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Case Report

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Endovascular management of an iatrogenic right hepatic artery injury with a covered stent following endoscopic extraction of a common bile duct stent: a case report

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Abstract

Background. Arterial haemorrhage related to indwelling biliary stents is a rare but life-threatening event. Most reported cases are delayed hepatic artery pseudoaneurysms that present with haemobilia and are managed by transarterial embolisation. We report an unusual mechanism: a 10 Fr plastic common bile duct (CBD) stent whose distal retention flap had eroded into the right hepatic artery. This was associated with chronic anaemia and then with acute arterial rupture when traction during routine stent removal dislodged the embedded flap from the arterial wall. The injury was treated with a flow-preserving covered stent in a transplant candidate.

Case presentation. A 45-year-old White European man with histologically confirmed Crohn's disease and secondary primary sclerosing cholangitis with biliary cirrhosis (Child-Pugh B, MELD 23), listed for liver transplantation and undergoing regular endoscopic CBD stent exchanges, was investigated for chronic anaemia. During a routine endoscopic stent exchange, a blood clot was noted at the tip of the indwelling 10 Fr plastic CBD stent. Immediately after stent removal, brisk bleeding occurred from the major papilla and the patient became haemodynamically unstable. Review of a computed tomography (CT) scan obtained two days earlier showed the distal retention flap of the stent protruding into the right hepatic artery. Angiography confirmed focal contrast extravasation from the right hepatic artery, which was sealed with a 5 × 22 mm balloon-expandable covered stent. The artery and distal hepatic perfusion were preserved and bleeding stopped immediately. The patient had no recurrent bleeding and underwent successful liver transplantation seven months later.

Conclusions. A blood clot on the tip of a biliary stent should be regarded as a warning sign of underlying arterial injury, and review of prior cross-sectional imaging can rapidly localise the source. In patients dependent on hepatic arterial flow, such as liver-transplant candidates, a covered stent offers a flow-preserving alternative to embolisation for a focal, accessible injury, although the resulting need for antiplatelet therapy must be weighed against the bleeding and peri-transplant risks.

Keywords: Hepatic artery injury; Haemobilia; Covered stent graft; Biliary stent; Endovascular treatment; Liver transplantation; Case report

Background

Haemorrhage associated with endoscopically placed biliary stents is uncommon but potentially fatal. The injury most frequently described in the literature is a hepatic artery pseudoaneurysm that develops after a latent interval and presents with haemobilia or upper gastrointestinal bleeding; the great majority of these are treated by transarterial coil or glue embolisation [1,2]. A recent systematic review of pseudoaneurysms following biliary stenting found that lesions arise most often in the hepatic artery, present after a mean of roughly four months, and are managed endovascularly, predominantly by embolisation, in the large majority of cases [2]. Direct laceration of the hepatic artery by the stent itself, producing immediate active extravasation at the moment of stent removal, is far less commonly reported, and its management differs in important ways.

We describe such a case, in which the distal retention flap of a plastic CBD stent had eroded into the right hepatic artery, was associated with chronic occult bleeding, and produced acute arterial extravasation when the stent was withdrawn. We highlight two features we believe add to the existing literature: the recognition of a clot adherent to the stent tip as an early warning sign of arterial erosion, and the deliberate choice of a flow-preserving covered stent rather than embolisation in a patient awaiting liver transplantation.

Case presentation

A 45-year-old White European man with histologically confirmed Crohn's disease had developed secondary primary sclerosing cholangitis with consequent biliary cirrhosis (Child-Pugh class B, MELD score 23) and was undergoing regular endoscopic CBD stent exchanges. He was listed for liver transplantation.

He had recently suffered from chronic anaemia, and a source of bleeding was being sought. Gastroduodenoscopy demonstrated single ulcerations in the duodenum and at the oesophagogastric junction, which were initially interpreted as the source. During his next routine endoscopic stent exchange, a blood clot was observed at the tip of the indwelling 10 Fr plastic CBD stent, a straight stent with proximal and distal retention flaps. Immediately after stent removal, brisk bleeding occurred from the major papilla (Figure 1). The patient became haemodynamically unstable, an arterial injury was suspected by the endoscopist, and interventional radiology was contacted.

Interventional radiology reviewed the most recent cross-sectional imaging. On a CT scan performed two days earlier, the distal retention flap of the CBD stent was seen protruding into the right hepatic artery (Figure 2). This was considered the most likely source of bleeding. Because of the patient's haemodynamic instability, repeat imaging was not performed and the patient was transferred directly to the angiography suite.

