

CASE REPORT

Spontaneous rupture of a gastroduodenal artery side branch immediately following endovascular treatment of gastroepiploic artery aneurysm or pseudoaneurysm

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Key clinical message

Pseudoaneurysms and aneurysms of the visceral arteries are rare entities. To the best of our knowledge, rupture of a proximal parental artery during endovascular treatment of a visceral aneurysm/pseudoaneurysm has not been reported and should be kept in mind as a tragic possibility immediately following an apparently successful management of them.

Abstract

A 55-year-old woman with a history of coronary artery disease was referred to our hospital with abdominal pain as her primary complaint. Early works revealed anemia, a small amount of free peritoneal fluid, and a possible large aneurysm or pseudoaneurysm by the greater curvature of the stomach. She underwent emergency angiography that showed a large aneurysm/pseudoaneurysm of the gastroepiploic artery. Successful embolization of the lesion was performed using the isolation technique. Perforation of a side branch of the gastroduodenal artery was observed on the immediate postembolization control angiography. Therefore, parent artery coiling was done immediately with good results. She was symptom-free and stable hemodynamically after the procedure, during the hospital course, and in the follow-ups.

KEYWORDS

angiography, endovascular coiling, ruptured visceral artery, vascular intervention, visceral aneurysm/pseudoaneurysm

1 | CASE PRESENTATION

A 55-year-old woman with a history of prior coronary artery bypass graft (CABG) 9 years ago was referred to our hospital due to severe abdominal pain and weakness. On arrival, she looked acutely ill, pale, and restless with BP and PR of 100/70 mmHg and 86/min, respectively, as well as a tender abdomen on physical examination.

Early evaluations showed anemia with a hemoglobin level of 6 mg/dL, and contrast-enhanced abdominal computed tomography (CT) scan revealed a small amount of free peritoneal fluid and a relatively hyperattenuated mass (50×75 mm) with an intensely enhancing core (40×60 mm) on the arterial phase located by the greater curvature of the stomach, suggestive of aneurysm/pseudoaneurysm (As/PAs) (Figure 1). Given the risk of

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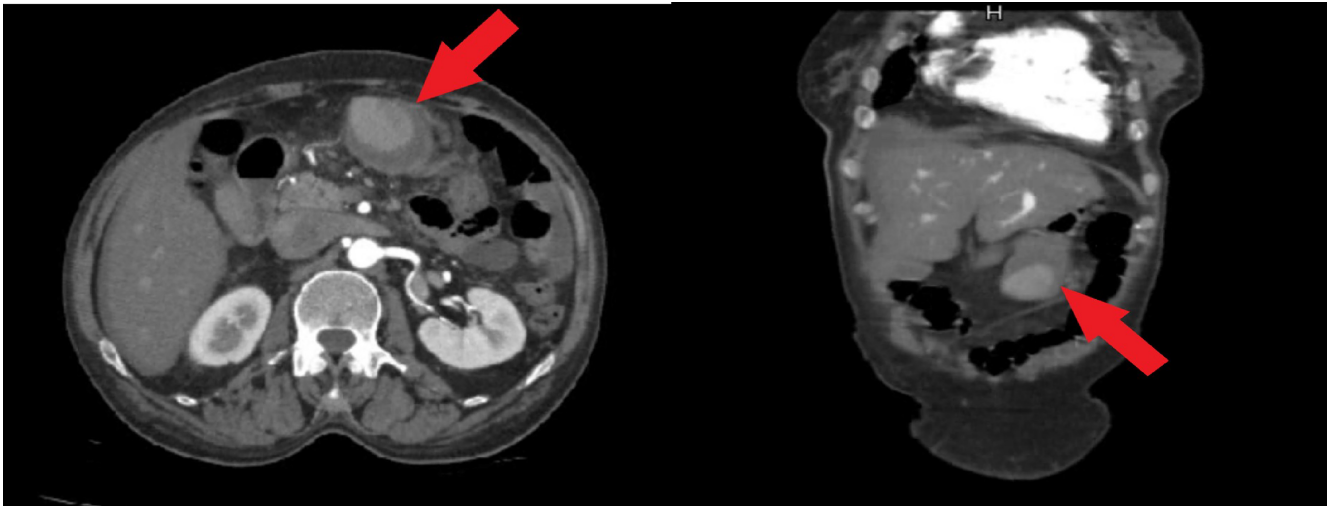


FIGURE 1 Axial and coronal images of the contrast-enhanced CT scan showing suspicious aneurysm in the epigastric area.

cardiovascular disease and unstable hemodynamic conditions of the patient, endovascular treatment was considered. Therefore, she was referred to angiography suite immediately. Through the right femoral arterial access, selective and superselective digital subtraction angiography (DSA) of the common hepatic artery and its branches was performed revealing a large wide-neck As/PAs ($40 \times 50 \times 60$ mm) of the right gastroepiploic artery was detected (Figure 2).

