

Case Report

Iatrogenic injury of the common bile duct during laparoscopic cholecystectomy in children

Danci A.¹, Jalba A.², Ambros I.²

Public Institution State University of Medicine and Pharmacy “Nicolae Testemițanu”,
Laboratory of Hepatic Surgery¹
Department of Pediatric Surgery, Orthopedics and Anesthesiology²
Chisinau, Republic of Moldova

Abstract

Leziunea iatrogenică a ductului biliar comun în timpul colecistectomiei laparoscopice la copil

Autorii prezintă un caz clinic de leziune iatrogenă a ductului biliar comun în timpul colecistectomiei laparoscopice, rezolvat prin operație reconstructivă – hepaticojejunostomie de ansă Roux in Y cu evoluție clinică favorabilă. Monitorizarea clinică și ecografică la distanță la 2 ani postoperator nu a relevat semne de stenoza a anastomozei bilio-digestive sau angiolită de reflux, iar pacientul rămâne în stare satisfăcătoare.

Cuvinte cheie: colecistectomie, laparoscopie, duct biliar comun, leziune iatrogenă, hepaticojejunostomie, copii

Abstract

The authors present a clinical case of the iatrogenic injury of the common bile duct during laparoscopic cholecystectomy, managed by reconstructive surgery – Roux en Y hepaticojejunostomy with favorable evolution. The clinical and ultrasound follow up after 2 years postoperatively revealed no signs of stenosis of the biliodigestive anastomosis or reflux cholangitis, and the child's condition remains satisfactory.

Keywords: cholecystectomy, laparoscopy, laparoscop, common bile duct, iatrogenic injury, hepaticojejunostomy, children

Correspondence: svetlana.sciuca@usmf.md; mob. +373 79471374

Background

At the moment the laparoscopic cholecystectomy, due to its safety and efficiency, represents the “gold standard” in the treatment of cholelithiasis [10]. Bile duct injury (BDI) is one of the most dangerous complications of cholecystectomy with a great potential of morbidity and mortality. According to literature data

the incidence of the BDI during gallbladder surgery ranges between 0,1-1,7% [4, 8, 11, 12, 13]. The BDI during laparoscopic surgery is determined by some factors such as wrong interpretation of the Calot triangle anatomy, surgeon's lack of experience, deficient anatomy of the hepatobiliary region etc. [1, 3, 11, 16, 17].

Case report

The child F.I. 9 years old was admitted on September, 12, 2016 with the diagnosis: Cholelithiasis. Acute calculous cholecystitis, which has been confirmed by abdominal ultrasound exam. The laparoscopic cholecystectomy was performed on September, 15, 2016. 24 hours postoperatively a mild jaundice occurred (Total bilirubin - 2,57 mg/dL), that became more prominent 48 hours postoperatively (Total bilirubin - 6,2 mg/dL).

The Magnetic Resonance Cholecystopancreatography (MRCP), performed on 17.09.2016, attested a funnel-shaped obstruction of the common bile duct in the middle 1/3, which was 16 mm long (12 mm from the bifurcation) (fig. 1).

According to Bismuth classification the diagnosis of E2 BDI (< 2cm from the hepatic biliary duct bifurcation) was established (Fig. 2).

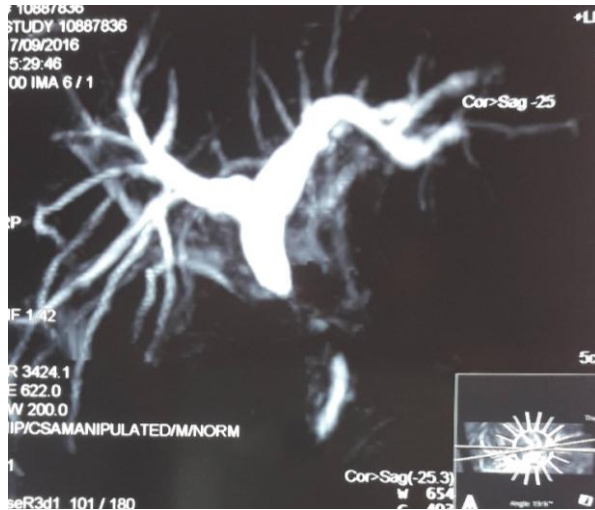


Fig. 1. MRCP. Clamping of BDI and excision of a segment of common bile duct. The injury mechanism: intraoperatively the common bile duct was ventrally elevated and misinterpreted as cystic duct, and the surgical clip was wrongly applied on it.

