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## Case Report

# Embolization coil migration in the stomach and spontaneous excretion: a case report and review of the literature <sup>☆</sup>

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### ABSTRACT

Embolization coil migration to the gastrointestinal tract is a rare complication. This report describes our experience of coil migration in the stomach and spontaneous excretion. A 77-year-old man, who was diagnosed with esophageal squamous cell carcinoma with multiple lymph node metastases, had a bleeding left gastric artery and splenic artery pseudoaneurysm associated with an abdominal lymph node mass, that was treated by coil embolization, after which the coil migrated into the stomach. Because there were no complications such as active bleeding or peritonitis, our patient was followed carefully, and excretion of the coil was documented. No standard management exists for migrated coils. Conservative treatment is an option, as in this case.

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## Introduction

Abdominal transcatheter arterial coil embolization has been used to treat hematemesis and prevent abdominal vessel bleeding in gastrointestinal (GI) ulcers, arterial aneurysms, and pseudoaneurysms [1,2]. Prophylactic coil embolization is also performed to minimize inadvertent misadministration to nearby structures in transarterial chemoembolization for hepatocellular carcinoma [3].

Because its high success rate has led to increased use of coil embolization, complications of coil embolization have been reported, including bleeding, infarction of normal structures, abscess formation, and coil migration [4–6]. Among these complications, migration to the GI tract is extremely rare.

This report describes our experience of treating a bleeding left gastric artery and splenic artery pseudoaneurysms associated with abdominal lymph node mass using coil embolization. The coil subsequently migrated into the stomach and was excreted spontaneously.

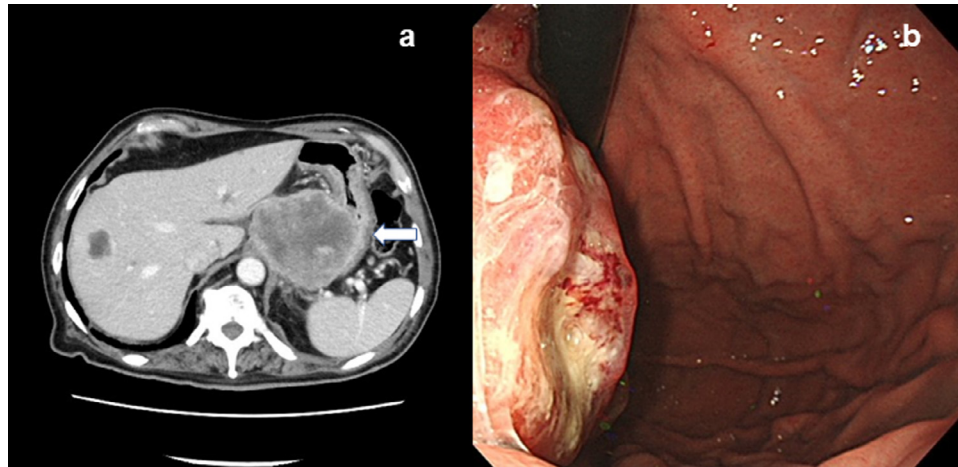
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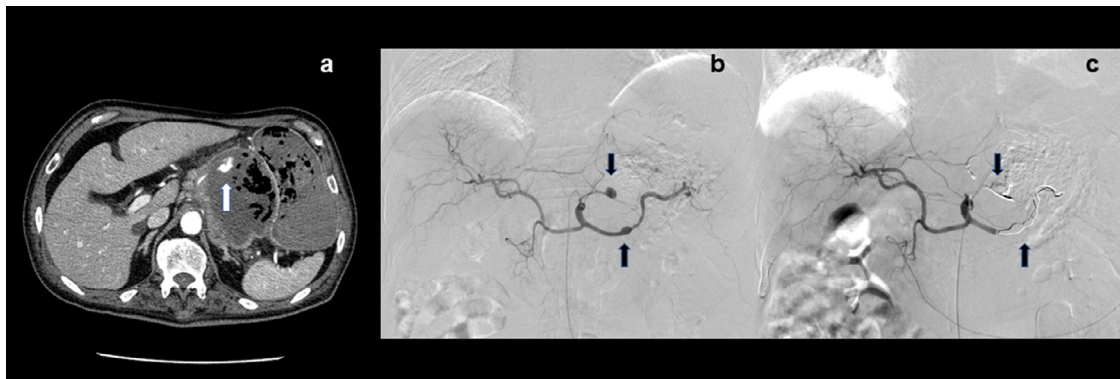
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**Fig. 1** – Computed tomography (a) and endoscopy (b) revealed an enlarged abdominal lymph node invading the posterior wall of the proximal stomach. The white arrow indicates the portion of the invasion (a).



**Fig. 2** – (a) Computed tomograph showing hemorrhage from the left gastric artery (white arrow), which was invaded by the enlarged abdominal lymph node. (b, c) Angiography before and after repeat embolization of the left gastric artery, and a splenic artery pseudoaneurysm (black arrows).

