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Case Report

Inadvertent Migration of Hepatic Artery Pseudoaneurysm Coil during Endoscopic Retrograde Cholangiopancreatography

Abstract

We report a case of a 72-year-old male with a cascade of complications being diagnosed as an acute cholecystitis. The cascade includes iatrogenic pulling of coils, which were placed for treatment of right hepatic artery pseudoaneurysm, into the common bile duct (CBD) in an attempt for removal of the misplaced/migrated CBD plastic stent inserted by endoscopic retrograde cholangiopancreatography (ERCP). The case demonstrates a series of mishaps leading to a rare complication of iatrogenic migration of transarterial coil in the gastrointestinal tract. This could be the first case of coil migration as a complication of ERCP due to suboptimal stenting/removal techniques.

Keywords: *Bleeding, coil migration, embolization, visceral pseudoaneurysm*

Riad Alchanan[1,2], Rajdeep Chhina[1], Ghali Salahia[1], Dean Huang[1], Dylan lewis[1]

[1]Department of Radiology, King's College Hospital, [2]Department of Interventional Radiology, The Royal London Hospital, London, United Kingdom

Introduction

Previously considered uncommon, visceral artery aneurysms (VAAs) are now more often diagnosed due to the increased use of cross-sectional imaging and an aging population. The reported incidence is approximately 0.01%–2% in autopsy and angiographic studies. The splenic artery is the most common site of VAA (60%) followed by the hepatic artery (20%), gastroduodenal and pancreaticoduodenal arteries (6%), superior mesenteric artery (SMA; 5.5%), and celiac artery (4%).[1-4]

VAAs include true aneurysms and pseudoaneurysms. True aneurysms can be defined as the focal enlargement of the artery diameter, with integrity of all vascular layers and are generally associated with atherosclerosis, fibromuscular dysplasia, or degenerative diseases affecting the vessel wall (e.g., segmental arterial mediolysis). Although less common, congenital diseases (Ehlers-Danlos syndrome, Alagille syndrome, Marfan syndrome, and type I neurofi bromatosis) can also be associated with true VAAs. False aneurysms, on the other hand, can either be iatrogenic (after abdominal surgery or percutaneous biliary procedures) or develop on the grounds of vasculitis, trauma, or intra-abdominal inflammation.[5]

Coil migration during embolization procedures have been reported to occur in 2%–6% of cases,[6,7] and the consequences can be catastrophic.[8,9] However, there is currently no standard management strategy for coil migration,[10] and most of reported cases occurred during intracranial procedures.

The visceral pseudoaneurysms are uncommon and attributed to degeneration of the vessel wall mostly due to infections and adjacent inflammation, trauma, and iatrogenic causes.[11] Hemorrhage due to rupture of these pseudoaneurysms is a rare but often life-threatening complication which manifests as intra-abdominal or retroperitoneal bleeding and requires emergency treatment.[12,13] To the best of our knowledge, this is the first case report that described inadvertent hepatic pseudoaneurysm coil migration during ERCP.

Using digital subtraction angiography the bleeding site can be evaluated followed by embolization of the bleeding vessel or pseudoaneurysm employing superselective catheterization technique.[14,15]

Case Report

A 72-year-old male with no significant medical history presented to the emergency department of a peripheral hospital with symptoms of acute cholecystitis which

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Address for correspondence:
Dr. Riad Alchanan, Department of Interventional Radiology, The Royal London Hospital, Whitechapel, London E1 1BB, United Kingdom.
E-mail: rodishan@hotmail.com

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was confirmed on ultrasound in April 2012. Preoperative magnetic resonance (MR) cholangiopancreatography demonstrated cholelithiasis and choledocholithiasis as the underlying cause [Figure 1]. A 2 cm incidental right hepatic artery pseudoaneurysm was also noted, thought to be secondary to the adjacent inflammatory process [Figure 2].

