

## Case Report

# Laparoscopic choledochoduodenal anastomosis after bile duct injury in a patient with previous laparoscopic gastric bypass

Adolfo Cuendis-Velázquez, Francisco Pérez-López,  
Erika Barlandas-Quintana\*, Orlando Bada-Yllán, Braulio Ríos-Muñoz

Department of General and Endoscopic Surgery, General Hospital Dr. Manuel Gea González, Tlalpan, Mexico City, Mexico

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**\*Correspondence:**

Dr. Erika Barlandas-Quintana,  
E-mail: [barlandas@gmail.com](mailto:barlandas@gmail.com)

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### ABSTRACT

Bile duct injuries after laparoscopic cholecystectomy remain a major problem in gastrointestinal surgery. Twenty five to thirty percent of bariatric patients could develop gallstone disease. However, laparoscopic cholecystectomy in this group may result challenging due to the presence of a previous Roux-en-Y reconstruction. We documented the successful case of 66 year old female with story of non-supplemented laparoscopic gastric bypass, with subsequent injury of bile duct during laparoscopic cholecystectomy treated with a laparoscopic choledochoduodenal anastomosis. This technique offers an excellent alternative to solve highly complex cases in a single surgical time, allowing the patient to restore his original functionality prior to the biliary duct lesion.

**Keywords:** Bile duct injury, Choledochoduodenal anastomosis, Gastric bypass, Cholecystectomy, Bile duct repair

### INTRODUCTION

Obesity and overweight affect more than one third of the adult population worldwide and is considered as one of the most important health issues in our country.<sup>1</sup> Laparoscopic gastric bypass with Roux-en-Y reconstruction is considered the gold standard in bariatric surgery. Nowadays the number of patients with Roux-en-Y reconstruction has increased, meaning that surgeons will be exposed to this type of anatomical alterations more frequently.<sup>2</sup>

On the other hand, bile duct injuries after laparoscopic cholecystectomy remain a major problem in gastrointestinal surgery with a direct impact on the patient's quality of life.<sup>3</sup> This pathology ranges from 0.2% to 0.7% of incidence after an elective procedure.<sup>4</sup>

In the bariatric surgery about twenty five to thirty percent of patients could develop gallstone disease. However,

laparoscopic cholecystectomy in this group of patients may result challenging due to the modified anatomy, postoperative adhesions and, frequently, the presence of a previous Roux-en-Y reconstruction.<sup>5</sup>

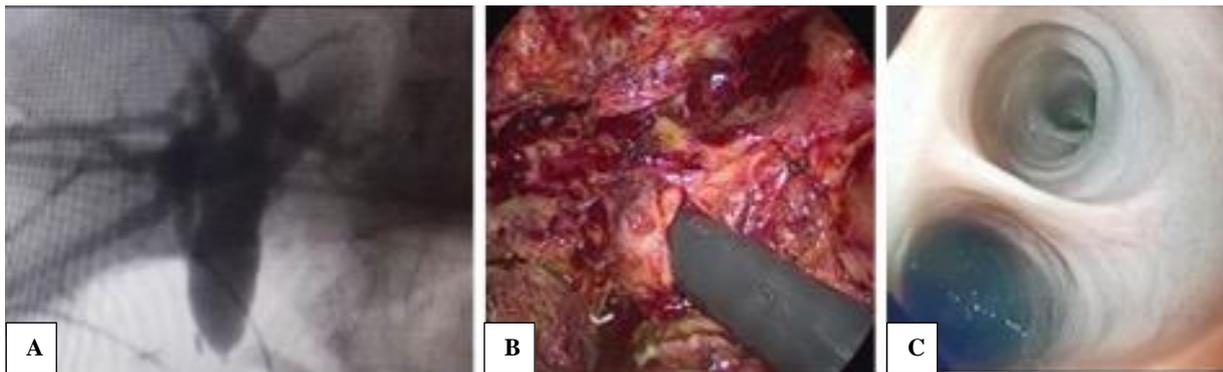
We documented the successful case of a patient with story of non-supplemented laparoscopic gastric bypass, with subsequent injury of bile duct during a cholecystectomy and its repair. All these interventions were performed by minimally invasive surgery and a laparoscopic choledochoduodenal anastomosis was practiced.

### CASE REPORT

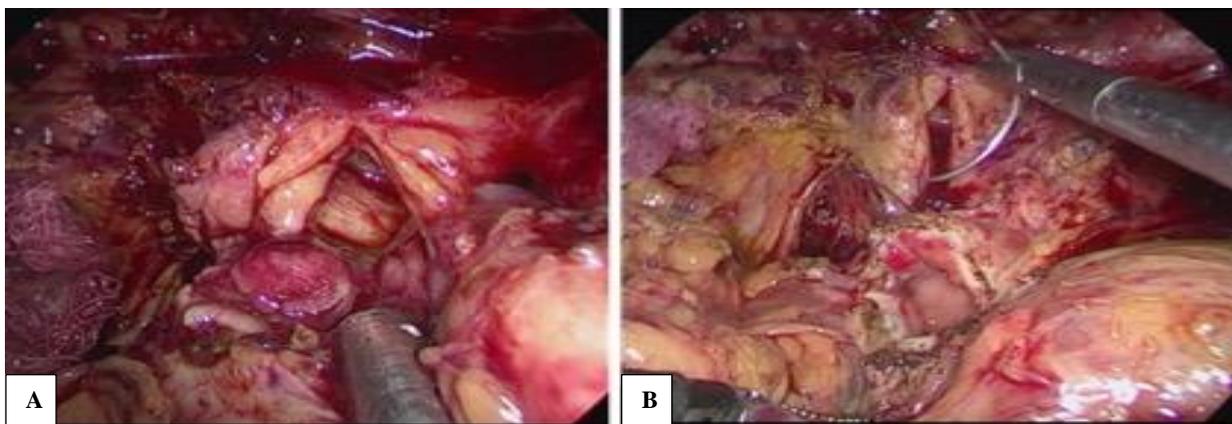
66 year old woman with a history of type 2 diabetes and systemic arterial hypertension, abdominal (open) hysterectomy and right quadrantectomy for breast cancer in 2003. Laparoscopic gastric bypass was performed in 2008, without complications, not supplemented and

