

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

ScienceDirect

journal homepage: [www.elsevier.com/locate/radcr](http://www.elsevier.com/locate/radcr)

## Case Report

# Stent treatment for huge aneurysm of the common hepatic artery: A case report

Manat Zhakubayev, MD<sup>a,b</sup>, Yasuhiro Maruya, MD, PhD<sup>a</sup>, Mitsuhisa Takatsuki, MD, PhD<sup>a</sup>, Zhassulan Baimakhanov, MD, PhD<sup>b</sup>, Akihiko Soyama, MD, PhD<sup>a</sup>, Masaaki Hidaka, MD, PhD<sup>a</sup>, Tomohiko Adachi, MD, PhD<sup>a</sup>, Ichiro Sakomoto, MD, PhD<sup>c</sup>, Susumu Eguchi, MD, PhD<sup>a,\*</sup>

<sup>a</sup> Department of Surgery, Nagasaki University Graduate School of Biomedical Sciences, 1-7-1 Sakamoto, Nagasaki 852-8501, Japan

<sup>b</sup> Department of Surgery, A.N. Syzganov's National Scientific Center of Surgery, Almaty, Kazakhstan

<sup>c</sup> Department of Radiology, Nagasaki University Hospital, Nagasaki, Japan

## ARTICLE INFO

## Article history:

Received 8 July 2018

Revised 9 September 2018

Accepted 11 September 2018

Available online 10 October 2018

## Keywords:

Segmental arterial mediolysis

Stenting

Aneurysm

## ABSTRACT

**Objective/Background:** Huge aneurysm of the visceral artery is rare and a treatment strategy for such cases has not yet been established. Here, we report a case of huge aneurysm of the common hepatic artery (44-mm diameter) successfully treated by stent placement.

**Methods:** A 77-year-old female patient was referred to our department due to growth of the common hepatic artery aneurysm. The cause of the aneurysm was suspected to be segmental arterial mediolysis. Due to the possibility of a spontaneous rupture, we decided to stent the common hepatic artery.

**Result:** We had some difficulties during the procedure, such as thrombosis of the stent, and it was necessary to insert an additional stent. The procedure was effective and the patient has been doing well without any complications at the 6-year follow-up.

**Conclusion:** Stenting is possible and effective in cases of huge aneurysm of the common hepatic artery.

© 2018 The Authors. Published by Elsevier Inc. on behalf of 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/>)

## Introduction

Huge aneurysm of the visceral artery is rare and requires special treatment because, if the aneurysm ruptures, it can be a

life-threatening complication [1]. Open abdominal surgery or radiologic endovascular stenting may be suitable strategies in such cases; however, a standard treatment strategy has not been established. Here, we report a case of huge aneurysm of the common hepatic artery (CHA), believed to be due to

**Abbreviations:** SAM, segmental arterial mediolysis; CHA, common hepatic artery; PHA, proper hepatic artery; SMA, superior mesenteric artery; SA, splenic artery; GDA, gastroduodenal artery.