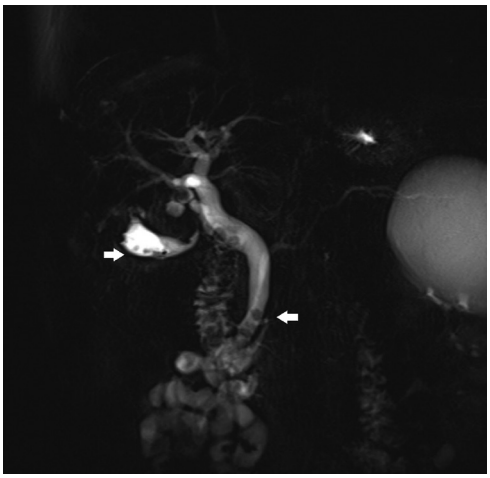

Figure 1: Preoperative magnetic resonance cholangiopancreatography demonstrating chololithiasis and choledocolithiasis (arrows). The images show multiple calculi within the gallbladder and the common bile duct

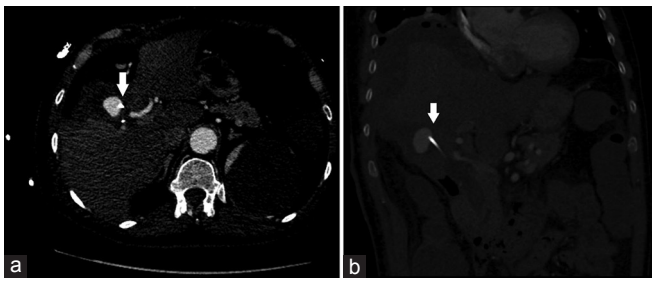

Figure 3: Computed tomography angiogram. Coronal (a) and axial (b) images demonstrate the hepatic artery pseudoaneurysm before embolization, with the biliary stent abutting its walls (arrow)

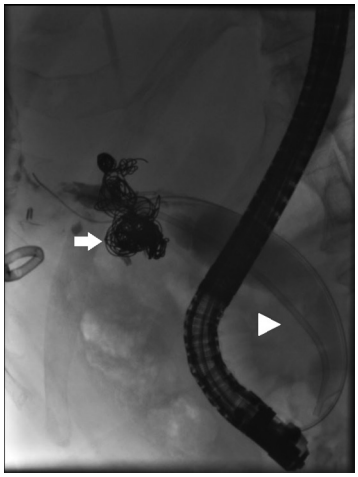

Figure 5: Endoscopic retrograde cholangiopancreatography image showing biliary stent *in situ* (arrowhead) with multiple coils within the pseudoaneurysm sac (arrow)

During the same admission, the patient underwent a laparoscopic cholecystectomy, which was complicated by iatrogenic common bile duct (CBD) injury for which

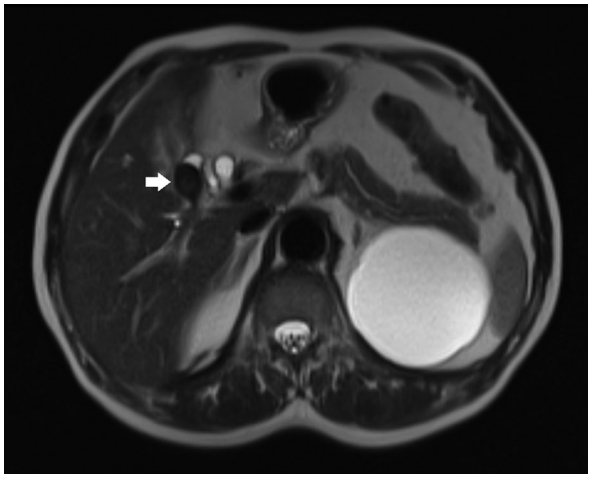

Figure 2: Preoperative axial T2 magnetic resonance imaging demonstrates an area of flow void arising from the right hepatic artery consistent with a hepatic pseudoaneurysm (arrow)

