

Primary Bile Duct Perforation Associated with Pancreatitis

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ABSTRACT

Primary bile duct perforation is rare in adults. It commonly results in biliary peritonitis and high morbidity and mortality. We present a 72-year-old man who was initially admitted with biochemically diagnosed pancreatitis who was found to have a bile duct perforation and bile collection limited to the lesser sac. This presented a diagnostic challenge and, due to its containment, did not result in generalized biliary peritonitis, which is usually associated with this condition. His condition was managed with stenting with endoscopic retrograde cholangiopancreatography.

INTRODUCTION

Perforation of bile ducts has been reported in the pediatric population, but it is a rare finding in adults.¹ Clinical presentation is variable, but many patients exhibit signs of an acute abdomen secondary to biliary peritonitis. Differentiating the diagnosis of bile duct perforation from other etiologies of an acute abdomen is difficult but may be aided by computed tomography (CT), magnetic resonance imaging (MRI), endoscopic retrograde cholangiopancreatography (ERCP), and percutaneous transhepatic cholangiography (PTC). The cause for perforation is often ambiguous, but bile duct stones, infection, tumors, and ischemia are proposed mechanisms.²

CASE REPORT

A previously fit and healthy 72-year-old man presented to the emergency department with sudden-onset epigastric pain, anorexia, and vomiting. He was afebrile, hypotensive with blood pressure 84/59 mm Hg, heart rate 70 beats/min, and tachypneic with a respiratory rate 25 breaths/min. On examination, his abdomen was soft but tender in the right upper quadrant and epigastric region, with no signs of peritonitis. Blood tests showed leukocytosis $27.15 \times 10^9/L$, C-reactive protein 400 mg/L, and amylase 1,014 U/L, with normal liver and renal function. A diagnosis of acute pancreatitis was made, and the patient was treated with supportive management with intravenous fluids and analgesia. The pain improved, his tachycardia subsided, and his blood pressure improved to 130 systolic.

Over the next 4 days, while hemodynamically stable, the upper abdominal pain did not fully resolve and there were episodes of mild fever. His blood tests showed that the leukocytosis was improving, but at $15.2 \times 10^9/L$ it was not yet normalized. A CT scan revealed an abscess containing fluid and gas, measuring 18×8 cm within the lesser sac (Figure 1). At this point, the working diagnosis was an infected pancreatic pseudocyst, although other causes of intra-abdominal abscess needed to be considered, such as duodenal, diverticular, or gallbladder perforation. The patient was subsequently started on intravenous antibiotics, and the radiology department performed CT-guided drainage of the abscess. The fluid from the drain was positive for *Escherichia coli* sensitive to amoxicillin and gentamicin. The following day the drain output was ~500 mL and resembled bile.

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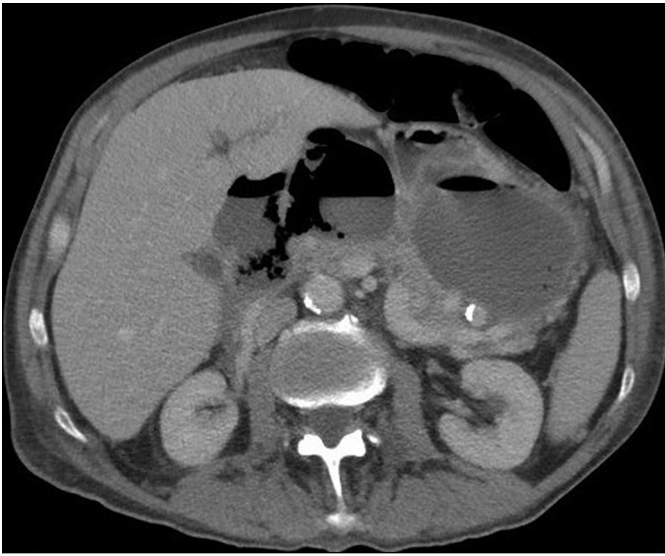


Figure 1. Computed tomography showing a gas-containing collection within the lesser sac.

The patient himself remained well with stable observations and blood tests. Following discussion with the radiology department, MRI of the liver identified a bile leak in the anterior wall of the common hepatic duct (Figure 2). The common bile duct was cannulated using ERCP, and a 12-cm 7-French pigtail drain was placed over the area of the leak (Figure 3). The drain output gradually decreased and became dislodged. The patient improved clinically and was discharged after a 3-week stay.

