



## Management of an Accessory Bile Duct Injury after Laparoscopic Cholecystectomy: A Case Report

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### Abstract

**Background:** Bile duct injury is a severe and potentially life-threatening complication of laparoscopic cholecystectomy and the most difficult to resolve if there is an accessory bile duct. This is a complex problem, where inadequate reconstruction has an impact on the quality of life of patients. Some series have reported a 0.5% to 1.4% incidence of bile duct injury during laparoscopic cholecystectomy. The aim of this case was to analyze the presentation, characteristics and treatment results of an infant with an accessory bile duct injury after a laparoscopic cholecystectomy.

**Case Presentation:** A child of 13-year-old, male patient was referred to our center (Centro Medico Nacional Siglo XXI: IMSS) for the management of cholelithiasis by laparoscopic cholecystectomy. In his medical history, he had diffused abdominal pain while 2 years ago, ultrasound (US) that revealed cholelithiasis (at least ten gallstone of different diameter 0.5 to 1cm), and an elective laparoscopic cholecystectomy was performed. Ten days after, he presented a bile duct injury that we had been repaired by PDS 6-0 and ferulization.

**Conclusion:** The cholelithiasis is not so frequently in infant and in child pathology, it is important to evaluate hilar stricture to exclude the possibility of an accessory bile duct by a magnetic resonance cholangiography (MRC) before the procedure. When we have involvement in the possibility of bile duct injuries is better realized an abdominal scan and try to repair the bile duct by PDS 6-0 by using a catheter like ferulization in the first time before realized the Roux- en-Y choledocojejunostomy.

**Keywords:** Accessory bile duct-biliary tract injury; Laparoscopic cholecystectomy; Choledocojejunostomy

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### Introduction

Bile duct injury is a severe and potentially life-threatening complication of laparoscopic cholecystectomy and most difficult to resolve if there is an accessory bile duct [1]. This is a complex problem, where inadequate reconstruction has an impact on quality of life of patients [2]. Gurusamy et al. [3] and others studies have reported a 0.5% to 1.4% incidence of bile duct injury during laparoscopic cholecystectomy and during the open cholecystectomies, the prevalence of bile duct injury has been estimated at only 0.1-0.2 like difference (Table 1) [3-5]. Intrahepatic and extrahepatic bile duct variations are commonly seen. The incidence of aberrant bile duct injury associated with laparoscopic cholecystectomy has not yet been adequately revised; abnormal biliary anatomy is seen in large percent in the normal population [6-8]. It is important to visualize and make sure the site crossing of right hepatic artery by consideration of biliary duct [2]. Bile duct injury after laparoscopic cholecystectomy can be divided into the following categories: 1-the classic injury; 2-variants of the classic injury; 3- burn injury; and 4-more remediable injuries [1].

Bile duct injury is a severe and potentially life-threatening complication of laparoscopic cholecystectomy and most difficult to resolve if there is an accessory bile duct [1]. This is a complex problem, where inadequate reconstruction has an impact on quality of life of patients [2]. 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 [9]. In those injuries, the most important, it is the repair procedure; like Sarmiento had evidenced that the life quality is the same like a health patient after a good reconstruction of a hilar duct [2]. Major biliary injuries are more severe than traditional cholecystectomy and require multidisciplinary expertise for successful results [1,2].

The aim of this case was to analyze the presentation, characteristics and treatment results of an infant with an accessory bile duct injury after a laparoscopic cholecystectomy.

