

# COMMON BILE DUCT STRICTURE AFTER LAPAROSCOPIC CHOLECYSTECTOMY: CASE REPORT

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**SUMMARY** – Despite progress in laparoscopic surgery and increasing surgical experience, the incidence of bile duct injury during laparoscopic cholecystectomy fails to fall below 0.3%-0.6% and it is still higher than those recorded in the era of open cholecystectomy. Bile duct injuries belong to the most serious complications of abdominal surgery in general and often end up with liver transplantation as the only hope for cure. We present a case of a 78-year-old jaundiced male patient who sustained common hepatic duct injury during laparoscopic cholecystectomy eight months earlier. Exploratory laparotomy, ERCP and MRCP revealed a metal clip placed just below hepatic duct confluence and causing stricture of bile duct with dilatation of bile ducts proximal to the level of stenosis (Strasberg classification type E3 injury). Repair of the injury was performed by creating termino-lateral hepaticojejunostomy between the right and left hepatic ducts and retrocolic Roux en-Y jejunal limb. By presenting this case, we wish to emphasize the importance of timely conversion and execution of intraoperative cholangiography in all cases when identification of the structures of Calot's triangle is not clear enough. Successful treatment of bile duct injury is only possible with joint approach of radiologist, gastroenterologist and experienced hepatobiliary surgeon.

*Key words: Cholecystectomy, laparoscopic; Bile ducts – injury; Cholangiography; Jaundice; Case reports*

## Introduction

Despite progress in laparoscopic surgery and increasing surgical experience, the incidence of bile duct injury during laparoscopic cholecystectomy fails to fall below 0.3%-0.6%<sup>1-5</sup>, and it is still higher than those recorded in the era of open cholecystectomy<sup>6,7</sup>. After the introduction of laparoscopic cholecystectomy as the gold standard in the treatment of cholelithiasis, the number of elective cholecystectomies has increased, and thus also the number of bile duct injuries. Bile duct injuries belong to the most serious complications of abdominal surgery in general and often end up with

liver transplantation as the only hope for cure. The risk factors that greatly increase the risk of extrahepatic bile duct injury are frequent anatomical variations of extrahepatic bile ducts, anatomical relations in the gallbladder altered by inflammation, bleeding in the operative field, and inexperience of surgeons<sup>8,9</sup>. Unfortunately, most injuries that occur during laparoscopic cholecystectomy are most severe, such as high level injury of the common bile duct or common hepatic duct (Strasberg classification type E)<sup>5</sup>.

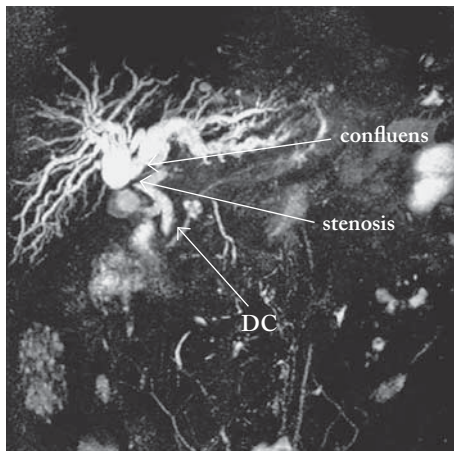
## Case Report

A 78-year-old male patient was transferred from another hospital to our Clinical Department of Internal Medicine presenting with painless obstructive jaundice without signs of cholangitis (laboratory re-

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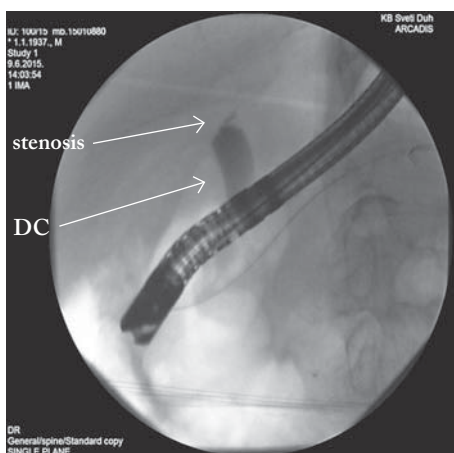
E-mail: [bakulabranko@gmail.com](mailto:bakulabranko@gmail.com)

