

# Intraoperatively malpositioned stent as a complication of common bile duct injury during laparoscopic cholecystectomy

Timur Özdemir<sup>1</sup>, Anne Schmitt<sup>2</sup>, Manuela Cesaretti<sup>1,3</sup>, Alban Zarzavadjian Le Bian<sup>1,4</sup>, and Long R Jiao<sup>2</sup>

<sup>1</sup>Digestive Surgery Unit, Simone Veil General Hospital, Eaubonne, France, <sup>2</sup>HPB Surgery Unit, Hammersmith Hospital, NHS/Imperial College, London, UK, <sup>3</sup>HPB Surgery and Liver Transplantation Department, Beaujon Hospital, Clichy, <sup>4</sup>Digestive Surgery and Surgical Oncology, Hôpital Avicenne, Assistance Publique - Hôpitaux de Paris, Paris, France

Injuries occurring during laparoscopic bile duct exploration in the course of laparoscopic cholecystectomy may represent threatening complications and lead to inappropriate management. We present a case of patient with biliary colic who underwent laparoscopic cholecystectomy. During the procedure, a common bile duct injury occurred, compelling conversion to open approach, and the patient was treated using a manually inserted biliary stent. She was referred with severe right upper quadrant pain six weeks after the surgery. Investigation with endoscopic retrograde cholangiopancreatography showed a malpositioned biliary stent with completely extra-biliary trajectory. This is thought to be the first description of a malpositioned common bile duct stent through the common biliary duct as a complication of the commonly performed surgical procedure of bile duct exploration. ([Ann Hepatobiliary Pancreat Surg 2019;23:84-86](#))

**Key Words:** Cholecystectomy; Laparoscopic cholecystectomy; Bile duct injury; Malpositioned biliary stent; Laparoscopy

## INTRODUCTION

The role of intraoperative common bile duct exploration during laparoscopic cholecystectomy (LC), has been the subject of debate. For patients with symptomatic gallstones and concomitant choledocholithiasis, a single-stage surgical procedure is equivalent to two-stage “LC then endoscopic retrograde cholangiopancreatography (ERCP)” in terms of clinical outcomes. Also, a routine intraoperative cholangiography does not seem to reduce the number of bile duct injuries or other missed injuries during surgery.<sup>1</sup> Yet, the matter of LC versus open cholecystectomy with respect to iatrogenic bile duct injuries has seen as a paradigm shift over the years; more recent reports show that the rates of bile duct injuries have now decreased to 0.08% and mirrors the historical figures quoted for open cholecystectomies.<sup>2</sup> Furthermore, a study of the human performance concepts related to bile duct injury showed that misperception was a significant factor leading to er-

rors, more so than knowledge, skill, or judgment.<sup>3</sup> This case represents the first report of an extra-anatomical biliary stent that was intraoperatively inserted for bile duct injury, highlighting once more the potential risks nowadays for the most frequently performed LC, the management of its complications and a unique example of a malpositioned biliary stent with a completely extra-biliary trajectory.

## CASE

A 42-year-old woman with biliary colic was assessed for an elective LC. Medical history was positive for factor V Leiden coagulopathy, recurrent deep vein thromboses and pulmonary embolisms (treated with lifelong anticoagulation).

Intraoperatively, severe inflammation of the gallbladder required conversion to an open cholecystectomy. Due to the occurrence of an intraoperative common bile duct in-

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**Corresponding author:** Alban Zarzavadjian Le Bian

Digestive Surgery and Surgical Oncology, Hôpital Avicenne, Assistance Publique - Hôpitaux de Paris, 125, rue Stalingrad, 93000 Bobigny, Paris, France

Tel: +33-6-8510-9112, E-mail: spleen2008@live.fr

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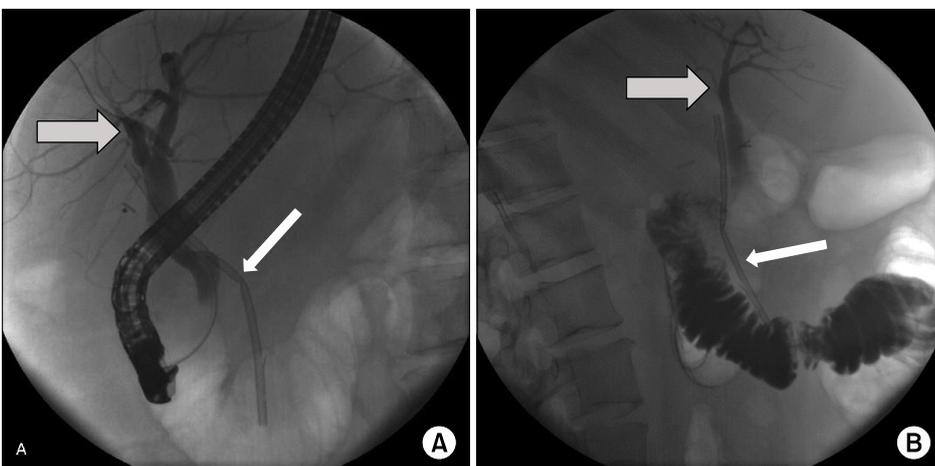
jury, a stent was inserted manually under visual control via the cystic duct in an anterograde direction. The injury was located at the insertion of the cystic duct into the common bile duct, was an anterior, partial transection with loss of substance of 7-10 mm, resulting in a Type D or E<sub>1</sub> iatrogenic bile duct injury in Strasberg classification.<sup>4</sup> Because of the loss of substance, the surgeon preferred to place a stent rather than a T-tube. There was no arterial injury. A drain was left in place in contact with the cystic stump. On postoperative day 8, a bile leak occurred and was treated by laparoscopic washout. The patient was subsequently discharged.

