

Case Report

Acute duodenal diverticulitis with contained perforation causing biliary obstruction and ascending cholangitis: a case report

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Received: 12 February 2026

Accepted: 27 February 2026

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ABSTRACT

Periampullary duodenal diverticula (PAD) are common in older adults but rarely cause biliary obstruction and cholangitis. Distinguishing diverticulitis with contained perforation from other periampullary pathology can be challenging, and endoscopic visualisation may be limited by scope choice. An 83-year-old woman presented with two weeks of right upper-quadrant pain, associated with fever, jaundice and cholestatic derangement. CT and MRCP showed periampullary diverticulitis with contained perforation, causing common bile duct (CBD) obstruction; several small non-obstructive CBD stones were also present. She met accepted criteria for definite acute cholangitis. In view of suspected diverticular perforation and anticipated technical challenges with endoscopic retrograde cholangiopancreatography (ERCP), she was managed conservatively with intravenous antibiotics and supportive care, with clinical and biochemical resolution. Follow-up CT intravenous cholangiogram showed normal calibre ducts and no filling defects. Forward-viewing gastroscopy later did not visualise diverticulum. PAD can present with diverticulitis and peridiverticular collection causing biliary obstruction and cholangitis, even when small non-occlusive CBD stones coexist. Conservative management may be effective in selected stable patients when ERCP carries high risk and side-viewing duodenoscopy should be considered when endoscopic visualisation is required.

Keywords: Periampullary duodenal diverticulum, Duodenal diverticulitis, Cholangitis, Choledocholithiasis, Lemmel syndrome, Endoscopic retrograde cholangiopancreatography

INTRODUCTION

Periampullary duodenal diverticula (PAD) are common incidental findings on imaging, particularly among older adults, with the vast majority remaining asymptomatic. A small subset, however, develop clinically significant complications such as diverticulitis, perforation, bleeding, or biliopancreatic obstruction.¹

We describe a case of PAD with features suggestive of a contained perforation causing extrinsic compression of the distal CBD and acute cholangitis. This occurred despite the presence of only small, non-obstructive CBD stones and was successfully managed without ductal clearance. Case highlights diagnostic and management

challenges, including limitations of forward-viewing endoscopy when evaluating periampullary pathology.

CASE REPORT

An 83-year-old woman presented to ED with a two-week history of right loin pain radiating to the right upper quadrant, associated with nausea, vomiting and anorexia. Over the preceding 10 days, the pain became constant and was no longer controlled with simple analgesia, prompting presentation. She also reported subjective fevers, dark urine, pale stools, jaundice, and an unintentional 10 kg weight loss over three months. There was no history of recent medication changes, sick contacts, travel, viral hepatitis risk factors, or family history of malignancy or autoimmune disease.

Her past medical history included hypertension, dyslipidaemia, atrial fibrillation, gastro-oesophageal reflux disease, and congestive heart failure. Regular medications included paracetamol–codeine, candesartan, apixaban, dapagliflozin, esomeprazole, verapamil, and rosuvastatin. She was an ex-smoker and consumed alcohol in moderation. She lived at home with her husband and was independent in activities of daily living.

Two weeks prior to presentation, her general practitioner had arranged investigations for abdominal pain. Ultrasound showed gallbladder sludge but no cholecystitis, and a mildly dilated CBD (8 mm, distally obscured by gas) (Figure 1). CT KUB excluded renal calculi but incidentally reported multiple colonic diverticula, several small bowel diverticula, and a 23 mm diverticulum in the second part of the duodenum without evidence of diverticulitis (Figure 2).

On examination, she appeared unwell with mild scleral icterus. Vital signs revealed a blood pressure of 100/40 mmHg, pulse rate of 85 bpm, respiratory rate of 22/min, SpO₂ of 95% on 2 L O₂, and a temperature of 38.2 °C. Her abdomen was soft, non-distended, and there was moderate tenderness in the right upper quadrant, epigastrium, and right flank.