Right common femoral access was obtained and a 55 cm, 6-French sheath (Flexor Ansel Guiding Sheath, Cook Medical, Bloomington, IN, USA) was inserted. Using a 4-French C2 Cobra catheter and a 0.035-inch angled hydrophilic guidewire (Radifocus Guidewire M, Terumo, Tokyo, Japan), the coeliac trunk was selected and the sheath was advanced into the common hepatic artery. Selective angiography of the right hepatic artery showed a small contrast irregularity in its proximal segment, just before the division into segmental branches, corresponding to the wall defect at the site of flap erosion (Figure 3A); a later, more selective run demonstrated faint contrast extravasation in the same location, consistent with leakage around the artery and into the adjacent common bile duct (Figure 3B). A 0.035-inch Rosen wire was placed, the sheath was advanced into the right hepatic artery, and a 5 × 22 mm balloon-expandable covered stent (BeGraft, Bentley InnoMed, Hechingen, Germany) was deployed across the injury. The completion angiogram showed the stent graft open and in good position

with no residual extravasation and preserved distal hepatic arterial perfusion, and the patient stabilised (Figure 3C).

A CT performed the same day showed no further source of bleeding and the covered stent patent and well-positioned, running across the common bile duct. The remaining inpatient course was uneventful and he was discharged on dual antiplatelet therapy. He had no recurrent bleeding and subsequently underwent successful orthotopic liver transplantation at a tertiary transplant centre seven months later. Dedicated imaging follow-up of the stent was not available to the authors.

Discussion

Acute arterial haemorrhage is a rare complication of biliary stents. The most frequently reported pattern is a delayed hepatic artery pseudoaneurysm presenting with haemobilia, typically managed by transarterial embolisation [1-3]. Recent reports underline both the persistence of this complication and the predominance of embolisation as first-line therapy: Ipek described haemobilia from a hepatic artery pseudoaneurysm after pigtail stent removal treated by coil embolisation [3]; Motohara et al. reported a pseudoaneurysm at the tip of a plastic stent treated with microcoils [4]; Katsurahara et al. and Yukimoto et al. described ruptured pseudoaneurysms after biliary and EUS-guided drainage, both controlled by embolisation [5,6]; and a 2025 systematic review confirmed that the hepatic artery is the most common site and embolisation the dominant treatment [2]. Older series similarly favoured coiling, with surgical ligation reserved for failure or instability [7-10].

Our case differs from this typical picture in mechanism and management. Rather than a contained pseudoaneurysm presenting after a latent interval, the distal retention flap of the stent had eroded into the wall of the right hepatic artery. This slow erosion caused only minor bleeding, which is likely to have contributed to the patient's chronic anaemia, with the clot adherent to the stent tip as a sign of this low-grade haemorrhage. The major acute injury occurred only at the moment of routine stent exchange: with the flap embedded in the arterial wall, traction on the stent during its removal ruptured the artery and produced brisk extravasation. The intra-arterial position of the flap was probably a matter of chance orientation; had the stent been rotated by 180 degrees, the flap would have pointed away from the vessel. In retrospect, two findings were decisive: the blood clot adherent to the stent tip and the protrusion of the flap into the artery on CT obtained two days earlier. We would emphasise the first as a practical, early warning sign: a clot on a biliary stent should prompt consideration of arterial erosion and review of cross-sectional imaging before the stent is manipulated, an approach also advocated by Yukimoto et al. after EUS-guided drainage [6].

The angiographic findings were subtle and merit comment. The injury appeared only as a small contrast irregularity of the proximal right hepatic artery, with faint extravasation into the adjacent common bile duct on a later run, rather than as an obvious pseudoaneurysm or a brisk arterial jet. Focal contrast at the site of a stent injury can be mistaken for a contained pseudoaneurysm; here it is best interpreted as contrast escaping through the small arterial defect into the bile duct, that is, angiographically demonstrated haemobilia, in keeping with the brisk bleeding seen endoscopically and with the chronic haemorrhage into the biliary tree that preceded it. The discreet appearance underlines the value of reviewing prior cross-sectional imaging and of careful, selective angiography to identify the source.

The choice of a covered stent rather than embolisation deserves explanation, because embolisation remains the standard for most stent-related arterial bleeding [2]. Embolisation, however, occludes the treated vessel. Superselective embolisation of a distal segmental branch can sometimes achieve haemostasis while sparing flow to the rest of the liver, but that was not

an option here, because the injury lay in the right hepatic artery itself rather than in a peripheral branch; embolisation at this level would have shut down the entire right hepatic arterial territory. In a patient with cirrhosis and primary sclerosing cholangitis awaiting transplantation, this carried a tangible risk of hepatic and biliary ischaemia, since the biliary tree is supplied exclusively by the hepatic artery and this arterial dependence is heightened when effective portal perfusion is compromised by portal hypertension; ischaemic cholangiopathy or hepatic infarction could have worsened the patient's condition and threatened his transplant candidacy. A covered stent, by contrast, sealed the defect while preserving right hepatic arterial flow. The anatomy made this feasible: the right hepatic artery was of large calibre and the injury lay in a proximal, accessible segment, allowing rapid and definitive exclusion of the defect in a haemodynamically unstable patient, even though central stent-graft placement this far into the hepatic artery is often technically demanding. Surgical ligation would likewise have sacrificed the artery.

