

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: <http://Elsevier.com/locate/radcr>

Interventional Radiology

Spontaneous hemoperitoneum resulting from segmental arterial mediolysis

Emily Olivares^{a,*}, Harlan Vingan MD^a, Qiao Zhou MD^b^a Department of Radiology, Eastern Virginia Medical School, Norfolk, VA, USA^b Department of Radiology, Emory University, Atlanta, GA, USA

ARTICLE INFO

Article history:

Received 11 October 2017

Received in revised form 19

November 2017

Accepted 30 November 2017

Available online

Keywords:

Arteropathy

Aneurysm

Spontaneous hemoperitoneum

Angiography

ABSTRACT

Segmental arterial mediolysis is a rare but potentially life-threatening arteropathy of medium to large arteries that can be managed with endovascular treatment for patients who are hemodynamically unstable. We present a case of segmental arterial mediolysis in a 73-year-old woman who developed spontaneous hemoperitoneum in the emergency department after initially presenting with unrelated upper respiratory complaints. Her initial computed tomography revealed an aneurysm arising off the right hepatic artery. She was taken to the interventional radiology suite for embolization and multiple aneurysms along the right hepatic artery were identified that had the appearance of segmental arterial mediolysis. She initially stabilized but then developed acute renal failure and had a decrease in hemoglobin on postprocedure day 2. She was taken back to the angiography suite where multiple small left gastric and left hepatic trunk aneurysms were identified, with a small area of extravasation evident. The vessel was coiled from the liver to the origin of the left gastric artery. She was discharged and had a follow-up angiogram 2 months later, which showed interval development of an aneurysm to the distal right hepatic artery.

© 2018 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Case report

A 73-year-old woman with a medical history of hypertension and hypercholesterolemia initially presented to the emergency department for sinus congestion. While in the emergency department, she experienced sudden onset of severe pain in her right upper quadrant with nausea and vomiting. On examination, she appeared uncomfortable and pale with exquisite right upper quadrant tenderness; temperature was 96.1°F, blood

pressure was 81/51 mm Hg, heart rate was 86 bpm, respiratory rate was 20 breaths/min, and O₂ saturation was 96%. Her hemoglobin and hematocrit (H/H) decreased from 11 and 32.9 to 9.1 and 25.4 after the onset of abdominal pain. She was then taken for computed tomography (CT) of the abdomen and pelvis with contrast which revealed hemoperitoneum and an aneurysm arising off the right hepatic artery as a probable source of the bleeding (Fig. 1). She was given fluids and a blood transfusion, and interventional radiology was consulted for embolization. During the intervention, multiple aneurysms were

Competing Interests: The authors have declared that no competing interests exist.

* Corresponding author.

E-mail address: olivarel@evms.edu (E. Olivares).

<https://doi.org/10.1016/j.radcr.2017.11.019>

1930-0433/© 2018 the Authors. Published by Elsevier Inc. under copyright license from the University of Washington. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

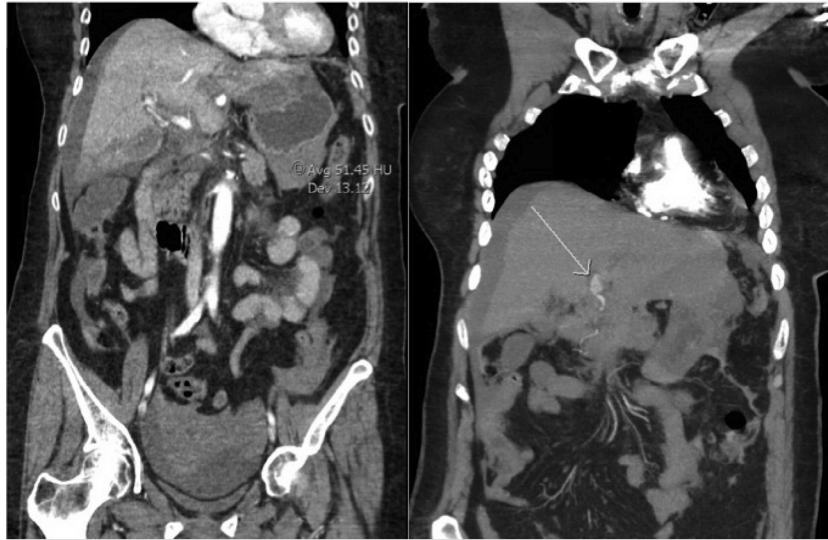


Fig. 1 – Computed tomography of the abdomen and pelvis with contrast showing hemoperitoneum and an aneurysm arising off the right hepatic artery.

identified along the course of the right hepatic artery that had the angiographic appearance of segmental arterial mediolysis (SAM). The dominant right hepatic artery aneurysm, which was thought to be the site of the bleeding, was identified and coiled (Fig. 2).