Laboratory investigations showed: Hb 129 g/L, WCC 11×10⁹/L (neutrophils 9.8), CRP 105 mg/L, bilirubin 38 µmol/L, ALT 751 U/L, AST 1092 U/L, ALP 644 U/L, GGT 957 U/L, lipase 21 U/L, and creatinine 86 µmol/L.

Contrast-enhanced CT abdomen demonstrated a periampullary duodenal diverticulum with surrounding inflammatory changes causing extrinsic compression of

the distal CBD and upstream biliary dilatation (Figure 3). MRCP confirmed a thick-walled periduodenal collection abutting the second part of the duodenum, causing mass effect on the distal CBD (Figure 4). Several small non-obstructive CBD stones were also present. Radiology favoured an inflammatory collection, most likely duodenal diverticulitis with a contained duodenal perforation, and in either case this process was causing biliary obstruction and likely ascending cholangitis. She met Tokyo guidelines 2018 criteria for definite acute cholangitis, with fever and elevated inflammatory markers, cholestatic liver function derangement with hyperbilirubinaemia, and imaging evidence of biliary dilatation with an obstructing periampullary process.

She was admitted under general surgery and commenced on intravenous piperacillin–tazobactam, IV fluids, proton pump inhibitor, analgesia, antiemetics, and venous thromboembolism prophylaxis. Within 24 hours, her inflammatory markers worsened (CRP 277 mg/L, bilirubin 53 µmol/L, ALT 1164 U/L, AST 2123 U/L, ALP 1187 U/L, GGT 981 U/L). She was discussed with the hepatopancreatobiliary (HPB) team and transferred to a tertiary hospital. At their multidisciplinary radiology meeting, the impression remained periampullary diverticulitis with possible contained perforation and secondary biliary obstruction. ERCP was considered technically challenging and carried a risk of worsening a possible perforation. A decision was therefore made for conservative management.

She subsequently improved and was transferred back to the referring hospital for ongoing care and discharged home after completing a 10-day course of antibiotics (intravenous followed by oral amoxicillin–clavulanate).