A Vasco microcatheter passed through a Cobra F5 catheter secured at the celiac trunk ostium and then via gastroduodenal artery (GDA) entered into the parent artery (right gastroepiploic), and then passed distal to the A/PA neck. First, the artery distal to the lesion was occluded using two microcoils (6×20 mm), followed by proximal artery embolization using a mixture of N-butyl cyanoacrylate and lipiodol. Control images revealed complete occlusion of the parental artery and nonopacification of the lesion lumen without any evidence of complications of the gastroduodenal artery and its side branches (Figure 3).

A second control DSA was done to obtain a better view of the celiac branches. Suddenly, an acute arterial rupture was detected at the ostium of the second side branch of GDA as a growing extravasation of contrast material (Figure 4).

Immediate coiling of the distal segment of the GDA was achieved using the Echelon microcatheter and two detachable microcoils (6×20 mm and 7×20 mm) with satisfactory result proved by the final DSA (Figure 5). The patient had a stable hospital course with improved symptoms and was discharged after a few days. She was completely symptom-free and looked happy on the seventh day of hospitalization and on the three-month follow-up. Computed tomography angiography (CTA) and

color Doppler examination revealed no imaging evidence of recanalization of the lesion.

2 | DISCUSSION

Splanchnic As/PAs are relatively rare, with a prevalence of 0.1%–2%.¹ The splenic artery is the most commonly involved artery (60%), followed by the hepatic artery (20%), superior mesenteric artery (8%), and gastric and gastroepiploic arteries (4%).²

Atherosclerosis, medial degeneration, abdominal trauma, and infection are among the major causes of true As/PAs, followed by less common etiologies such as connective tissue disorders and vasculitis.

As/PAs are mainly caused by iatrogenic and traumatic etiologies as well as secondary to infection and inflammation. Pancreatitis is the most common cause of splenic artery As/PAs.³

Pain, hemodynamic instabilities, and anemia are the most common symptoms of visceral artery As/PAs. The mortality rate from rupture of these lesions has been reported from 25% to 100%, regarding the location and size of them.^{1,4}

There are both surgical and endovascular treatment options for visceral artery As/PAs. Endovascular management gains more attraction because of technical success rates of 89%–98% of the patients, although surgical ligation has been the gold standard for their management.^{1,3,5,6}

The standard technique in endovascular management of visceral artery As/PAs is isolation, which includes stepwise embolization of the distal and proximal arteries, respectively. Detachable microcoils and liquid embolic agents are most commonly used to permanently occlude the inflow and outflow vessels.³