**Acknowledgments:** We do not have any financial support for this work.

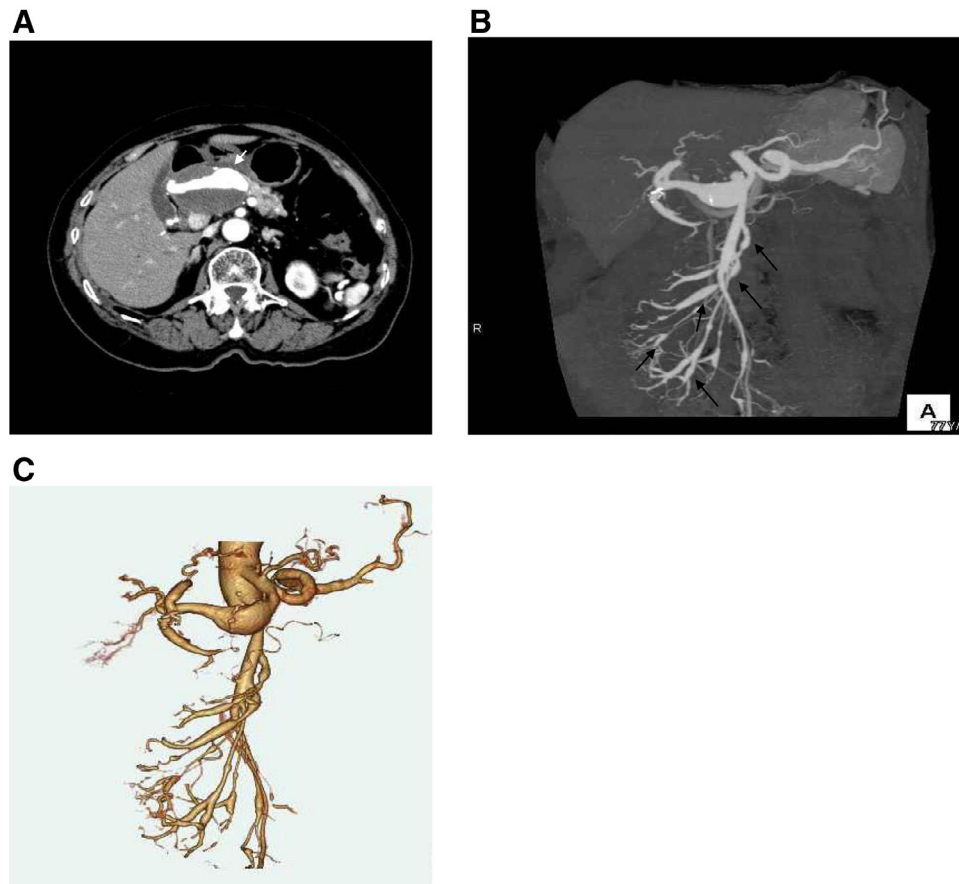
**Conflict of interest:** None of the authors have conflicts of interest to declare.

\* Corresponding author.

E-mail address: [sueguchi@nagasaki-u.ac.jp](mailto:sueguchi@nagasaki-u.ac.jp) (S. Eguchi).

<https://doi.org/10.1016/j.radcr.2018.09.008>

1930-0433/© 2018 The Authors. Published by Elsevier Inc. on behalf of 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** – The enhanced CT shows huge aneurysm of common hepatic artery (the white arrow) (A). The enhanced CT shows a diffusive extension of the splenic artery (SA), proper hepatic artery (PHA), gastroduodenal artery (GDA), and string-of-beads appearances of superior mesenteric artery (SMA; the black arrows) (B). The 3D-processed CT examination which accurately details the arteries involved in the process (C). CT, computed tomography.

segmental arterial mediolysis (SAM), successfully treated with endovascular stenting.

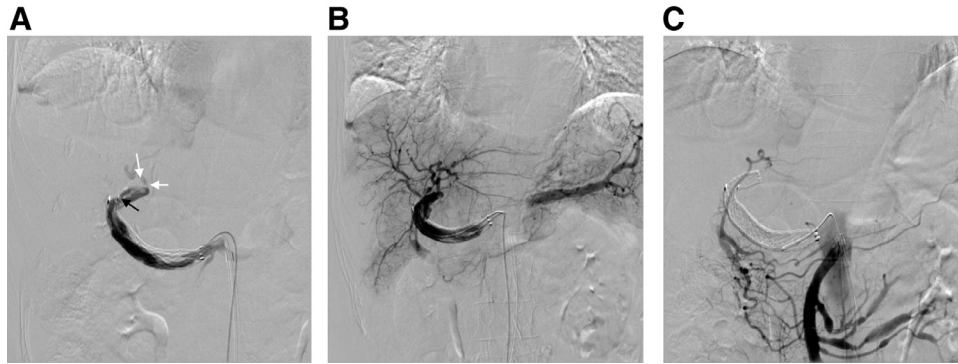
### Case report

A 77-year-old female patient was admitted to the hospital with a diagnosis of aneurysm of the CHA and comorbid hepatitis C virus infection and hyperuricemia. The aneurysm had been diagnosed 2 years previously when a computed tomography (CT) scan performed due to hepatitis C revealed the aneurysm of the CHA. At the time of the initial examination, the size of the aneurysm was 35 mm. However, the patient had no complaints. Clinical follow-up was performed 2 years later.