## Case report

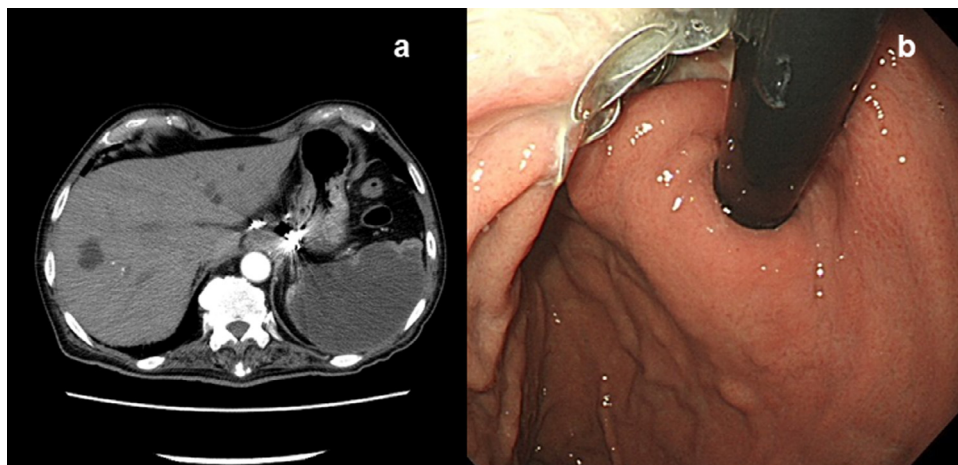
A 77-year-old man was diagnosed with esophageal squamous cell carcinoma and multiple lymph node metastases. An enlarged abdominal lymph node confirmed to contain an squamous cell carcinoma had invaded the posterior wall of the proximal stomach (Fig. 1). This ulcerative lesion was treated with proton pump inhibitor administration. Bloody stool appeared during the first course of chemotherapy, which consisted of DCF (docetaxel, 70 mg/m<sup>2</sup> per day, day 1; cisplatin, 70 mg/m<sup>2</sup> per day, day 1; fluorouracil (5-FU), 750 mg/m<sup>2</sup> per day, days 1-5) repeated every 3 weeks. Abdominal computed tomography (CT) revealed bleeding from the left gastric artery, which was invaded by the mass (Fig. 2a). Transarterial embolization was performed on the left gastric artery with coils and N-butyl-2-cyanoacrylate. A splenic artery pseudoaneurysm that also penetrated the mass was treated with coils (Fig. 2b, c). After the patient's general condition improved, chemotherapy was restarted. CT and upper GI endoscopy revealed that the mass had decreased markedly in size and the

embolization coil, used on the splenic artery, was exposed in the portion of the stomach where the mass had invaded (Fig. 3) 2 months after embolization.

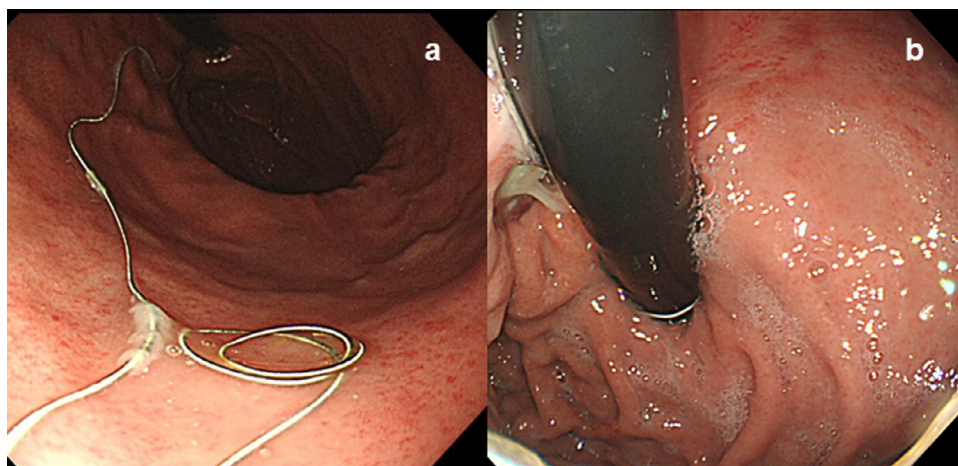
The patient responded partially to chemotherapy, which was continued. Follow-up endoscopy revealed a shallow ulcer and more extensive coil extrusion into the stomach (Fig. 4a). Five months after the embolization, the coil was not visible (Fig. 4b). At that time, coil migration was followed with x-ray examination, which demonstrated excretion of the coil.

## Discussion

Visceral artery pseudoaneurysms are caused by regional infection, inflammation, and trauma [7,8], and excessive hemorrhage from them can be life-threatening. Visceral artery aneurysms occur mainly in the splenic artery (60%-80%) and hepatic artery (14%-20%), whereas they occur rarely in the gastric artery (4%) [9]. In this case, inflammation by the lymph



**Fig. 3** – About 2 months after embolization of the left gastric artery and a splenic artery aneurysm, computed tomography revealed the markedly shrinking mass (a), and endoscopy showed the coil eroding through the gastric wall (b).



