

Portobiliary fistula following laparoscopic cholecystectomy

B Merrick, D Yue, MH Sodergren, LR Jiao

Hammersmith Hospital, Imperial College London, London, UK

ABSTRACT

The laparoscopic approach has replaced open surgery as the gold standard for cholecystectomy. This technique is, however, associated with a greater incidence of bile duct injuries (BDIs). We report a case of portobiliary fistula (PBF), a rare complication of BDI, occurring post laparoscopic cholecystectomy (LC). PBF has been reported after procedures such as endoscopic retrograde cholangiopancreatography and pathologies such as liver abscesses, but only once previously in the setting of LC. We discuss the management of this patient with apparent dual pathology, and summarise other aetiologies that may give rise to this condition.

KEYWORDS

Laparoscopic cholecystectomy – Bile ducts – Fistula

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CORRESPONDENCE TO

Long R Jiao, E: l.jiao@imperial.ac.uk

Laparoscopic cholecystectomy (LC) has replaced open surgery as the gold standard for cholecystectomy due to reduced postoperative pain and length of hospital stay, and a faster return to activities of daily living. Despite a reduction in both surgical and systemic-related complications, there remains a significant risk of bile duct injuries (BDIs) with the laparoscopic technique. Although this was initially attributed to a ‘learning curve’ effect, it has persisted for two decades.¹ We report on a rare complication of BDI following LC.

Case Report

A 48-year-old female of Chinese origin presented 3 days after an initially uncomplicated laparoscopic cholecystectomy with abdominal pain radiating to her shoulder tip. Blood tests on admission showed raised inflammatory markers (white cell count $14.8 \times 10^9/L$, C-reactive protein 183 mg/L) and deranged liver function tests (alanine transaminase 132 IU/L, alkaline phosphatase 148 IU/L). A suspected bile leak was investigated with a computed tomography (CT) scan. This revealed subphrenic free fluid with air locules, free intraperitoneal air and focal intrahepatic biliary dilatation in the left lobe of liver.

Endoscopic retrograde cholangiopancreatography (ERCP) was attempted, but the patient did not tolerate the procedure. An emergency exploratory laparotomy was undertaken, which revealed a Bismuth Grade IV injury to the distal right hepatic duct. After thorough peritoneal lavage, a T-tube was inserted across the identified site of injury, with placement of a 20 FG Robinson’s drain behind the portal triad. Following

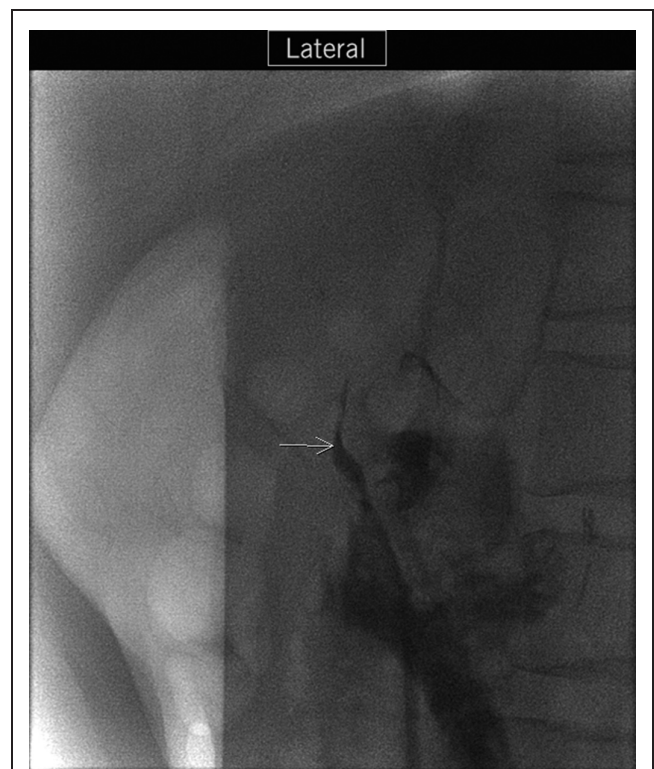


Figure 1 Tubogram. Lateral view, demonstrating fistula between the portal vein and biliary system.

laparotomy, she was transferred to us for further management of this complex biliary injury.

Postoperatively, the patient remained well, despite large volumes of bile draining (>500 ml/24 hours). Repeat CT a few days later revealed a 30 mm lesion behind the left portal vein in liver segment III, suggesting the presence of a haematoma. This raised concerns that, in addition to the right-sided ductal injury identified intraoperatively, the left hepatic duct had been clipped (causing left-sided intrahepatic ductal dilatation), with concurrent left-sided vascular injury resulting in a haematoma. A tubogram successfully visualised both the right and left-sided ductal systems and the theory that the left side had been clipped was discounted. However, it did demonstrate, which was confirmed on portal venography, that there was a fistula between the portal vein and biliary system, known as a porto-biliary fistula (PBF) (Figure 1). As the patient continued to improve clinically with conservative management, she was discharged with a T-tube in situ prior to definitive treatment.

