surgeon. In this case the origin of the injury is not the non-perioperative reconnaissance of the biliary structures but most likely a termic injury during laparoscopic cholecystectomy. The choice for a laparoscopic comes from the study of Safi Dokmak., *et al.* [7] were here it was no suspicion of complete transaction of the common bile duct and the biliary convergence was supposed to be intact.

The patient presented an acute abdomen hence we chose to perform a surgical revision in emergency instead of other techniques like the percutaneous drainage or ERCP like reported [8].

Different authors [9,10] suggest to primary close the lesion by with fine absorbable sutures and to place an infra-hepatic drainage. Peri-operatively we estimated the tissue very inflammatory hence fragile and we preferred to place Kehr tube drainage instead of primary closure.

The ERCP was performed in the postoperative course in order to assure a free flow of the bile into the duodenum without any hyper pressure on the biliary tree. In general, the recommendation is to perform the ERCP and stenting as a secondary treatment but in our case the strategy was adapted in advance.

Regarding the Kehr tube ablation the recommendation reported varies from 2 weeks [11,12] to 12 weeks [13]. We opted for a timing of 8 weeks before the T tube removal after have realized a control cholangiography which was negative.

Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) recommend its liberal use, although there have been studies that have proven its ability to reduce the incidence of BDI, especially during the learning curve period [14]. IOC however, has been also associated with a higher bile duct stone pick up, which leaves the surgeon in a conundrum. IOC has its drawback of increased operative time and cost, along with the possibility of bile duct injury during cannulation [15]. Regarding the hospital stay some authors [16] report a period of 17 days. In our case the patient has 15 days of hospital stay.

Conclusion

Even on experienced surgical hands a common bile duct injury can happened and its cause is not an anatomical difficulty but a technical complication. Cautions have to be considered especially when case appears easy to be performed.

The most quoted Consensus is the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) safe cholecystectomy program. But it remains still fleeting however the routine use of intraoperative cholangiogram during laparoscopic cholecystectomy.

We believe that perioperative utilization of ICG may be an effective tool in aiding the surgeon to finally curb the unchanged incidence of BDI.

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