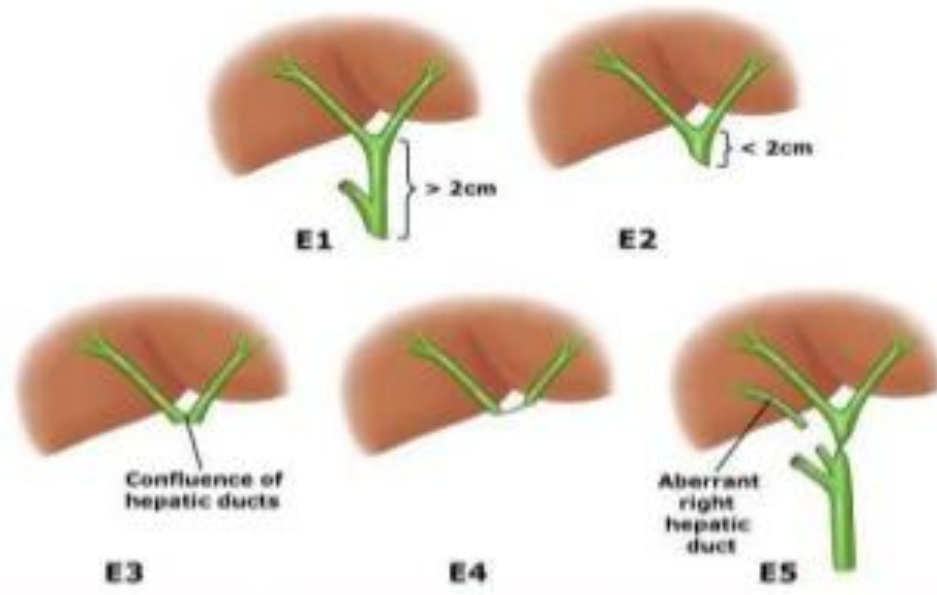


Fig 2. Bismuth BDI Classification

86 hours postoperatively the patient underwent open surgery – Roux-en-Y hepaticojejunostomy with Volker biliojejunal anastomosis stenting and drainage of the subhepatic space. The length of the Roux loop and of the jejunum from the Treitz ligament to the terminolateral jejunojejunal anastomosis was approximately 40 cm altogether (fig. 3).

On the 11th day postoperatively (28.09.2017) an intestinal fistula opened, being an evidence of partial biliodigestive anastomosis dehiscence (fig. 4).

The next 9 days the child was at a total parenteral nutrition, the fistula closed on the 08.10.2016 and the enteral feeding was restarted. On the 17.10.2016 (30 days after reconstructive surgery) after subhepatic

drain removal with Volker stent in place the patient was discharged. On 19.10.2016 he was urgently readmitted because of accidentally exteriorization of the Volker stent (fig. 5).

The Volker stent was removed. On the 25.10.2016 the child was discharged with recommendations. Abdominal ultrasound exam after 1 month had shown that the biliary ducts were not distended, the hepatic parenchyma had no pathology.

The ultrasound exam performed 1 year after discharge has shown that the biliary ducts are not distended, there is a lack of signs of cholangitis, the hepatic parenchyma is homogenous. The lifestyle and food regimens without restrictions were recommended.