**Table 1:** Incidence of Biliary Tract Injury (BTI) during Open Cholecystectomy (OC).

Author	Year	Country	Number OC	Patients with BTI (%)
Rosenquist	1960	Sweden	21530	43 (0.20%)
Bismuth	1981	France	53637	84 (0.16%)
Sandberg	1985	Sweden	92856	65 (0.07%)
Clavien	1992	USA/Switzerland	1088	0 (0%)
Roslyn	1993	USA	42474	91 (0.2%)
Gouma	1994	Netherlands	8780	45(0.5%)

**Table 2:** Corlette-Bismuth classification.

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

## Case Presentation

A child of 13-year-old, male patient was referred to our center (Centro Medico Nacional Siglo XXI: IMSS) for the management of cholelithiasis by laparoscopic cholecystectomy. In his medical history, he had diffuse abdominal pain while 2 years ago, without etiology and no haematologic disease had been reported, only the ultrasound (US) revealed cholelithiasis (at least ten gall stones of different diameter 0.5 to 1 cm), and an elective laparoscopic cholecystectomy was performed by using technical of three ports [10] (Figure 1 and 2).

The duration of laparoscopic cholecystectomy was 85 minutes while the procedure was completed by three ports (generally we prefer the laparoscopic cholecystectomy by three ports, only, if it is necessary we use the fourth port), during the procedure we had found the right hepatic artery (RHA) across from behind the cystic duct (CD) and there is no record of intraoperatively identified biliary injury (Figure 3 and 4) and the patient was living home without disturbance, ten days postoperative, he has had abdominal pain. We realized an US without evidential abdominal collection. Six hours after we performed an abdominal scan (Figure 5) and we have identified a pelvic collection.

We performed a laparoscopic revision and we have identified an accessory bile duct and we converted the procedure by an open procedure, the remnant of cystic duct has identified and we have placed a catheter follow right hepatic duct and we have realized a cholangiography, by identified the accessory duct we have closed it by PDS 6-0, and the catheter had not removed for two months before removing it, the patient has had no complains and the liver function tests results within the normal limits (Figure 6).

## Discussion

Since the introduction of laparoscopic cholecystectomy in 1987 by Philippe Mouret in France, an increase in these iatrogenic injuries has been observed worldwide [4]. The laparoscopic cholecystectomy is the preferred method for removing the gallbladder in the United States. As with traditional open cholecystectomy, bile duct injury is the most feared complication related to the new procedure [11]. The biliary fistula is the most important injury in this procedure. There have been a few proposals to classify postoperative strictures and bile duct injuries. The Corlette-Bismuth classification is based on the

**Figure 1:** US Before Cholecystectomy (three Ports).**Figure 2:** Patient 10 days postoperative.

length of the proximal biliary stump but not on the nature and length of the lesion. Using this classification our patient had been injury type five that is a combined common hepatic and aberrant right hepatic duct injury, separating from the distal common bile duct (Table 2 and Figure 3). In our patient if we had used the classification proposed by McMahon, we had considered it like a major injury [1,2,4].

Biliary anatomical variations are encountered in 18.39% of cases, with potentially hazardous anomalies predisposing to BTI in only 3-6%. Anomalous right hepatic ducts are considered the most dangerous type of anomaly, and our patient we had observed an anomalous right hepatic duct (Figure 6) [4,12]. By the other hand,



Figure 3: RHA and CD anomaly positioning.

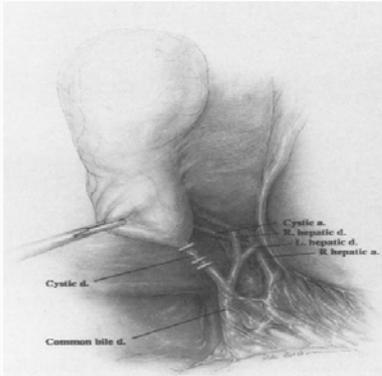


Figure 4: Normal positioning.

abnormal biliary anatomy, such as a short cystic duct or a cystic duct entering into the right hepatic duct would increase the incidence of injuries in the bile duct [13].