This consideration carries particular weight in a young transplant candidate facing an unpredictable waiting time. At transplantation the diseased right hepatic artery would be removed with the explanted liver and arterial inflow re-established more proximally, so the aim was not to protect the future graft but to preserve the patient's own liver and biliary tree, and thus his candidacy, over what may be a prolonged and uncertain interval before a donor organ becomes available. In this patient transplantation followed seven months later, but such waits can extend to years, during which avoidable arterial or biliary ischaemia could compromise candidacy. Endovascular techniques likewise remain central to the management of hepatic arterial complications in the liver-transplant setting [11].

These advantages must be balanced against real drawbacks. A covered stent in the hepatic artery carries a risk of thrombosis and requires dual antiplatelet therapy, which is not trivial in a patient with cirrhosis and portal hypertension, with a history of Crohn's disease that may require future surgery, and who is awaiting transplantation. Antiplatelet therapy increases bleeding risk in this population, and any interruption for surgery or transplantation raises the risk of stent thrombosis. The decision therefore reflects a trade-off rather than a universally preferable option: we judged that immediate, definitive haemostasis with preservation of hepatic arterial flow outweighed the medium-term antiplatelet burden in this specific patient, but in a patient who was not transplant-dependent, or where the injury was more distal, selective embolisation would be equally or more appropriate. From a technical standpoint, advancement of a 6-French sheath over a 0.035-inch wire into the right hepatic artery carries a risk of vasospasm, intimal injury or dissection; in this case the large calibre and favourable course of the right hepatic artery made sheath advancement straightforward, whereas in less favourable anatomy a coaxial microcatheter technique may reduce these risks and would be a reasonable alternative, particularly if embolisation is planned.

This report is limited by its single-case nature and by the absence of dedicated imaging follow-up of the stent available to the authors; ultrasound surveillance may have been undertaken at the transplant centre, but those reports were not available to us. The patient nonetheless remained free of recurrent bleeding and proceeded to successful liver transplantation seven months later. The case illustrates a distinct mechanism of stent-related arterial injury and a defensible, flow-preserving treatment strategy.

Conclusions

Endovascular treatment of acute arterial bleeding following gastrointestinal endoscopic procedures is safe, effective and rapid. A blood clot adherent to a biliary stent should raise suspicion of vascular injury and prompt further evaluation before the stent is manipulated.

Review of prior cross-sectional imaging is essential for rapid localisation of the bleeding source, and the bleeding point should be approached as selectively as is safely possible. In patients dependent on hepatic arterial perfusion, such as liver-transplant candidates, a covered stent provides a flow-preserving alternative to embolisation for a focal, accessible arterial injury, provided the implications of subsequent antiplatelet therapy are taken into account.

Patient perspective

Because the bleeding occurred as a sudden, life-threatening emergency, the patient has little personal recollection of the event itself. In retrospect he expressed relief that the haemorrhage could be controlled rapidly and that his liver and its arterial supply were preserved without major collateral damage, allowing him to proceed to transplantation.

Abbreviations

CBD: Common bile duct
CT: Computed tomography
EUS: Endoscopic ultrasound
Fr: French (catheter gauge)
MELD: Model for End-Stage Liver Disease

Declarations

Ethics approval and consent to participate. Ethics committee approval is not required for a single de-identified case report at our institution. The patient gave written informed consent to participate.

Consent for publication. Written informed consent was obtained from the patient for publication of this case report and the accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Availability of data and materials. Data sharing is not applicable to this article, as no datasets were generated or analysed during the current study. All information supporting the case is included within the published article. Further details are available from the corresponding author on reasonable request, subject to patient confidentiality.

Competing interests. The authors declare that they have no competing interests.

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Authors' contributions. MK performed the endovascular procedure and drafted the manuscript. CK and FE were responsible for the endoscopic management and clinical care of the patient. All authors contributed to manuscript revision and read and approved the final manuscript.

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Figure legends

Figure 1. Endoscopic view immediately after removal of the common bile duct stent, showing brisk arterial bleeding from the region of the major papilla (arrows). The endoscopic field was obscured by blood within seconds.

Figure 2. Volume-rendered CT reconstruction showing the distal retention flap of the biliary stent (arrow) protruding into the right hepatic artery (asterisk), obtained two days before the bleeding event.