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DC = ductus choledochus

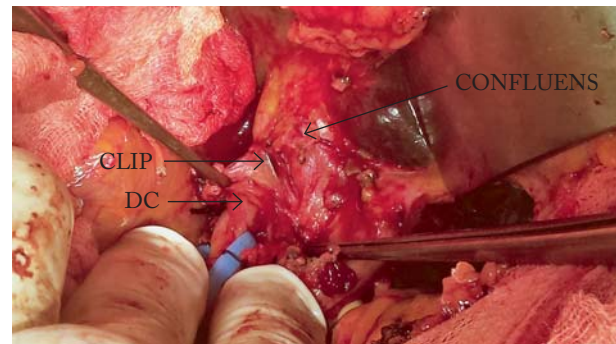
*Fig. 1. Magnetic resonance cholangiopancreatography (MRCP) showing significant dilatation of the intrahepatic and extrahepatic bile ducts to the level of stenosis located below confluence of the common hepatic duct.*



DC = ductus choledochus

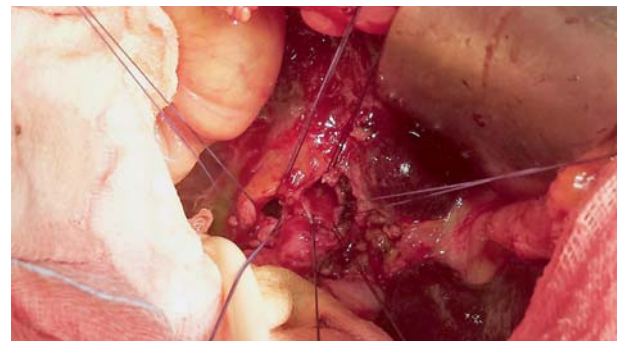
*Fig. 2. Endoscopic retrograde cholangiopancreatography (ERCP) showing stenosis of the common hepatic duct.*

sults on admission: white blood cell count (WBC) 4, C-reactive protein (CRP) 11, total bilirubin 312, direct bilirubin 154, alanine aminotransferase (ALT) 85, aspartate transaminase (AST) 105, gamma-glutamyl transferase (GGT) 316, and alkaline phosphatase (ALP) 813). Eight months before, the patient had undergone cholecystectomy, which started as laparoscopic cholecystectomy, but due to bleeding and unclear anatomical relations was converted to open cholecystectomy. The postoperative course was uneventful and the patient was discharged from the hospital on post-



DC = ductus choledochus

*Fig. 3. Metal clip placed just below dilated hepatic duct confluence that holds about 3/4 width of the common hepatic duct.*



*Fig. 4. View of resected, dilated left and right hepatic duct, prepared for anastomosis.*



*Fig. 5. Completed retrocolic Roux en-Y terminolateral hepaticojejunal anastomosis.*

operative day 8 with normal physical examination of the abdomen. On admission to our hospital, magnetic resonance cholangiopancreatography (MRCP) was performed to show significant dilatation of the intrahepatic and extrahepatic bile ducts to the level of stenosis positioned below the confluence of common he-

patic duct, while bile ducts distal to the stenosis were normal (Fig. 1). Due to suspicion of extraluminal or intraluminal obstruction, endoscopic retrograde cholangiopancreatography (ERCP) was indicated. ERCP first showed normal papilla of Vater, and then also normal common bile duct. Further endoscopic exploration revealed stenosis of common hepatic duct with passage of contrast above the narrowing, but we failed to pass the guide wire or put in the endobiliary stent (Fig. 2). Surgical exploration was indicated. During surgery, the structures of hepatoduodenal ligament and porta hepatis were carefully dissected and a metal clip was found, placed just below hepatic duct confluence that involved about  $\frac{3}{4}$  width of the common hepatic duct (Fig. 3). In addition, duct wall in the area of the confluence was altered by inflammation and fibrosis, which was the cause of obstruction (Strasberg classification type E3 injury). Part of the bile duct (including confluence) altered by fibrosis was resected to the healthy tissue (Fig. 4). Distal part of the bile duct was blindly closed and bile drainage ensured by creating termino-lateral hepaticojejunostomy between the right and left hepatic ducts and retrocolic Roux en-Y jejunal limb. Anastomosis was performed as a single layer using synthetic absorbable interrupted sutures (Vicryl 4-0) (Fig. 5). The operation and postoperative course were uneventful. The patient was discharged from the hospital on postoperative day 13 in good general condition, with normal physical examination of the abdomen and satisfactory laboratory results (laboratory results at discharge: WBC 6, CRP 14, total bilirubin 106, direct bilirubin 42, AST 73, ALT 53, GGT 251, and ALP 465). Further monitoring, clinical presentation, as well as check up laboratory results indicated that biliodigestive anastomosis was unobstructed and recovery of liver function was good.