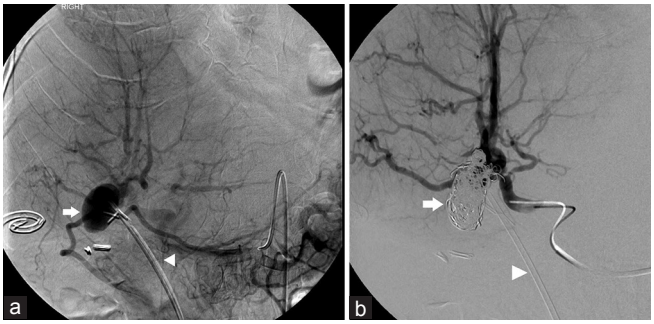

Figure 4: Conventional angiogram, preembolization (a) showing the pseudoaneurysm sac (arrow) and postembolization (b) showing exclusion of the pseudoaneurysm sac by multiple metallic coils (arrow). The pseudoaneursym has been successfully excluded using metallic coils, with common bile duct stent remains *in situ* (arrowhead)

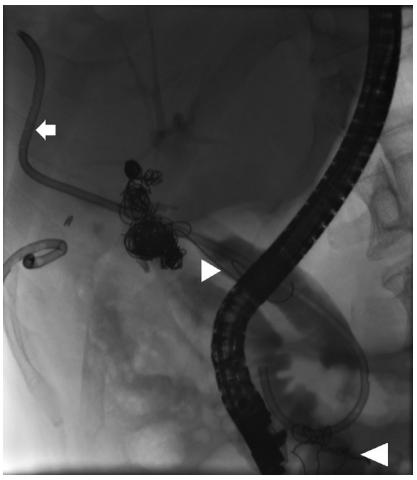

Figure 6: Endoscopic retrograde cholangiopancreatography image postbiliary stent removal showing migrated coils in the common bile duct and proximal small bowel loops (arrowheads). A double pigtail biliary stent was left *in situ* (arrow)

an endoscopic retrograde cholangiopancreatography (ERCP)-guided plastic stent was subsequently inserted.

A week later, the patient presented with a significant episode of melena. Computed tomography (CT) scan of the abdomen and pelvis showed that the tip of the CBD stent was projecting into the pseudoaneurysm sac [Figure 3]. After discussion with interventional radiology (IR), the decision was made to embolize the hepatic artery pseudoaneurysm. A right femoral puncture was made with the placement of a 5 Fr bright-tip sheath (Cordis, California, USA). A selective coeliac angiogram was performed using 5 Fr SIM2 (Cordis, California, USA) and 135 cm Progreat (Terumo, Shiboma, Japan) which confirmed the right hepatic artery pseudoaneurysm. Subsequent embolization using 0.018 coils (Boston Scientific, Marlborough, USA) was done resulting in effective occlusion of the pseudoaneurysm sac and achieving hemostasis [Figure 4].

Despite remaining hemodynamically stable and with no further episodes of melena, the patient's liver function continued to deteriorate, and the patient underwent a further ERCP a week after the embolization to investigate. Initial ERCP images demonstrated the CBD stent to be malpositioned with its tip lying in the coil-embolized pseudoaneurysm sac [Figure 5]. The stent was deemed to be inadequately draining due to incorrect deployment/migration and so the decision of stent change was made. During the stent exchange, some of the metallic coils were inadvertently pulled into the CBD and proximal small bowel loops [Figure 6]. An ERCP-guided double-pigtail plastic stent was inserted, and the procedure was terminated. Repeat ERCP examinations were done in April 2013 and July 2013, but no attempts to remove the migrated coils by surgical or endovascular techniques had been recorded in the retrieved medical records.