The patient was seen in the outpatient clinic 6 weeks after discharge. Repeat MRI showed the development of a stricture developing within the bile duct, and the previous collection within the lesser sac had almost fully resolved. He was asymptomatic and was referred to a hepatopancreaticobiliary center, where he underwent repeated ERCP that did not find

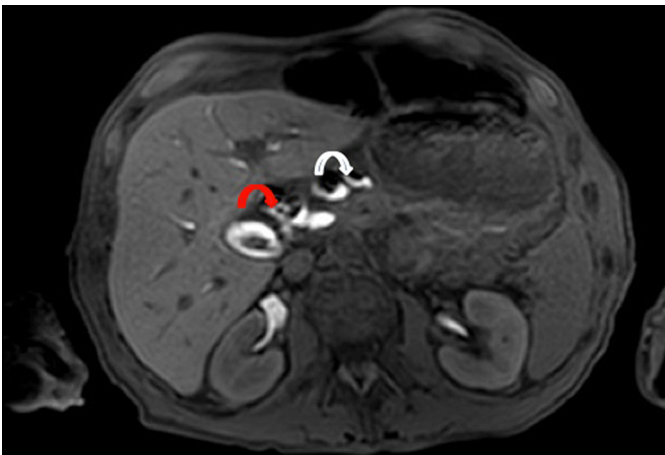


Figure 2. Magnetic resonance imaging showing bile duct perforation (red arrow) and bile collecting in the lesser sac (white arrow).

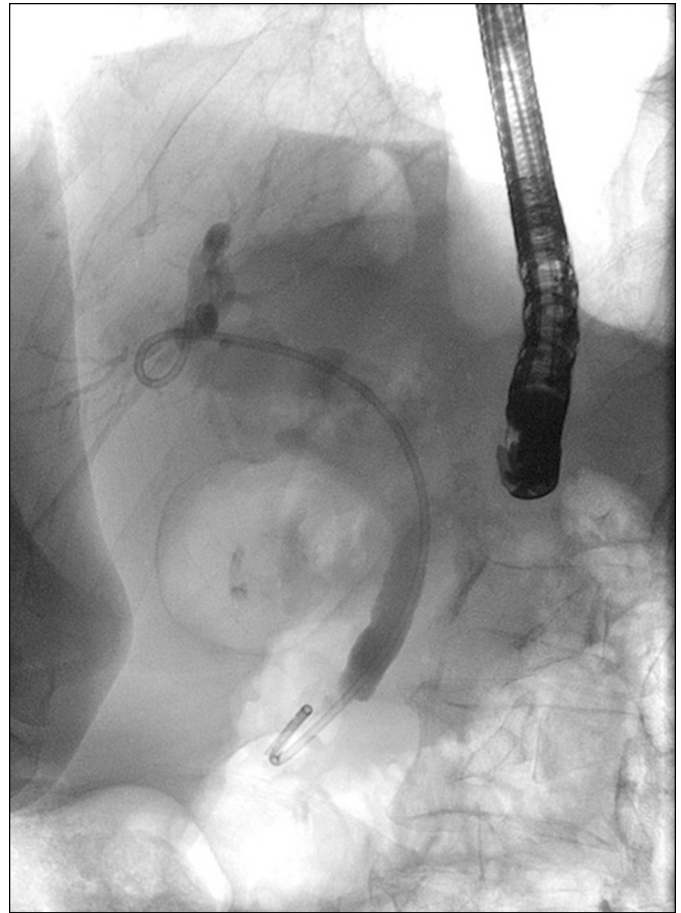


Figure 3. Endoscopic retrograde cholangiopancreatography with the pigtailed stent across the area of the leak.

any further leak and confirmed the presence of a stricture. He is due to have a follow-up ERCP in the coming months to remove the stent and consider cholecystectomy.

DISCUSSION

As highlighted in this case, even in the presence of a relatively stable patient, making the diagnosis of a perforated bile duct can be challenging. This is even more difficult in cases of acute abdomen, where an unstable patient may be unsuitable for imaging and may require exploratory surgery. In such cases, it is important to consider bile duct perforation within the differential. Useful investigations to establish a diagnosis include CT, MRI, ERCP, and PTC.

Bile duct perforation can be managed endoscopically via ERCP or surgically, depending on whether the diagnosis can be made preoperatively and the clinical condition of the patient. The most common surgical intervention involves washout and drainage of the abdominal cavity with closure of the duct perforation around a T-tube if the duct has been transected or ERCP is not available.³

Review of the images did not reveal any large gallstones within the bile ducts that may have contributed to the perforation. With the raised amylase and features of pancreatitis in this patient, the perforation may have resulted from a regurgitation of activated pancreatic enzymes from the pancreatic duct and common bile duct, but there remains no clear evidence for how such perforations occur.⁴

In this case, the bile duct perforation could be managed with ERCP. In cases where the diagnosis was only made at explorative laparotomy, closure of the perforation around a T-tube has been described.⁵ The basis of management is dependent on each individual patient but should include control of bile leak, removal of gallstones and gallbladder if required, and reconstruction of the bile duct.⁶

Our case highlights the difficulties in making the diagnosis of a primary bile duct perforation. The containment of bile likely led to the patient remaining generally stable and the usual biliary peritonitis being absent, which would be associated with a high degree of morbidity and risk of mortality.

DISCLOSURES

Author contributions: AD Gerrard and R. Date searched the literature and wrote the manuscript. G. Thind assessed the

radiology images and wrote the manuscript. R. Date is the article guarantor.

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Informed consent was obtained for this case report.

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