## Discussion

The ultimate goal of any treatment of bile duct injury is to ensure smooth flow of bile from the liver to the intestine. Nowadays, retrocolic Roux-en-Y T-L hepaticojejunostomy is considered the method of choice. Only rare, smaller lateral injuries of the common bile duct can be attempted to be treated with primary suturing the defect with T tube drainage. Experience has shown that such a treatment is often not

satisfactory because it leads to the development of stenosis at the site of bile duct reconstruction<sup>10</sup>.

Timely commencement of surgery to repair bile duct injury is crucial. Given that the majority of injuries is not noticeable until the postoperative period<sup>5</sup> and development of complications such as cholangitis, peritonitis, biliary fistula, biloma or abscess, the patient should first be stabilized, the aforementioned complications treated (percutaneous hepatic drainage, percutaneous biloma or abscess drainage, antibiotic therapy) and surgery started after alleviating the symptoms of inflammation<sup>10</sup>. In case that the bile duct injury is noticed during cholecystectomy itself, and that experienced hepatobiliary surgeon is available, intraoperative cholangiography should be performed and repair of bile duct injury immediately started. In all other cases, adequate external drainage of bile should be ensured and the patient referred to another facility with experience in hepatobiliary surgery<sup>10-12</sup>.

In our case, the cause of bile duct injury was a metal clip placed during laparoscopic cholecystectomy, probably due to bleeding and misidentifying bile ducts. The metal clip partially occluded lumen of the common hepatic duct just below the confluence, which was the reason why the patient had not developed jaundice immediately. Over time, due to the sensitivity of the duct wall and its tendency to form fibrosis, almost complete obstruction of the bile duct developed. Since our patient was in good general condition and had not developed cholangitis or any other inflammatory complication, there was no need for delay of surgery and reconstruction of the injured bile duct.

## Conclusion

After 13,200 laparoscopic cholecystectomies since 1992 in our hospital (extrahepatic biliary injury, 0.21%), by presenting this case we wish to emphasize the importance of timely conversion and execution of intraoperative cholangiography during cholecystectomy in all cases when identification of the structures of Calot's triangle is not clear enough<sup>12-15</sup>. We also want to emphasize that, in all unclear cases, the decision to convert to open cholecystectomy may spare the patient from life-threatening complications<sup>16,17</sup>. Successful treatment of bile duct injury is only possible with joint approach of radiologist, gastroenterologist and experienced hepatobiliary surgeon<sup>10</sup>.

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## Sažetak

## OZLJEDA GLAVNOG ŽUČNOG VODA NAKON LAPAROSKOPSKE KOLECISTEKTOMIJE: PRIKAZ SLUČAJA

I. Zoričić, I. Soldo, I. Simović, M. Sever, B. Bakula, M. Grbavac, M. Marušić i A. Soldo

Unatoč napretku laparoskopske kirurgije te povećanju kirurškog iskustva incidencija ozljede žučnih vodova tijekom laparoskopske kolecistektomije ne uspijeva se spustiti ispod razine od 0,3%-0,6% pa je i dalje viša od one iz doba klasične kolecistektomije. Ozljede žučnih vodova pripadaju skupini najtežih komplikacija općenito abdominalne kirurgije te nerijetko završavaju transplantacijom jetre kao jedinom nadom za izlječenje. Predstavljamo slučaj 78-godišnjeg ikteričnog bolesnika bez kolangitisa koji je zadobio ozljedu žučnog voda osam mjeseci ranije tijekom laparoskopske kolecistektomije. ERCP-om, MRCP-om te eksplorativnom laparotomijom nađena je metalna klipsa postavljena tik ispod konfluensa duktusa hepaticusa kao uzrok opstrukcije te izrazito dilatirane žučne vodove proksimalno od stenozne (E3 ozljeda po Strasbergovoj klasifikaciji). Drenaža žuči osigurana je kreiranjem retrokolične T-L hepatikojejunalne anastomoze. Prikazom ovoga slučaja želimo naglasiti važnost izvođenja intraoperacijske kolangiografije tijekom kolecistektomije u svim slučajevima kada nije dovoljno jasna identifikacija struktura Calotova trokuta. Uspješno liječenje ozljede žučnog voda može se provesti samo uz zajednički pristup radiologa, gastroenterologa i iskusnog hepatobilijarnog kirurga.

Ključne riječi: *Kolecistektomija, laparoskopska; Žučni vodovi – ozljeda; Kolangiografija; Ikterus; Prikazi slučaja*