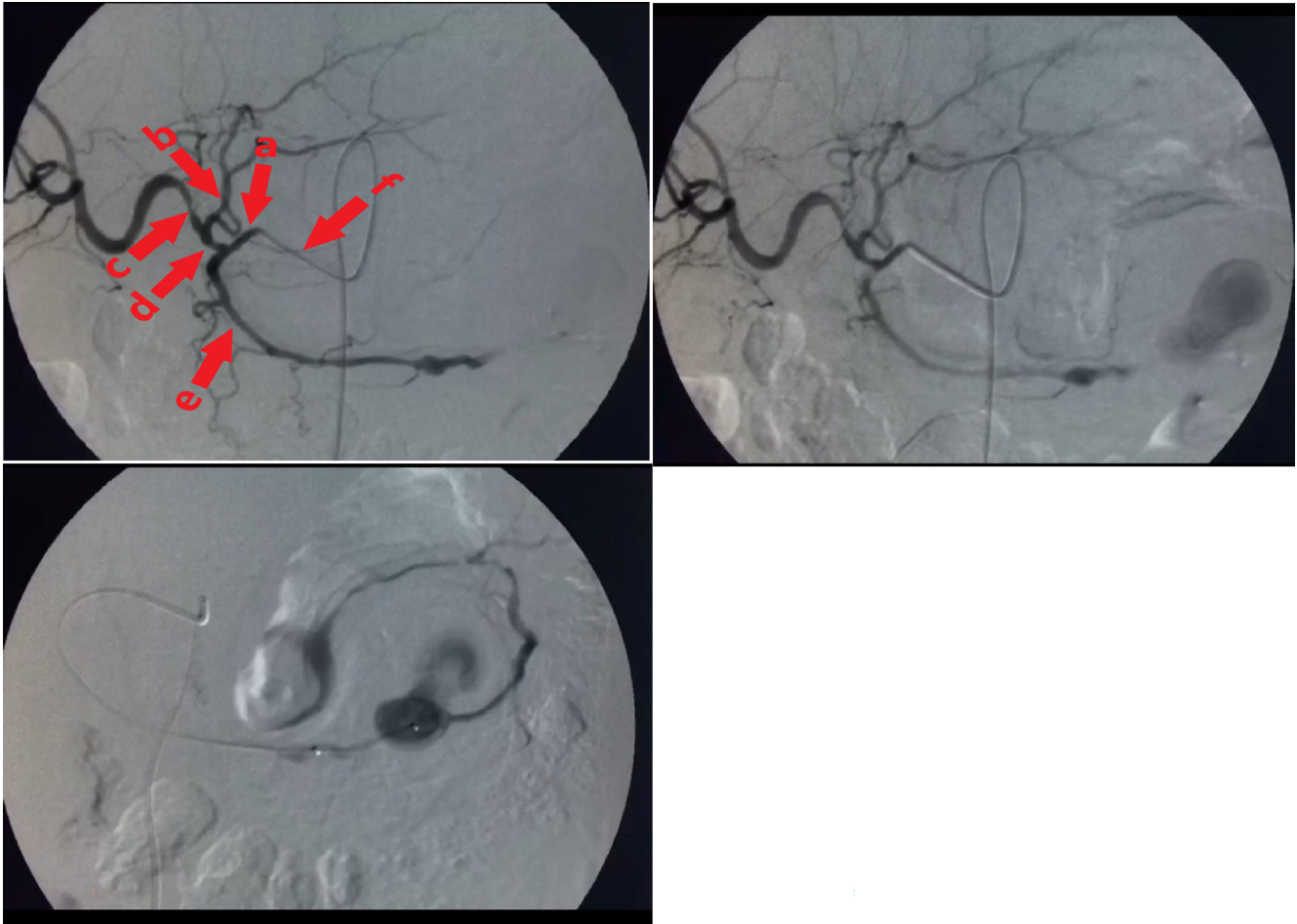


FIGURE 2 Selective DSA of the common hepatic artery shows a large aneurysm/pseudoaneurysm of the right gastroepiploic artery. Superselective microcatheterization of the neck of the lesion and visualization of the distal arterial segment are also shown (a: common hepatic artery, b: left hepatic artery, c: right hepatic artery, d: proper hepatic artery, e: gastroduodenal artery, f: catheter).



FIGURE 3 Selective DSA showing microcoiling and embolization distal and proximal to the lesion, respectively (arrows).



FIGURE 4 DSA shows extravasation of the contrast material from the second side branch of the gastroduodenal artery consistent with arterial rupture (arrow).

Other techniques to preserve the parent artery include stent grafts, stent-assisted coil packing of the As/PAs, and balloon-assisted thrombin injection. Coil

packing is not indicated in the management of As/PAs as their sac continues to expand because of lack of true wall.^{1,3}

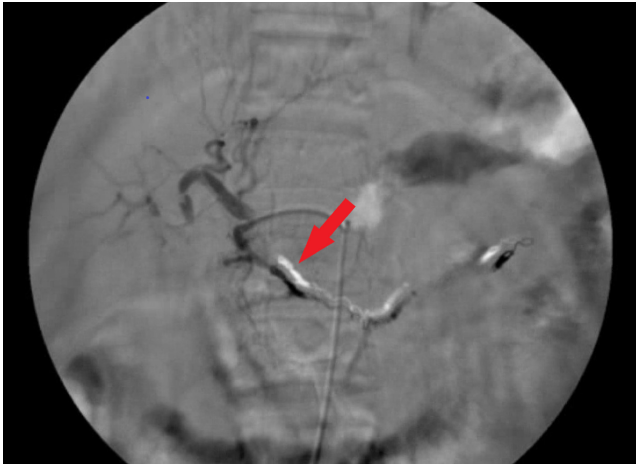


FIGURE 5 DSA demonstrating glue embolization at the site of gastroduodenal artery branch rupture (arrow).

Significant complications related to visceral artery embolization include visceral ischemia and infarction, parental vessel dissection, hepatic abscess, and cholecystitis.³

Failure of endovascular therapy has been observed as reperfusion of the As/PAs that might be related to incomplete coiling, technical difficulties, migration of the coils and stents, and persistent inflammatory state.^{3,6}

It has been recommended to perform follow-up 7–30 days, 6 months, and yearly CT-scan or magnetic resonance imaging (MRI) studies to exclude recanalization of As/PAs.^{4,5}

Spontaneous rupture of the arteries proximal to splanchnic arterial As/PAs immediately following embolization has not been reported in the literature.

We assumed it could be a result of regional hemostatic changes secondary to acute embolization of the parent artery, underlying vascular disease and long-term administration of anticoagulants considering history of CABG, and iatrogenic trauma or a combination of them.

3 | CONCLUSION

As/PAs of the visceral arteries are rare entities, and spontaneous rupture of the parental arteries proximal to them during endovascular management is even a rarer entity that has not been reported and should be kept in mind as a possible catastrophic event immediately following the procedure.

AUTHOR CONTRIBUTIONS

Mohammad Gharib Salehi: Conceptualization; data curation; methodology; project administration; supervision; writing – original draft. **Mohammad Hossein Golezar:** Data curation; investigation; methodology; supervision; writing – original draft; writing – review and editing.

Mahmoud Goudarzi: Formal analysis; investigation; methodology; validation; visualization; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors declare that there is no conflict of interest regarding the publication of this article.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available upon request from the corresponding author. These data are not publicly available due to privacy or ethical restrictions.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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