In September 2016, the patient presented to our institution with repeated episodes of significant melena and hematemesis. Endoscopy revealed active bleeding secondary to duodenal erosions which were not controlled with endoscopic sclerotherapy. A CT scan of the abdomen and pelvis was then performed which revealed active extravasation from the pseudoaneurysm. It also demonstrated the known migrated coils in the CBD and proximal small bowel, as well as a new thin long metallic, believed to represent a further migrated coil within the distal small bowel loops [Figure 7]. The patient was then transferred under the care of the IR team for further management. A right femoral puncture was made with the placement of 5 Fr bright-tip sheath (Cordis, California, USA). A selective coeliac angiogram was performed using 5 Fr SIM2 (Cordis, California, USA) and 135 cm Progreat (Terumo, Shiboma, Japan). Subsequent further coiling of the previously coiled pseudoaneurysm sac using 0.018 coils (Boston Scientific, Marlborough, USA) was done resulting in hemostasis [Figure 4]. Embolization of the gastroduodenal artery was also undertaken to treat the actively bleeding duodenal erosions (secondary to the migrated coils) using 0.018 coils (Boston Scientific, Marlborough, USA) [Figure 8]. Postembolization right hepatic angiogram showed good perfusion to the right hepatic lobe. Uneventful recovery period was obtained with no further episodes of melena or hematemesis reported.

Discussion

This case demonstrates a cascade of mishaps leading to a rare complication of arterial coil migration into the biliary system and gastrointestinal tract (GIT). As this patient initially presented at a different institution for his cholecystitis symptoms, we could not ascertain the rationale behind performing a laparoscopic cholecystectomy without either managing the hepatic artery pseudoaneurysm intraoperatively or before surgery with embolization. In the absence of any follow-up CT scans or any documentation of attempting to remove

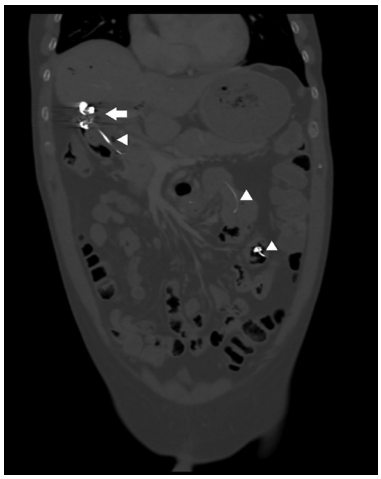

Figure 7: Coronal computed tomography image demonstrates coils in the pseudoaneurysm sac (arrow) with multiple metallic objects in the common bile duct and the small bowel loops consistent with the migrated coils (arrowhead)

Figure 8: Postembolization angiogram demonstrates coils in the hepatic artery pseudoaneurysm and in the gastroduodenal artery (arrowheads). The image also shows the migrated coil in the common bile duct (arrow)

the migrated coils, we suspect they may not have been identified on poststent removal ERCP images in 2012 and was only subsequently recognized on CTA performed in 2016 when the patient presented to our institution with repeated episodes of melena, at which time the coils had eroded and migrated further in the GIT.

In retrospect, there are several practices carried out at the base hospital that should have been managed differently. To start with, once the pseudoaneurysm had been identified on MR imaging, it should have been treated with endovascular coiling, before the ERCP/CBD stent insertion. In addition, when the patient returned for his CBD stent removal/exchange, an experienced endoscopist should have acknowledged the stent was entangled within the coils which now protrude through the Pseudoaneurysm and into the CBD. At the very least, the endoscopist should have been aware of the complication they caused by pulling the stent and coils along with it into the biliary system. Even if pulling the coil was inevitable/unavoidable when trying to remove the biliary stent, the endoscopist should have followed up the patient with further regular imaging and at best, contacted the IR team and HPB surgeons/obtain a multidisciplinary team consensus approach to further management. By not doing the above, the patient was negligently allowed to carry on as normal until the coils further dislodged causing hematemesis and melena.

Although the literature on transarterial embolization coil erosion and migration into the GIT is limited, there have been a few reported cases, in which coil erosion and migration were presented as a delayed complication, ranging between 5 months and 10 years, thus making it a rare but recognized complication. Our case stresses the importance of early recognition and appropriate management of a visceral artery pseudoaneurysm and coil migration to avoid such seemingly inevitable Mishaps.

Conclusion

We report a rather unusual case of iatrogenic coil migration from a treated right hepatic pseudoaneurysm into the CBD and small bowel loops leading to a delayed presentation with GIT bleeding secondary to erosion for which further selective transarterial coil embolization was successfully performed.

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Conflicts of interest

There are no conflicts of interest.

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