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DE MÉXICO

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■ Clinical case

# Endoscopic recanalization following accidental ligation of the common hepatic duct. A new technique

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■ Abstract

Bile duct injury is a known complication of cholecystectomy. While minor injuries can be treated endoscopically, successful endoscopic management of complete ligation of the common hepatic duct (CHD) has not been described. Our aim was to report a novel technique for endoscopic recanalization of accidentally ligated CHD. We demonstrated a 75 year old woman presented with a small bile leak and complete ligation of the CHD after open cholecystectomy subjected to successful biliary endoscopic recanalization. Cholangiogram demonstrated resolution of the bile leak and minimal residual narrowing of the CHD. Endoscopic intervention following biliary needle puncture access may avoid surgery in patients with CHD ligation or complex stenosis.

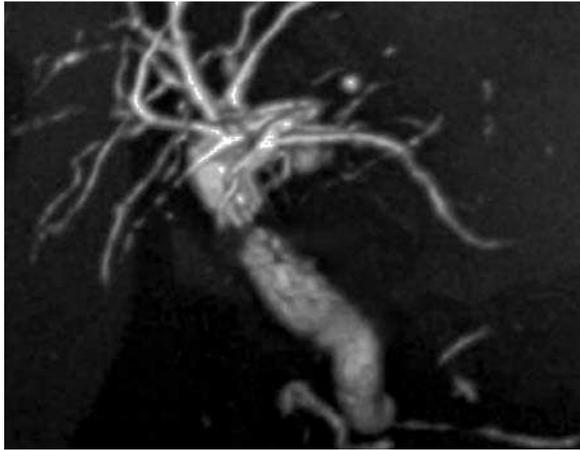
**Key words:**  
common hepatic duct, bile duct injury, cholecystectomy, complication, stenosis, Brazil.

■ Resumen

*Las lesiones de las vías biliares son una complicación reconocida de la colecistectomía. Aunque las lesiones menores pueden ser tratadas mediante endoscopia, aún no se ha descrito un manejo exitoso de la ligadura completa del conducto hepático común (CHC). Nuestro objetivo es informar una técnica novedosa de recanalización endoscópica de un CHC ligado en forma accidental. Presentamos el caso de una mujer de 75 años que presentó una pequeña fuga biliar y ligadura completa del CHC luego de colecistectomía abierta, que se logró recanalizar mediante endoscopia. La colangiografía demostró resolución de la fuga y estrechamiento residual mínimo del CHC. La intervención endoscópica luego de acceder a la vía biliar mediante punción con aguja puede evitar la cirugía en pacientes con ligadura del CHC o estenosis complejas.*

**Palabras clave:**  
conducto hepático común, lesión de vías biliares, colecistectomía, complicación, estenosis, Brasil.

■ **Figure 1.** Magnetic resonance cholangiopancreatography (MRCP) reveals intrahepatic biliary dilation and complete interruption of the common hepatic duct located 2 centimeters distal to the bifurcation (Bismuth I).



## ■ Introduction

Bile duct injury following cholecystectomy can result in morbidity and decreased survival.<sup>1,2</sup> Bile duct strictures following cholecystectomy injury have been successfully treated endoscopically with dilation and stenting. However, treatment of complete bile duct occlusion resulting from ligation has not been previously described. We describe the use of an endoscopic intervention that resulted in successful recanalization of the common hepatic duct (CHD) following accidental ligation during cholecystectomy.

## ■ Case presentation

A 75 year old woman underwent cholecystectomy (laparoscopic converted to open) for symptomatic cholelithiasis. Following discharge, the patient was readmitted 25 days later with abdominal pain and jaundice. Laboratory evaluation revealed direct hyperbilirubinemia of 17 mg/dL (normal 0 - 0.2 mg/dL) and alkaline phosphatase elevation of 977 IU/L (normal 90 - 234 IU/L). Magnetic resonance cholangiopancreatography (MRCP) showed intrahepatic biliary dilation and complete stenosis of the CHD, 2 cm distal to the confluence (Bismuth I lesion), **Figure 1**.

■ **Figure 2a.** The Artifon needle catheter is designed for puncture access to the biliary system. It has a double lumen - one for insertion of a 0.025" or 0.035" guidewire and one for contrast injection. **2b.** The catheter displays a retractable needle and a flexible metallic sheath at its distal end.