**Fig. 4** – (a) About 4 months after embolization, a strand of the wire extended into the stomach. (b) About 5 months after embolization, the coil was no longer visible in the stomach and was thought to have been excreted.

node mass might cause left gastric and splenic artery pseudoaneurysms, which were treated by coil embolization.

Migration of an embolization coil into the GI tract is a rare complication [10,11]. Although the exact reason for coil migration is unclear, most migrations occur after endovascular embolization for pseudoaneurysms, and localized inflammatory events occur before coil migration in some cases [12,13]. In addition to the neoplastic inflammation, chemotherapy might damage the vessel [14] and provoke more inflammation [15], which could be a trigger of coil migration. Migration occurred as the mass shrank in our case.

To reduce the risk of coil migration, proximal and distal embolization without filling the aneurysm space had been reported [10,11,16]. Because pseudoaneurysms have thin walls, they are more fragile than adjacent normal vessels and can be a pathway for migration. However, sandwich embolization sometimes cannot be performed in the context of branched vessels that supply blood flow to the aneurysm without a main proximal and distal vessel route, as in this case.

There is no standard management for migrated coils [13,16], because there is insufficient information regarding coil migration. Some were removed endoscopically or surgically, and others were conservatively treated. Some coils passed spontaneously, although this is extremely rare [13,17]. Shah et al reported the case of migration of embolization coil passed per rectum after splenic artery pseudoaneurysm embolization in a patient with chronic pancreatitis, although the exact route of passage was unclear [17]. Because there was no active bleeding or peritonitis, our patient was carefully followed up, and excretion of the coil was documented. To the best of our knowledge, this is the first report of endoscopic follow-up of coil migration progress to the stomach.

There have been 7 reported cases of visceral artery coil migration into the stomach in the English literature. The clinical figures, including the present case (total 8 cases), are summarized in Table 1. Six patients had pseudoaneurysms or aneurysms, and 2 underwent prophylactic embolization. Most initial coil locations were the splenic artery and gastroduo-

**Table 1 – Summary of reported cases of visceral artery coil migration into the stomach.**

| Author               | Age | Sex | Underlying disease     | Indication of coil embolization       | Location of initial coil deployment | Site of coil migration | Complications of coil migration     | Time from embolization | Treatment                                 |
|----------------------|-----|-----|------------------------|---------------------------------------|-------------------------------------|------------------------|-------------------------------------|------------------------|---|
| Current case         | 77  | M   | Esophageal cancer      | Pseudoaneurysm                        | Splenic artery                      | Gastric body           | None                                | 2 months               | Continuation of PPI                       |
| Takahashi et al [10] | 59  | M   | Chronic pancreatitis   | Pseudoaneurysm                        | Splenic artery                      | Gastric body           | None                                | 3 weeks                | Open surgery                              |
| Dinter et al [6]     | 82  | F   | Gastric ulcer bleeding | Aneurysm                              | Celiac artery                       | Gastric cardia         | Aortogastric fistula                | 10 years               | None (death)                              |
| Blitstein et al [18] | 67  | M   | HCC                    | Prophylactic embolization before TACE | GDA                                 | Gastric antrum         | Abdominal pain                      | 1 year                 | PPI administration                        |
| Chang et al [19]     | 63  | M   | HCC                    | Prophylactic embolization before TACE | RGA<br>Accessory RGA                | Gastric pylorus        | Anorexia<br>Gastric ulcer bleeding  | 2 years                | Endoscopic removal of coil and hemostasis |
| Skipworth et al [11] | 55  | M   | Chronic pancreatitis   | Pseudoaneurysm                        | GDA                                 | Gastric pylorus        | Abdominal tenderness<br>Weight loss | 10 months              | NJ-nutrition and future surgery           |
| Tekola et al [12]    | 48  | M   | Renal disease          | Pseudoaneurysm                        | Splenic artery                      | Gastric body           | Abdominal pain                      | 3 months               | Open surgery                              |
| Pratap et al [20]    | 65  | F   | None                   | Aneurysm                              | Splenic artery                      | Gastric body           | Dyspepsia<br>Anemia                 | 4 years                | Laparoscopic endoscopic combined surgery  |

PPI, proton pump inhibitor; HCC, hepatocellular carcinoma; TACE, transarterial chemoembolization; GDA, gastroduodenal artery; RGA, right gastric artery.

denal artery or the right gastric artery, and sites of migration were the gastric body and gastric pylorus or the antrum, respectively. Two cases, both of which were pseudoaneurysms of the splenic artery, showed no complications. Migrations occurred from 3 weeks to 10 years. Surgery or endoscopic removal was performed in 5 cases, and conservative therapy was administered in 2 cases.

Our case is one of 2 rare cases showing no symptoms and only one conservative treatment case of coil migration after splenic artery embolization. Although it is difficult to make recommendations on management because of its rarity, a conservative treatment would be an option in cases without complications.

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