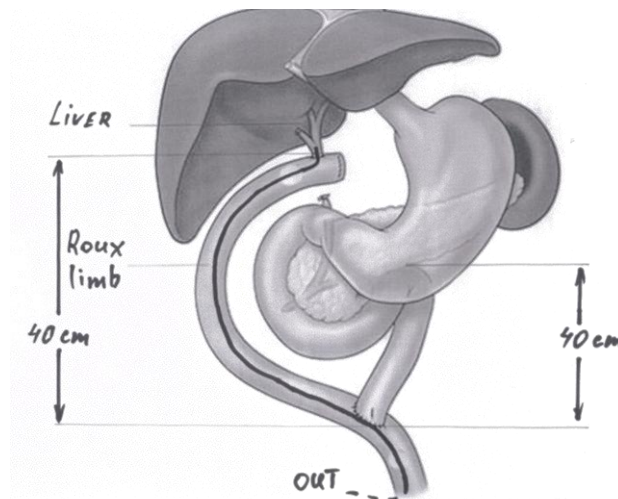


Fig.3. Roux-en-Y hepaticojejunostomy with Volker stenting of biliodigestive anastomosis



Fig. 4. Fistulography through Volker stent. Partial dehiscence of the biliodigestive anastomosis.

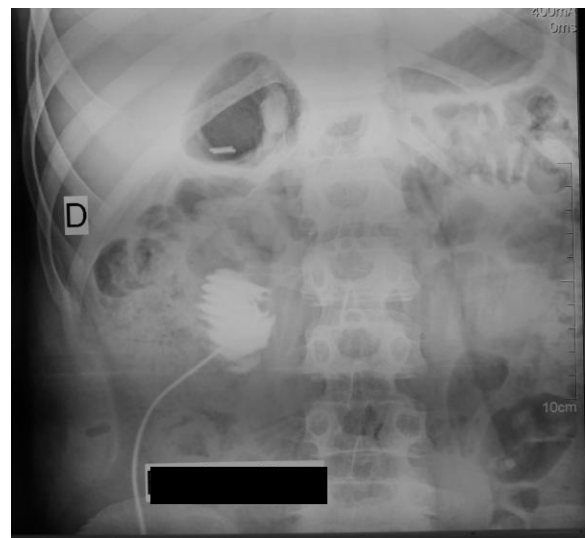


Fig. 5. Fistulography through Volker stent. Accidental exteriorization of the stent.

Discussion. The most frequent cause of the BDI during laparoscopic cholecystectomy is wrong interpretation of the Calot triangle anatomy by the surgeon [10]. The BDI is determined mainly by laparoscopic approach factors themselves (lack of direct perception, poor tactile feedback, lack of full manual maneuverability because of 2D image), as well as by surgeon's insufficient training and by topographic anatomy risk factors [2]. The most important factor responsible for the BDI during laparoscopic cholecystectomy is the position of the surgeon at the beginning of "learning curve" [5, 6]. However, an important role in the BDI occurring is played by phlogistic deterioration of the local topographic anatomy, caused by acute cholecystitis, significant adhesive processes due to chronic inflammation of gallbladder, all of these being responsible for 15-35% of the BDIs [1, 13]. Diverse abnormal anatomic variants of biliary ways (short cystic duct, cystic duct connected to the right hepatic biliary duct etc.) may also serve as a background for the BDI during cholecystectomy [1, 13].

The mechanisms of the BDI during laparoscopic cholecystectomy include: incomplete surgical dissection of the cystic duct and Calot triangle, application of surgical clips on the common bile duct which was mis-

interpreted as cystic duct, transection of the common bile duct [10, 14]. The optimal option for the correction of the BDI is considered the Roux-en-Y hepaticojejunostomy, although there are endoscopic and radiologic alternatives [1, 4, 5, 6, 7, 15].

Conclusion:

1. The anatomic and physiologic peculiarities of children should be always considered during laparoscopic cholecystectomy. The diameters of their biliary ducts are 2-3 folds smaller than in adults. This fact may lead to erroneous interpretation of the Calot triangle anatomy – the common hepatic and bile ducts may be easily misinterpreted as cystic ducts.