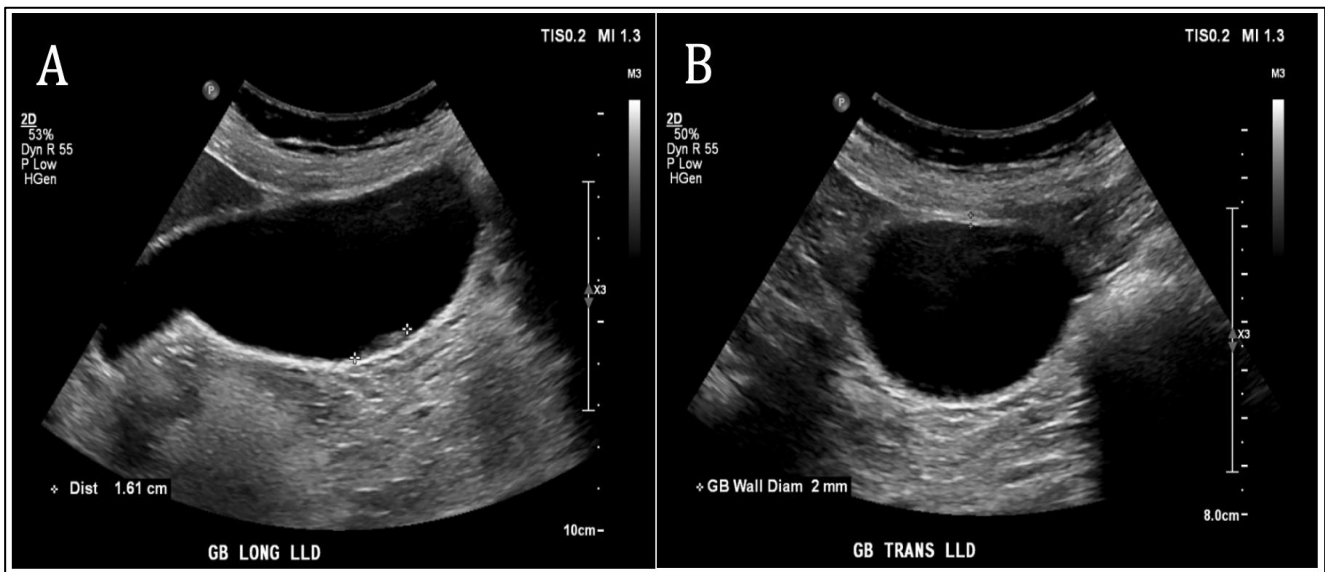


Figure 1 (A and B): Right upper quadrant ultrasound.

(A) Longitudinal view of a distended gallbladder with thin wall and dependent low-level internal echoes, consistent with sludge; (B) transverse view again demonstrating thin-walled gallbladder with anechoic bile with no pericholecystic fluid. Overall appearance was suggestive of a distended gallbladder with sludge, and no sonographic evidence of cholecystitis.

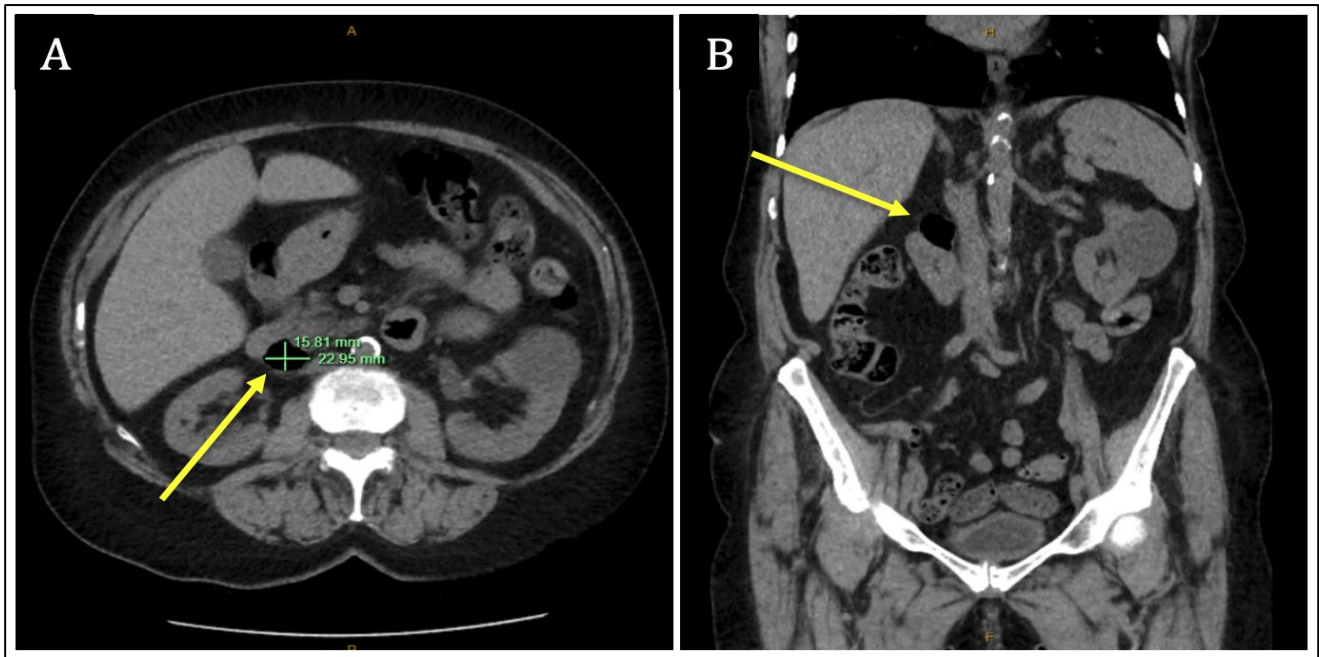


Figure 2 (A and B): Non-contrast CT KUB performed two weeks prior to admission.