Six weeks later, she was referred to a tertiary academic centre with severe right upper quadrant pain. On examination, she was found to be afebrile and normotensive, with a distended abdomen and right upper quadrant tenderness. On admission, blood tests showed: white blood cell count,

14.4 g/L, normal serum amylase, aspartate transaminase 26 IU/L, alanine transaminase 179 IU/L, bilirubin 4 µmol/L, albumin 24 IU/L, globulin 42 g/L. An abdominal computed tomography (CT) scan revealed no significant intra-abdominal collection, but the common bile duct stent was shown to be malpositioned, perforating the duodenum and lying in the retroperitoneal cavity (Fig. 1). ERCP confirmed a malpositioned biliary stent, running parallel but extra-anatomically to the common bile duct, which was dilated to 3 cm. The stent could not be accessed and removed by endoscopic means (Fig. 2). It was surgically removed using an open approach and T-tube enabled biliary drainage. Postoperatively, a resurgent leak of the cystic duct was successfully managed with endoscopic insertion of a biliary stent. The patient recovered completely following the procedure.



**Fig. 1.** X-ray and CT-scan. Imaging showing no abnormality regarding the abdominal X-ray (A) but a malpositioned biliary stent at abdominal CT-scan (B). The white arrow shows the biliary stent.



**Fig. 2.** Endoscopic Retrograde CholangioPancreatography. Endoscopic Retrograde cholangio-pancreatography (A: front side; B: from the side) showing the biliary stent (white arrow) outside the dilated common bile duct (grey arrow).

## DISCUSSION

Reports on complications related to misplaced endoscopic stents are rare,<sup>5</sup> whereas 1-20% of stents (depending on the type) migrate in patients treated for benign and malignant biliary strictures.<sup>6</sup> As demonstrated for bile duct injuries during LC,<sup>3</sup> the intraoperative mispositioning of a biliary stent correlates to a surgeon's misperception of the anatomy of the extra-hepatic bile duct system.<sup>7</sup>

Yet, when the incidence of bile duct injuries in laparoscopy has approximated that of the open procedure,<sup>3</sup> a low threshold for conversion to open cholecystectomy should be maintained for the benefit of the patient, especially in situations of unclear anatomy.

Regarding repair of the bile duct injury, it should be undertaken, either in the immediate (0-72 hours) or delayed (>6 weeks) periods after LC. Surgical options include choledochojejunostomies, hepaticojejunostomies, right hepatectomies with biliary reconstruction and common bile duct repair, depending on their Grade (Strasberg Classification A-E) status.<sup>4</sup> Yet, performing a complex repair during the LC and inducing a bile duct injury are not deemed to be very sensible approaches. Current standards of care for patients with bile duct injuries involve multimodality treatment plans, e.g., surgical, radiologic, and endoscopic collaborations.<sup>8</sup>

In conclusion, a malpositioned common bile duct stent through the common biliary duct is seen as a complication of repair of common bile duct injury and has never been described. The same factors that contribute to inadvertent bile duct injury (visual perceptual illusion, faults in tech-

nical skill, knowledge and judgment errors) played a role in this case. When performing common bile duct exploration and facing technical difficulties or not recognizing the anatomy, the surgeon should not hesitate to perform cholangiography and, if still unclear, should stop the procedure and perform an endoscopic common bile duct exploration, and perform conversion to an open approach.

## REFERENCES

1. Giger U, Ouaisi M, Schmitz SF, Krähenbühl S, Krähenbühl L. Bile duct injury and use of cholangiography during laparoscopic cholecystectomy. *Br J Surg* 2011;98:391-396.
2. Halbert C, Pagkratis S, Yang J, Meng Z, Altieri MS, Parikh P, et al. Beyond the learning curve: incidence of bile duct injuries following laparoscopic cholecystectomy normalize to open in the modern era. *Surg Endosc* 2016;30:2239-2243.
3. Way LW, Stewart L, Gantert W, Liu K, Lee CM, Whang K, et al. Causes and prevention of laparoscopic bile duct injuries: analysis of 252 cases from a human factors and cognitive psychology perspective. *Ann Surg* 2003;237:460-469.
4. Sahajpal AK, Chow SC, Dixon E, Greig PD, Gallinger S, Wei AC. Bile duct injuries associated with laparoscopic cholecystectomy: timing of repair and long-term outcomes. *Arch Surg* 2010;145:757-763.
5. Nicholson AA, Martin DF. Misplacement of endoscopic biliary endoprotheses. *Endoscopy* 1997;29:125-127.
6. Dumonceau JM, Tringali A, Blero D, Devière J, Laugier R, Heresbach D, et al. Biliary stenting: indications, choice of stents and results: European Society of Gastrointestinal Endoscopy (ESGE) clinical guideline. *Endoscopy* 2012;44:277-298.
7. Strasberg SM. Error traps and vasculo-biliary injury in laparoscopic and open cholecystectomy. *J Hepatobiliary Pancreat Surg* 2008;15:284-292.
8. de Reuver PR, Grossmann I, Busch OR, Obertop H, van Gulik TM, Gouma DJ. Referral pattern and timing of repair are risk factors for complications after reconstructive surgery for bile duct injury. *Ann Surg* 2007;245:763-770.