2. The biliary ducts wall in children is thinner than in adults that is why the reconstructive surgery may be more difficult as far as anastomosis sutures application is concerned, which, in turn, could affect the quality of biliodigestive anastomosis.

3. The postoperative evolution of children is less predictable, and the probability of the accidental stent removal is higher than in adults.

4. The incidence rate of cholelithiasis in children is smaller than in adults, and, respectively, the learning curve of specialized pediatric surgeons is chronologically longer.

REFERENCES

1. Ahrendt S.A., Pitt H.A. Surgical therapy of iatrogenic lesions of biliary tract. *World J. Surg.* 2001; 25(10):1360-5.
2. Azagra J.S., De Simone P., Goergen M. Is there a place for laparoscopy in management of postcholecystectomy biliary injuries? *World J. Surg.* 2001; 25(10):1331-4.
3. Babel N., Sakpal S.V., Paragi P., Wellen J., Feldman S., Chamberlain R.S. Iatrogenic bile duct injury associated with anomalies of the right hepatic sectoral ducts: a misunderstood and underappreciated problem. *HPB Surg.* 2009; 2009:153269.
4. Barbier L., Souche R., Slim K., Ah-Soune P. Long-term consequences of bile duct injury after cholecystectomy. *J. Visc. Surg.* 2014; 151(4):269-79.
5. Brandabur J.J., Kozarek R.A. Endoscopic repair of bile leaks after laparoscopic cholecystectomy. *Semin. Ultrasound CT MR.* 1993;14(5):375-81.
6. Connor S., Garden O.J. Bile duct injury in the era of laparoscopic cholecystectomy. *Br. J. Surg.* 2006; 93(2):158-68.
7. Davidoff A.M., Branum G.D., Meyers W.C. Clinical features and mechanisms of major laparoscopic biliary injury. *Semin. Ultrasound CT MR.* 1993;14(5):338-45.
8. Gadacz T.R. U.S. experience with laparoscopic cholecystectomy. *Am. J. Surg.* 1993;165(4):450-4.
9. Huang X., Feng Y., Huang Z. Complications of laparoscopic cholecystectomy in China: an analysis of 39,238 cases. *Chin Med. J. (Engl).* 1997;110(9):704-6.
10. Lee V.S., Chari R.S., Cucchiari G., Meyers W.C. Complications of laparoscopic cholecystectomy. *Am. J. Surg.* 1993; 165(4):527-32.
11. MacFadyen B.V. Jr., Vecchio R., Ricardo A.E., Mathis C.R. Bile duct injury after laparoscopic cholecystectomy. The United States experience. *Surg. Endosc.* 1998; 12(4):315-21.
12. Nuzzo G., Giuliani F., Persiani R. The risk of biliary ductal injury during laparoscopic cholecystectomy. *J. Chir. (Paris).* 2004; 141(6):343-53.
13. Parmeggiani D., et al. Biliary tract injuries during laparoscopic cholecystectomy: three case reports and literature review. *G. Chir.* 2010; 31(1-2):16-9.
14. Pulitanò C., Parks R.W., Ireland H., Wigmore S.J., Garden O.J. Impact of concomitant arterial injury on the outcome of laparoscopic bile duct injury. *Am. J. Surg.* 2011; 201(2):238-44.
15. Siegel J.H., Cohen S.A. Endoscopic treatment of laparoscopic bile duct injuries. *Gastroenterologist.* 1994; 2(1):5-13.
16. Wu Y.V., Linehan D.C. Bile duct injuries in the era of laparoscopic cholecystectomies. *Surg. Clin. North Am.* 2010; 90(4):787-802.
17. Zhou L.K., Prason P. Mechanical and preventable factors of bile duct injuries during laparoscopic cholecystectomy. *Hepatogastroenterology.* 2012; 59(113):51-3.