(A) Axial image at the level of pancreatic head showing a gas filled sac-like outpouching from the medial wall of the second part of duodenum (D2) (yellow arrow), consistent with a diverticulum, with a dimension of approximately 23×16 mm. (B) Coronal image again demonstrating the D2 diverticulum (yellow arrow) adjacent and posterior to pancreatic head. No surrounding inflammatory stranding or free gas was seen on this study.

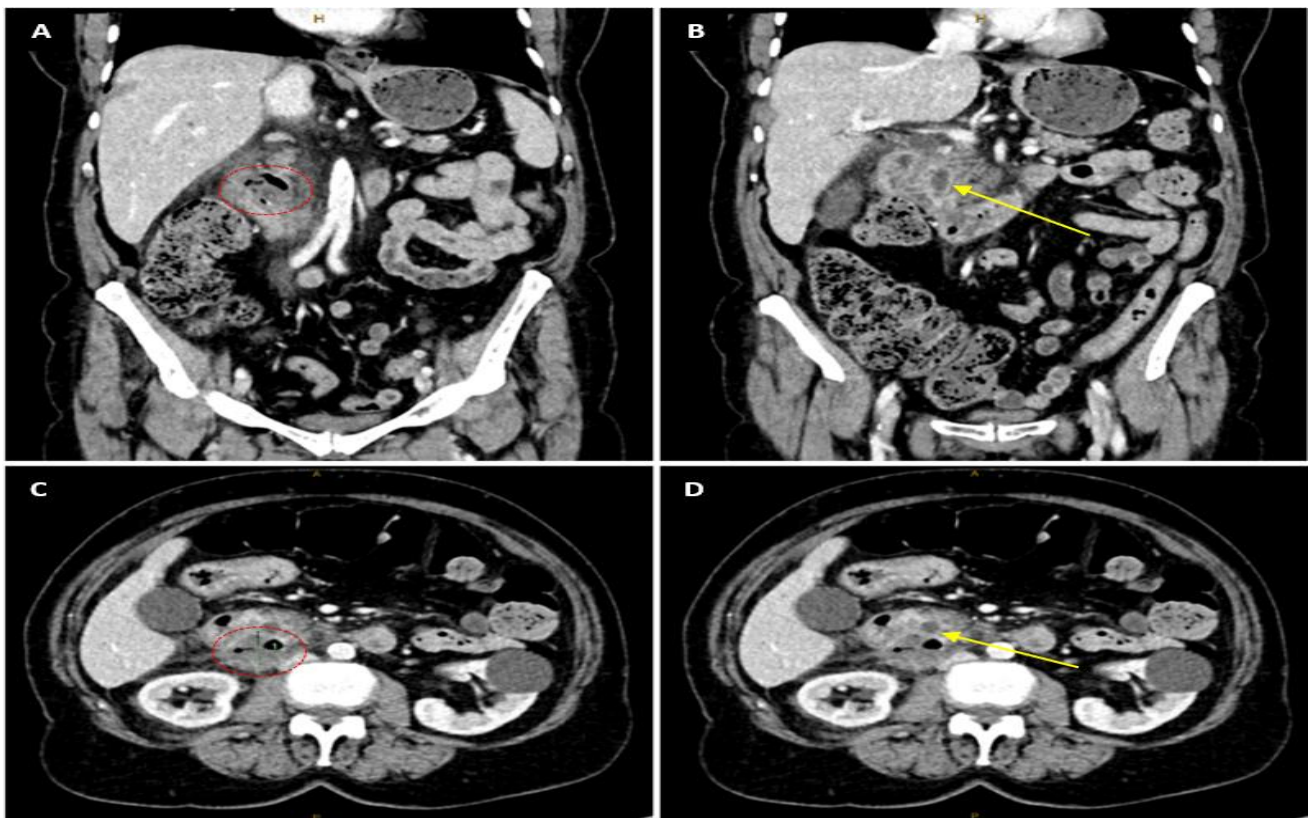


Figure 3 (A-D): Contrast-enhanced CT abdomen/pelvis at ED presentation.