without follow up. In November 2018 she underwent laparoscopic cholecystectomy in a private hospital. On the first postoperative day she started with biliary output by Penrose drain, abdominal pain and fever were added. Three weeks after surgery, she remained with spontaneous biliary output of biliohepatic fluid through the subxiphoid wound, therefore, she was sent to our institution. Systemic inflammatory response, biliary output through the surgical wound, acute abdomen and chronic malnutrition were detected. She underwent diagnostic laparoscopy where 4500 cc of bilioperitoneum was drained, direct puncture intraoperative cholangiography was performed revealing a type Strasberg E2 biliary duct lesion (Figure 1A). The procedure was concluded with the placement of closed drains. She was discharged without complications and referred to multidisciplinary management by the nutrition department for proper supplementation prior to definitive surgery. She was scheduled for bilio-digestive anastomosis three months after the previous procedure. Diagnostic laparoscopy and adhesiolysis with harmonic scalpel were performed. First and second duodenal

portions were identified along with the hepatoduodenal ligament, which was dissected allowing the location of the main biliary duct. Then, cholangiography by catheter followed, showing excluded segmental bile duct over 2 centimeters from the biliary junction, with 12 mm dilatation, without filling defects or proximal leakage. A choledochotomy was performed with cold knife excision in longitudinal direction with bile outflow without purulent drainage. Later, choledochoscopy was performed with a 9.8 mm gastroscope without evidence of lithiasis showing adequate permeability of both bile ducts (Figure 1 B and C). Longitudinal duodenotomy was realized and a diamond-shaped anastomosis was performed, with two polydioxanone 3.0 barbed sutures. (Figure 2 A and B). This resulted in a manual one-plane side-to-side choledochoduodenal anastomosis. A closed drain was placed towards the hepatorenal recess. Operative time was 130 minutes, with 50 ml of bleeding, without transfusion requirements. The patient evolved properly, starting enteral diet at 24 hours and discharged 72 hours after surgery. Postoperative follow-up was performed seven days after discharge with removal of sutures and drainage.



**Figure 1: (A) Cholangiography by catheter; showing excluded segmental bile duct over two centimeters from the biliary junction, with 12 mm dilatation, no filling defects or proximal leakage were documented; (B and C) choledochoscopy without evidence of lithiasis showing adequate permeability of both bile ducts.**



**Figure 2: (A) Choledochotomy was performed in longitudinal direction with bile outflow, no purulent drainage was observed; (B) longitudinal duodenotomy and a diamond-shaped anastomosis was performed, with two polydioxanone 3.0 barbed sutures.**

## DISCUSSION

There were different surgical procedures for biliary reconstruction in patients with prior laparoscopic gastric bypass with Roux-en-Y reconstruction including choledochoduodenal anastomosis and choledochojejunal anastomosis. In this case, a choledochoduodenal anastomosis was chosen. Proper mobilization of the duodenum must be achieved with this approach to ensure a tension-free anastomosis. The main benefits of this technique involved earlier enteral intake (since the alimentary tract was never interrupted) and facility of access to the choledochoduodenal anastomosis by percutaneous techniques through the gastric remnant.<sup>2</sup>

Successful results had been documented with choledochoduodenal anastomosis (6,7) that were similar to choledochojejunal anastomosis in several diseases such as benign bile duct strictures, choledochal cysts, hepatopancreato-biliary cancer and biliary duct injuries.<sup>8</sup> In Mexico, successful results have been successfully reported for this type of surgical approach in patients with multiple comorbidities and elderly patients.<sup>9</sup>

The choledochoduodenal anastomosis fulfilled the fundamental requirements for a successful long-term bilio-digestive bypass which included tension-free, mucosal-mucosal junction, maximum accuracy, properly vascularized ducts and adequate drainage of all the liver segments.<sup>10</sup> We did not identify any reports in our review in which the bariatric procedure, disruption and bilio-digestive repair were entirely performed by a minimally invasive approach. There was a case report in a patient with similar features whose bypass was performed by open approach.<sup>5</sup>

## CONCLUSION

In conclusion, laparoscopic bilio-digestive anastomosis is a safe procedure and provides the functional benefits and advantages of minimally invasive surgery, allowing the choledochoduodenal anastomosis to be a highly effective procedure for permanent outcome. In a patient with altered anatomy, such as gastric bypass with Roux-en-Y reconstruction, like the patient reported in this case, this technique offers an excellent alternative to solve highly complex cases in a single surgical time, allowing the patient to restore his original functionality prior to the biliary duct lesion, which is the main goal in this particular type of circumstances.

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