Sometimes it is difficult to obtain the exact incidence rate iatrogenic bile duct injury when there is an accessory duct not identified previous the procedure, like our patient and when there is not observed bile flow during the procedure. At the same time, some Authors have also stressed the importance of an anomaly in the right hepatic arterial running parallel to the cystic duct such as an anomalous or accessory right hepatic artery. Common mechanisms of injury during laparoscopic cholecystectomy are: 1- misidentification of the cystic duct and the common hepatic duct because the cystic duct is short (defined as cystic duct having a length of less than 5mm); 2-lateral clipping of the common hepatic duct; 3-traumatic avulsion of the cystic duct junction, 4-diathermic injury of common hepatic duct [9,8,12].

In this case the patient had presented some problems ten days postoperative and the most important trouble had been an abdominal diffuse pain. We had not imagined injury of an accessory bile duct, because during the procedure we had been much emphasis to complete the exposure of the peritoneal attachments in Carlot's triangle and the anatomical variations observed it had the right hepatic artery coursing behind the cystic duct and we had not identified confluence of any abnormal ducts into the cystic duct. However, during the laparoscopic exploration, we had observed very clear the bile flow by another duct. The management were included to open the cystic duct and introduced a catheter to right hepatic duct and closed the accessory bile duct by PDS 6-O in the right hepatic bile duct.

Some studies mentioned that during cholecystectomy, the anatomical structure of Carlot's triangle is not very clear because of congestion, edema and fragility of the tissues around the cystic

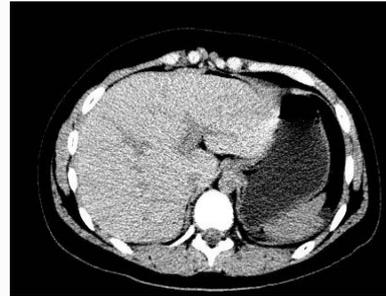


Figure 5: Abdominal scan.



Figure 6: Accessory duct and catheter.

duct in acute suppurate or gangrenous cholecystic. Fibrous tissue scars are often formed in Carlot's triangle in atrophic cholecystitis and it is more difficult to avoid intraoperative bile duct injuries, in such conditions when correct identification of Carlot's triangle is less likely, intrahepatic bile duct anatomy is complex with many common and uncommon variations. In spite of excellent laparoscopic visualization complications. Perioperative lesions vascular structure or extrahepatic (especially accessory) bile ducts during laparoscopic cholecystectomy are a frequent cause of intra- and -postoperative injury. The most common variant in the Radha Sarawagi study was right posterior sectoral duct draining into the left hepatic duct in 27.6% of subjects [1,14-17].

In our patient it was different even-though it very important to realize a magnetic resonance in pediatric patient with cholelithiasis because it is not frequently like an adult this pathology in infant and one of the diagnostic suspect had included hilar bile abnormality, cholangiopancreatography (MRCP) is an excellent non-invasive imaging technique for visualization of detailed biliary anatomy [8,16]. It is our contribution in this case. The other importation in this case is by the suspect of injury after laparoscopic cholecystectomy, it is better realizing an abdominal scan. In this patient, like the accessory duct was identified with a grand possibility to close the bile flow it had been not necessary a hepaticojejunostomy by Roux -en-Y jejunal limb, or less commonly an end to side Roux-Y choledocojejunostomy [1,11,8,15].

## Conclusion

The cholelithiasis is not so frequently in infant and in child pathology, it is important to evaluate hilar stricture or exclude the possibility of an accessory bile duct by a magnetic resonance cholangiography (MRC) before the laparoscopic cholecystectomy procedure. When we have involvement, in the possibility of bile duct injuries, it is better realized an abdominal scan and try to repair the bile duct by PDS 6-O by using a catheter like ferulization in the

first time, before realized the Roux- en-Y choledocojejunostomy. Expert surgeons have stressed the importance to open calot's triangle, thereby reducing the likelihood of misidentification. Clear visualization of both: cystic duct and the choledochus, should be obtained before clip placement and transection of the cystic duct. Overuse of electrocautery must be avoided during the dissection of calot's triangle because the heat transduction should be caused no identified injury during the procedure.

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