(A and B) Coronal images demonstrating thick-walled diverticulum at D2, with surrounding inflammatory stranding, suggestive of acute duodenal diverticulitis. (C and D) Axial images again showing inflamed diverticulum, or collection (red dashed outline) posterior to and exerting mass effect on distal common bile duct (yellow arrow) with prominent fat stranding. No intraperitoneal free gas was identified on this imaging study.

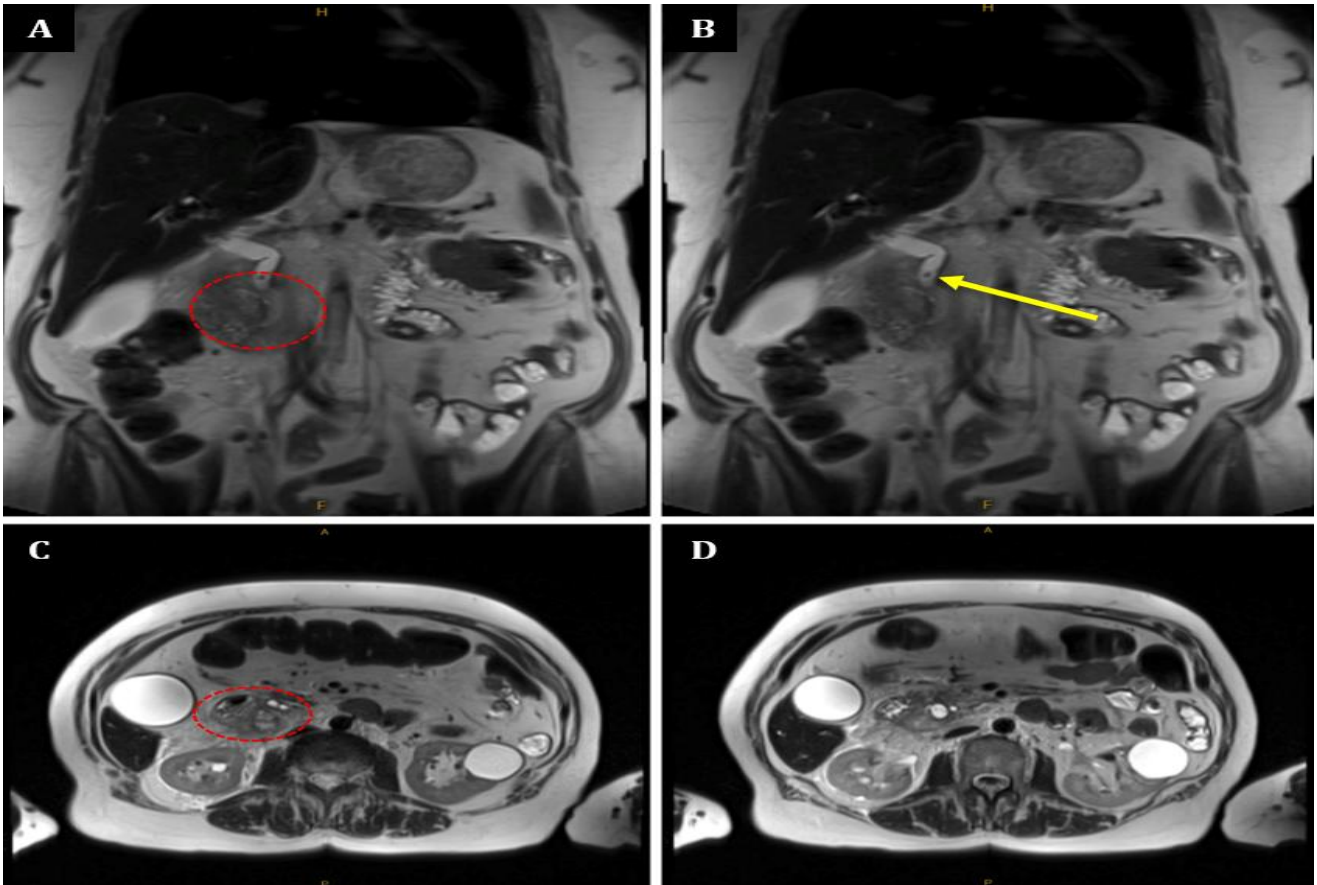


Figure 4 (A-D): MRCP images.

(A and B) Coronal T2-weighted images showing an inflammatory collection (red dashed line) adjacent to D2 and posterior to distal CBD. Note the small filling defect in CBD, likely a