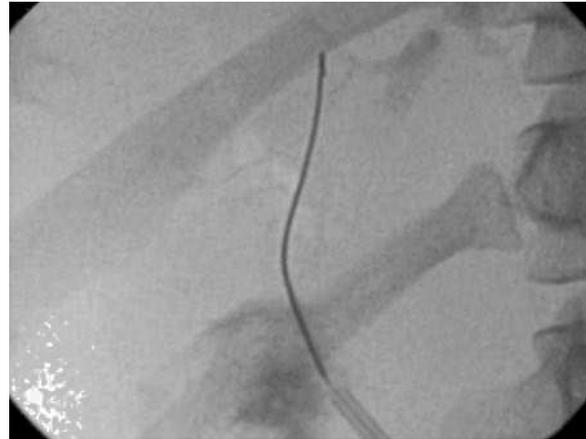


## ■ Technique

**Device:** The Artifon Catheter (Scitech, Sao Paulo, Brazil), boasts a retractable 18-gauge needle and a flexible metallic sheath at the distal end (**Figure 2a, 2b**). It was designed for biliary cannulation by puncturing the bile duct transduodenally and passing a 0.025" or 0.035" guidewire using the Seldinger technique.<sup>3</sup> A second lumen allows for simultaneous injection of contrast.

**Procedure:** The patient underwent ERCP using moderate sedation. The common hepatic duct (CHD) was cannulated using an Autotome RX 44 sphincterotome and 0.035" guidewire (Boston Scientific, Natick, MA). Cholangiography confirmed interruption of the CHD. In addition, contrast extravasation consistent with a bile leak was seen

■ **Figure 3a.** Schematic illustration of needle puncture through the center of ligated stump, with insertion of a guide wire into the proximal CHD. **3b.** Fluoroscopic image demonstrating guidewire passage into the proximal CHD after puncture access with the needle catheter.



distal to the ligated segment. The sphincterotome was exchanged for an Artifon catheter. Under fluoroscopy, the 18-gauge needle was advanced from the sheath and into the proximal CHD as it punctured through the center of the ligated stump. The guidewire was then advanced into the proximal CHD (**Figure 3a, 3b**). An 8.5Fr x 10 cm plastic stent was placed. Thirty days later, the stent was removed and the stricture was dilated with an 8 mm balloon. Three plastic 10Fr, 10 cm long stents were positioned across the tract (**Figure 4**). Six months later repeat cholangiography demonstrated resolution of the bile leak and mild residual narrowing of the CHD (**Figure 5**). Stents were not reinserted. The patient remains well 18 months later with normal labs.

## ■ Discussion

The optimal treatment of post-cholecystectomy bile duct injury is dependent on early recognition, taking into consideration the anatomic location and severity of the lesion. In minor cystic or bile duct leaks (Amsterdam type A and B), biliary sphincterotomy or stenting is effective. Strictures without bile leakage (Amsterdam type C lesions) can often be managed non-operatively with dilatation and stenting. Although successful endoscopic treatment of a completely transected bile duct (Amsterdam type D) has been reported early after

■ **Figure 4.** Fluoroscopic image demonstrating three plastic stents bridging the CHD tract.



cholecystectomy,<sup>4</sup> the presence of clips at the distal stump and the lack of continuity between biliary segments usually mandate operative repair.<sup>2</sup>

Surgical repair of post-operative biliary injuries is technically challenging and carries a high

■ **Figure 5.** Follow-up cholangiogram shows complete resolution of the bile leak and minimal residual narrowing of the CHD tract.



risk of early and late complications.<sup>5,6</sup> Combined endoscopic and percutaneous approaches have been attempted to treat severe strictures in selected cases.<sup>7,8</sup> In the present case a specialized needle catheter afforded access to the proximal biliary tree across the ligated segment. This allowed for

successful non-surgical management. As long as the lesion is short enough and can be adequately traversed by the needle puncture, this endoscopic technique allows successful creation of a permanent internal fistula. This method is comparable to what has been described using percutaneous interventional techniques and avoids the need for external puncture and catheters.<sup>7,8</sup> We believe this approach is a promising non-surgical alternative in patients with short length transections of the bile duct.

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