The patient initially stabilized with an H/H of 10.2/29.9 and blood pressure of 107/66; however, on postprocedure day 1, her H/H once again decreased to 8.9/24.2 and she developed acute renal failure. A noncontrast CT was ordered, which was not diagnostic. The patient was brought back to the angiography suite where multiple small left gastric and left hepatic trunk aneurysms were identified, with a small area of extravasation evident. The vessel was coiled from the liver to the origin of the left gastric artery (Fig. 3). After the procedure, her blood pressure stabilized to 110/80 and her H/H increased to 10.1/

27.3. The patient was eventually taken off pressors and transferred out of the intensive care unit. The H/H remained stable and she was discharged on hospital day 15. She returned for a follow-up angiogram after 2 months, which showed that there was a new aneurysm to the distal right hepatic artery. The feeding vessel to the aneurysm was subsequently coiled (Fig. 4).

Discussion

SAM is a relatively rare nonatherosclerotic, noninflammatory arteropathy characterized by degeneration of the muscular layer of medium to large arteries. The splanchnic and renal arteries

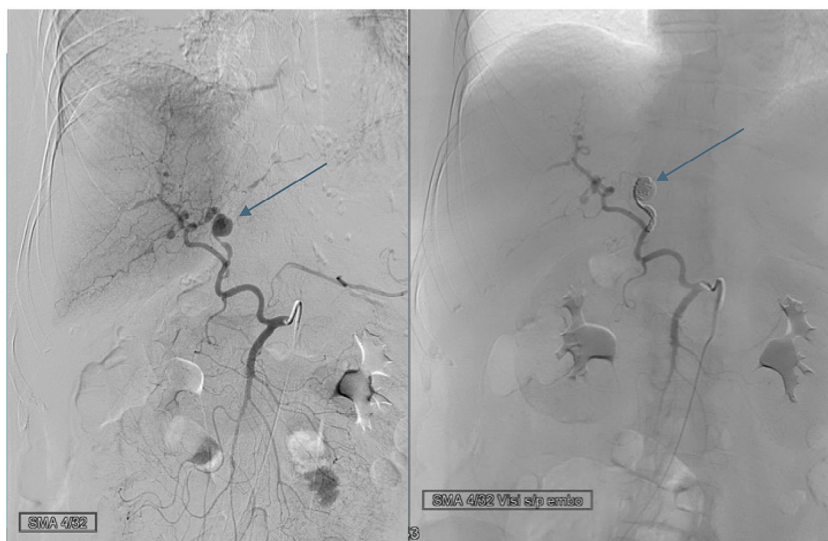


Fig. 2 – Multiple aneurysms are identified along the course of the right hepatic artery with the angiographic appearance of segmental arterial mediolysis. The dominant right hepatic artery was then coiled.

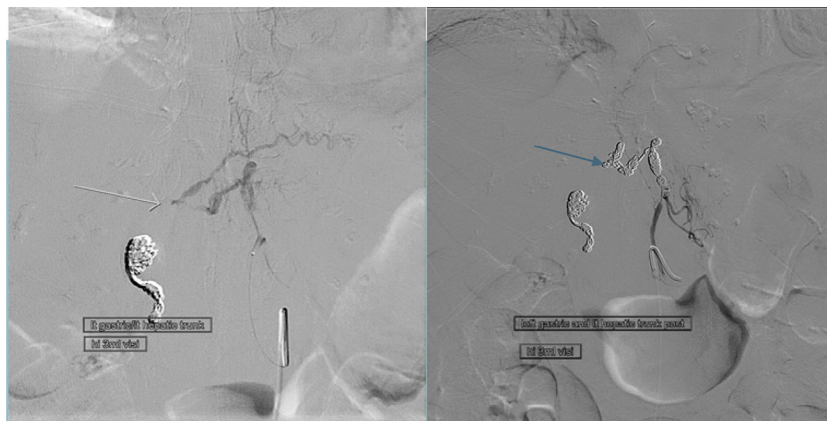


Fig. 3 – Multiple small left gastric and left hepatic trunk aneurysms with a small area of extravasation at the distal portion. The vessel was coiled from the liver to the origin of the left gastric.

are the most commonly involved, but cases involving the carotid, cerebral, and coronary arteries have also been reported. SAM typically affects the middle aged and elderly population and is slightly more common in men. It is associated with a 25%-50% mortality[1].

SAM involves an initial injurious phase followed by a reparative phase to the affected vessels. Although the exact etiology is unknown, it is thought to be catalyzed by a vasospastic event, such as hypoxemia, pulmonary hypertension, vasopressor administration, recent anesthesia, and so on, which injures the vessel resulting in lysis and degeneration of the outer arterial wall [2]. The medial layer subsequently tears from the adventitia and gaps form between the intima and the damaged internal elastic lamina [3]. These gaps are vulnerable to dissection and intramural hematoma. This is followed by a reparative phase where granulation tissue forms in the gaps and is replaced with fibrotic tissue in an effort to restore normal vessel architecture [4]. Secondary dissection can occur during the reparative phase [2]. Vessel walls become weakened to the point of impending arterial rupture. This process can happen in portions or throughout the entire circumference and affects segments of the artery, with normal segments in between [3].