small non-obstructive CBD stone (yellow arrow). (C and D) Axial T2 images at pancreatic head level showing an irregular thick-walled collection (red dashed outline) with adjacent fat stranding, and tract of fluid signal to the second part of the duodenum, and at the level of narrowing of CBD (likely mass effect). Differential diagnoses of duodenal diverticulitis vs contained duodenal perforation. The gallbladder was distended without choledocholithiasis or pericholecystic fluid. There was fluid in the retroperitoneum, extending on the right into the paracolic gutter.

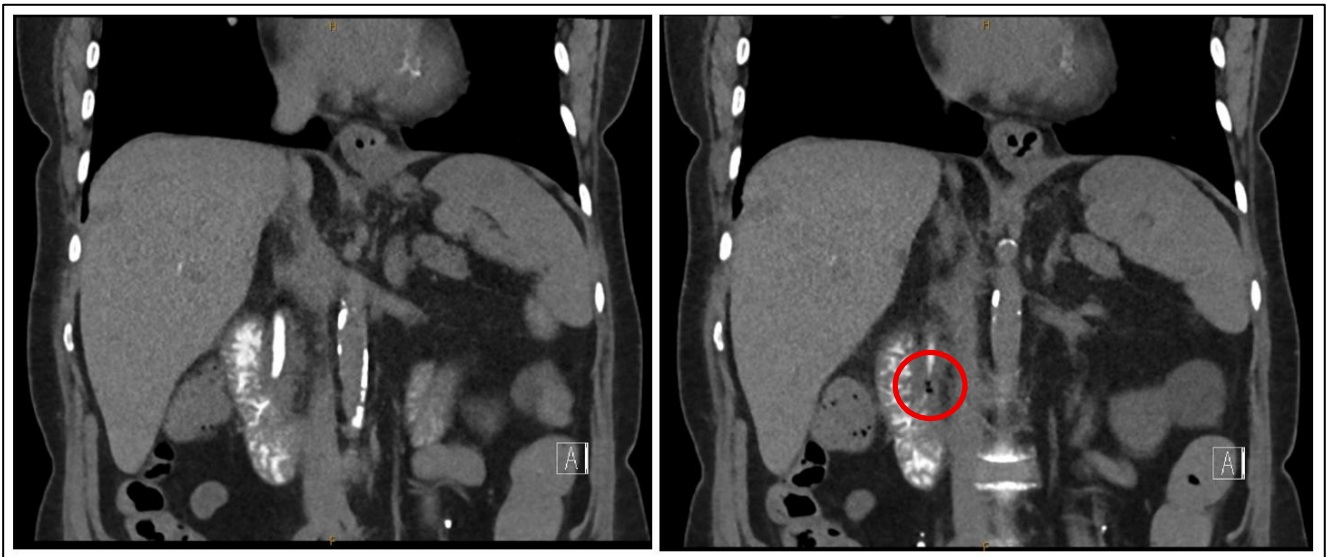


Figure 5: CT intravenous cholangiogram at outpatient follow-up.