On elective re-admission 4 months later, blood tests revealed a microcytic anaemia in keeping with iron deficiency secondary to chronic blood loss. A tubogram could not be performed as the T-tube was blocked, and a repeat ERCP was therefore attempted under general anaesthetic. This showed a persistently dilated left ductal system with intrahepatic ductal stones and distal CBD stones. Sphincterotomy was performed with stent insertion during the procedure. After stent placement, blood was noted to be trickling through it, suggesting an ongoing fistulous communication between the biliary tree and portal vein. In view of the failure of the portobiliary fistula to settle with conservative management, and the presence of an abnormal left ductal system, the decision was to proceed to left hepatectomy over treatments such as coil embolisation.

At operation, a grossly abnormal left liver lobe with common bile duct dilatation was identified. Histological analysis revealed multiple intrahepatic gallstones, with chronic inflammation. These findings suggested a more protracted

Table 1 Reported cases of portobiliary fistulae

Reference	N	Aetiology	Management
Chanyaputhipong, 2014 ⁶	1	iatrogenic	Balloon tamponade ± coil embolisation
Karabulut, 2014 ⁷	1		Stent placement
Okhotnikov, 2014 ⁸	1		Medical management
Peynircioglu, 2006 ⁹	1		
Rankin, 1991 ¹⁰	4		
Koch, 1969 ¹¹	1		
Mizandari, 2014 ¹²	1	Portal vein radiofrequency ablation	Stent placement
Spahr, 1996 ¹³	1	TIPS	Covered stent placement
Kawaguchi, 2014 ¹⁴	1/6-8,000	ERCP	Conservative management, simple or balloon tamponade, stenting, thrombin injection, surgical repair
Dawwas, 2013 ¹⁵			
Kawakami, 2011 ¹⁶			
Romberg, 2009 ¹⁷			
Quinn, 2007 ¹⁸			
Stableforth, 2011 ¹⁹	1	Stent placement	Pigtail drain
Chaitowitz, 2007 ²⁰	1		'stent-within-stent'
Lugagne, 1988 ²¹	1	Choledochoduodenostomy	Separate drainage of biliary and portal tracts
Merrick, 2015*	1	Laparoscopic	Hemi-hepatectomy
Coppola, 2011 ⁵	1	Cholecystectomy	Conservative management
Hurtarte-Sandoval, 2013 ⁴	1	Open Cholecystectomy	Angiography and selective embolisation
Lorenz, 2010 ²²	1	Liver transplantation	Stent placement
Kasahara, 2010 ²³	1		Surgical reconstruction
De Santis, 1996 ²⁴	1	Liver biopsy	†
Ishikawa, 1982 ²⁵	1	Hepatobiliary pathology	†
Osborne, 1980 ²⁶	1		†
Rasmussen, 2006 ²⁷	1	Pancreatitis	Medical management
Skelly, 1999 ²⁸	1	Liver abscesses	†

* Current report
† Information on management unavailable
ERCP = endoscopic retrograde cholangiopancreatogram; TIPS = transjugular intrahepatic portosystemic shunting

disease, such as tropical cholangitis, as cause of the ductal dilatation, rather than it being secondary to iatrogenic insult at original surgery. However, the portobiliary fistula was most likely a complication of the initial procedure (in addition to the right-sided bile leak), with the existing anomalous left ductal system a potentially predisposing factor. On review 6 weeks after leaving hospital, the patient remained well and was discharged from further follow-up.

Discussion

The complication rate following laparoscopic cholecystectomy is around 7%. Some of the most serious complications include bile duct and/or visceral injury, which are seen in 0.2%–0.6% procedures.² Vasculobiliary injury (VBI) is a distinct subset of bile duct injury, defined by Strasberg *et al* as an injury to a bile duct and a hepatic artery and/or portal vein.⁵ In most cases (92%), this is due to an injury to the right hepatic artery. While 15 reports of VBI's involving the portal vein were identified in their paper, there was no mention of fistula formation between the biliary tree and the hepatic artery, vein or portal system.⁵

The are numerous aetiologies for PBF, including being secondary to hepatobiliary pathology and iatrogenic insult (Table 1). PBF following cholecystectomy is, however, extremely rare, with this being the third reported case. Of the first two, one occurred after open cholecystectomy; it was discovered postoperatively by angiography and managed successfully with selective embolisation.⁴ The other case was only discovered after the patient subsequently underwent an ERCP. It was managed conservatively with resolution noted on repeat imaging.⁵

Although rare, PBF should be considered in patients presenting with complications after (laparoscopic) cholecystectomy, as the potential for morbidity, as well as the need for further intervention, is significant.

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