Figure 3. Selective angiography of the right hepatic artery, with the catheter positioned within the vessel. (A) A small contrast irregularity is seen in the proximal right hepatic artery, just before its division into segmental branches, corresponding to the wall defect (the arterial “hole”) at the site of flap erosion (circle). (B) On a later, more selective run, faint contrast extravasation is visible in the same location, consistent with leakage around the artery and into the adjacent common bile duct (arrows). (C) After deployment of a 5 × 22 mm balloon-expandable covered stent, the stent graft is open and in good position, with no residual extravasation; the patient stabilised.

Figure 1



Figure 2



Figure 3A

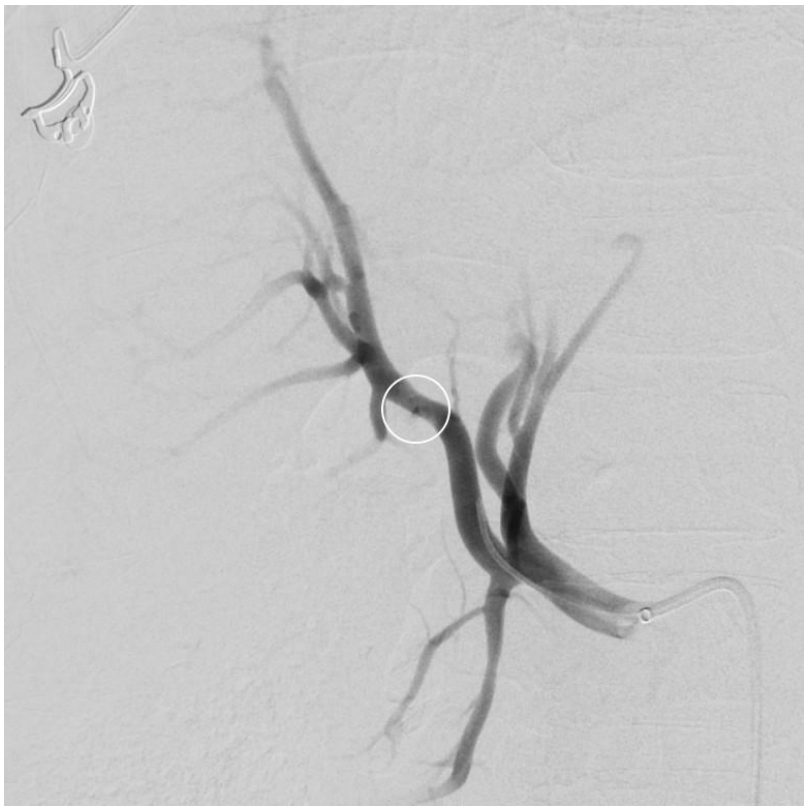


Figure 3B

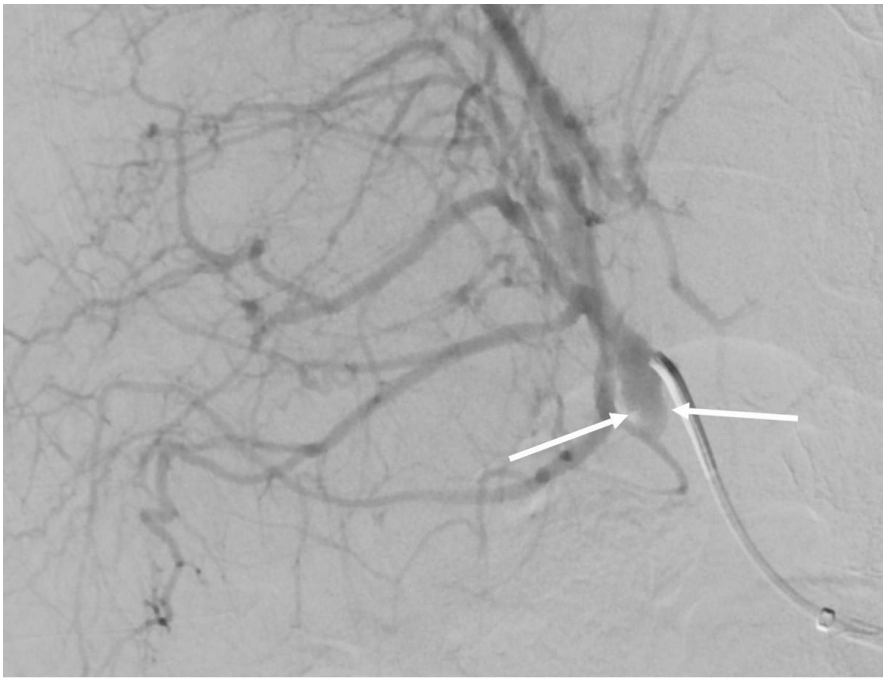


Figure 3C