Presentation of SAM is variable and ranges from incidentally discovered aneurysms to life-threatening intra- or

retroperitoneal hemorrhage, although most patients present with nonspecific abdominal or flank pain [4]. Biopsy and histologic studies are required to definitively diagnose SAM; however, this is typically not done because the most commonly affected vessels are located deep in the abdomen and are difficult to access. Instead, SAM is diagnosed based on characteristic clinical and radiographic features once atherosclerosis, inflammatory conditions, and connective tissue disorders that could also cause dissections have been ruled out [5]. SAM may mimic other vasculitides, such as polyarteritis nodosa, systemic lupus erythematosus, or fibromuscular dysplasia, but can be distinguished by the involvement of the main branches of the aorta, including the celiac trunk, superior mesenteric artery, inferior mesenteric artery, renal arteries, and rarely the carotid arteries, coronary arteries, and cerebral arteries [4]. Six distinct angiographic patterns of SAM have been described: arterial dilations, single aneurysm, multiple aneurysms in a “string-of-beads” pattern, dissecting hematomas, and arterial occlusion [1].

Many cases of SAM are self-limited and can be managed conservatively with supportive care. However, patients who are hemodynamically unstable or develop significant end-organ ischemia require definitive treatment with embolization or surgical bypass or resection of the affected arteries [6]. Steroids

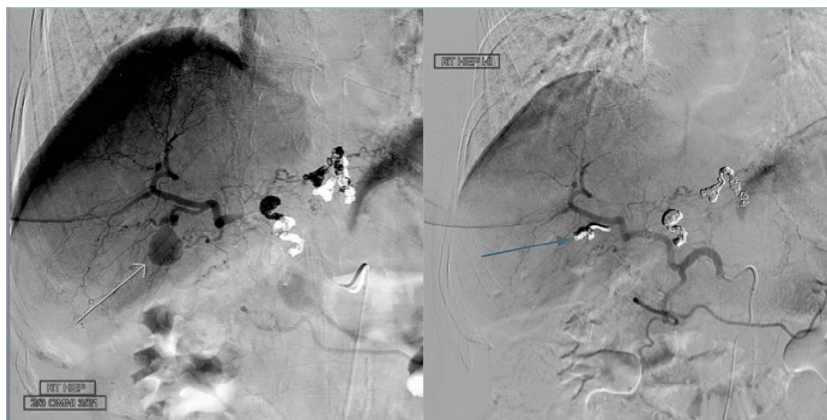


Fig. 4 – Interval development of a distal right hepatic artery aneurysm and subsequent coiling of the feeding vessel.

are not effective in stopping the progression of disease and in fact have been shown to result in worse clinical outcomes. It is recommended that patients have long-term follow-up with computed tomography angiography to monitor for interval development of aneurysms [7].

REFERENCES

- [1] Slavin RE. Segmental arterial mediolysis: course, sequelae, prognosis, and pathologic-radiologic correlation. *Cardiovasc Pathol* 2009;18:352–60.
- [2] Tabassum A, Sasani S, Majid AJ, Henderson C, Merrett ND. Segmental arterial mediolysis of left gastric artery: a case report and review of pathology. *BMC Clin Pathol* 2013;13(1):26. doi:10.1186/1472-6890-13-26.
- [3] Pillai AK, Iqbal SI, Liu RW, Rachamreddy N, Kalva SP. Segmental arterial mediolysis. *Cardiovasc Intervent Radiol* 2014;37(3):604–12. doi:10.1007/s00270-014-0859-4.
- [4] Alhalabi K, Menias C, Hines R, Mamoun I, Naidu S. Imaging and clinical findings in segmental arterial mediolysis (SAM). *Abdom Radiol (NY)* 2017;42(2):602–11.
- [5] Schönefeld E, Kasprzak B, Völker W, Plenz G, Torsello G. [Segmental arterial mediolysis: pathogenesis of aneurysms and dissections in patients younger than 60 years]. *Zentralbl Chir* 2012;137:466–71.
- [6] Fujiwara Y, Takemura M, Yoshida K, Morimura K, Inoue T. Surgical resection for ruptured aneurysm of middle colic artery caused by segmental arterial mediolysis: a case report. *Osaka City Med J* 2010;56:47–52.
- [7] Shimohira M, Ogino H, Sasaki S, Ishikawa K, Koyama M, Watanabe K, et al. Transcatheter arterial embolization for segmental arterial mediolysis. *J Endovasc Ther* 2008;15(4):493–7. doi:10.1583/08-2384.1.