(A and B) Coronal images demonstrating opacification of biliary tree with free contrast progression through normal calibre intrahepatic bile ducts, common bile duct into the proximal small bowel, without filling defect to suggest gallstones or choledocholithiasis. Small gas locule posterior to CBD (outlined with red circle) are noted at the prior site of collection, indicating interval resolution.



Figure 6: Forward-viewing gastroscopy of the second part of the duodenum (D2).

Periapillary mucosal folds was visualised; no diverticular orifice was seen on this examination.

At follow-up several weeks later, a CT intravenous cholangiogram showed no filling defects in the CBD and normal calibre intrahepatic and extrahepatic ducts (Figure 5). At outpatient clinic review, she reported feeling well with only mild intermittent backache. A follow-up gastroscopy with a forward-viewing scope revealed mild antral gastritis and a normal-appearing second part of the duodenum; the ampulla was visualised, but no diverticulum was identified (Figure 6). She remained well under surveillance with a plan for elective cholecystectomy.

DISCUSSION

PAD is identified in up to 20% of imaging studies, but fewer than 5% become symptomatic, most commonly with diverticulitis, perforation, bleeding, or biliopancreatic obstruction.¹ Obstructive jaundice secondary to PAD in the absence of stones or malignancy, an entity described as Lemmel's syndrome, continues to be reported in contemporary literature.²⁻⁵ In this case, although small non-obstructive CBD stones were present, extrinsic compression of the distal CBD from diverticulitis and the contained perforation was the primary driver of biliary obstruction and cholangitis rather than choledocholithiasis.

PAD is strongly associated with biliopancreatic disease across cohort studies.^{6,7} Proposed mechanisms include extrinsic compression of the distal CBD, papillary distortion and fibrosis, and duodeno-biliary reflux promoting bile stasis and stone formation.

ERCP is the standard therapy for cholangitis, but PAD presents unique and well-recognised technical challenges.⁸ Cannulation failure is more likely when the papilla lies within or adjacent to a diverticulum, as highlighted in case reports.^{4,9,10} Jayaraj's 2019 meta-analysis confirmed significantly reduced odds of successful cannulation in patients with PAD.¹¹ Even when successful, ERCP in this context is associated with longer procedural times, increased difficulty, and higher risk of pancreatitis or bleeding.^{7,12,13} Alternative drainage strategies including percutaneous cholecystostomy and Laparo-endoscopic Rendezvous have been described when ERCP is unsuccessful.^{10,14}

In stable patients, conservative management of duodenal diverticulitis, including cases with contained perforation, is well supported.^{1,5,15} Escalation is reserved for those who deteriorate or fail to improve; options include ERCP with adjunctive techniques, EUS-guided, or percutaneous transhepatic biliary drainage.^{8,16} Diverticulectomy, duodenal resection and bilioenteric bypass are surgical options, but associated with significant morbidity.^{4,6,9}

Another key challenge illustrated by this case is endoscopic visualisation. Forward-viewing gastroscopes often fail to identify periampullary diverticula, particularly those with narrow necks or concealed by mucosal folds. Side-viewing duodenoscopy provides markedly superior evaluation of the periampullary region.² Classic reports by Langdon and Baysal similarly describe lesions undetected on forward-viewing endoscopy but subsequently revealed with a side-viewing

duodenoscope.^{17,18} In our patient, gastroscopy failed to identify a diverticulum despite repeated CT evidence, consistent with these known limitations.

CONCLUSION

Periampullary diverticulitis is an uncommon but important cause of biliary obstruction and cholangitis. In the presence of inflammation or contained perforation, ERCP may carry additional risk and should be considered carefully. Conservative therapy can be effective in stable patients, and side-viewing duodenoscopy should be utilised when endoscopic assessment is required.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

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Cite this article as: Keng C, Goai XY, Pretorius CF. Acute duodenal diverticulitis with contained perforation causing biliary obstruction and ascending cholangitis: a case report. *Int Surg J* 2026;13:634-9.