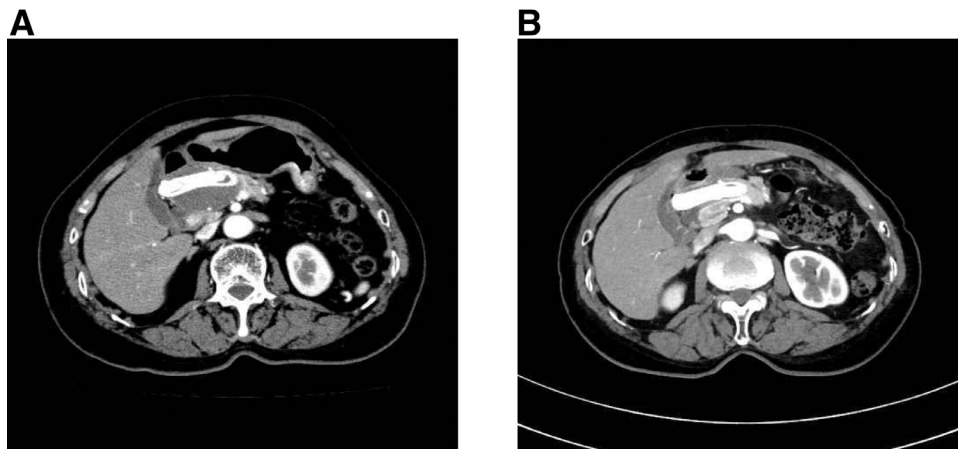
Subsequent contrast-enhanced CT examination showed that the size of the aneurysm had increased. The patient was referred to our center for further examination. Laboratory screening for vasculitis (C-reactive protein, antinuclear antibodies, and immunoglobulin) was negative. Except for the aneurysm, the patient had no clinical criteria for connective tissue diseases such as Behcet's syndrome, neurofibromatosis, or inherited defects in vessel wall structural protein such

as type 4 Ehlers-Danlos or Marfan syndrome. An abdominal contrast-enhanced CT scan showed that the size of the aneurysm of the CHA was 44 mm and 0.9 mm increase from 2 years ago (Fig. 1A). In addition, the CT revealed a diffusive extension of the splenic artery, proper hepatic artery, gastroduodenal artery, and a string-of-beads appearance of the superior mesenteric artery (Fig. 2B and C). Because of the significant increase in diameter, we decided to treat the patient due to the risk of spontaneous rupture. As open abdominal surgery could cause complications like hemorrhage and hepatic infarction, the decision to perform endovascular treatment was made.

Under local anesthesia, the bilateral common femoral artery was punctured and a 5F Flexor long sheath introducer was placed. A 9F Flexor long sheath introducer was placed in the common hepatic artery. A stent graft (10-mm diameter, 80-mm length, FLUENCY Plus Endovascular Stent Graft; Bard Peripheral Vascular, Tempe, AZ) was placed from the CHA with transition to the proper hepatic artery. After the stent was expanded using a balloon (7-mm diameter, 40-mm length, PowerFlex P3; Cardinal Health, Dublin, OH), the stenting zone was contrasted where the thrombosis was detected in the lumen of the stent placed in the hepatic artery. Next, heparin (3000



**Fig. 2 – A** stentgraft (10-mm diameter, 80-mm length, FLUENCY Plus Endovascular Stent Graft; Bard Peripheral Vascular, Tempe, AZ) was placed from the CHA with transition to the PHA; the distal part of the stent hits a wall of the proper hepatic artery (the black arrow), and there are thrombi in a lumen of the stent and in the proper hepatic artery (the white arrows) (A). Additional stentgraft (10-mm diameter, 60-mm length SMART; Cardinal Health, Dublin, OH) was deployed in the lumen of the previous stent and the lumen of the own artery of the liver (B). Control angiography shows filling of the left hepatic artery through the pancreatic arch (C). CHA, common hepatic artery; PHA, proper hepatic artery.



**Fig. 3 – (A)** The contrast-enhanced CT 10 months after stenting. **(B)** The contrast-enhanced CT 5 years after intervention. CT, computed tomography.

units) and urokinase (18,000 units) were administered using a 4-Fr catheter for successful lysis of the thrombus. Because the absence of adaptation of the distal part of the stent to the artery wall was visualized on the angiography from the celiac trunk, which could cause feebleness of circulation and, consequently, thrombus formation, the decision was made to mount an additional stent. The additional stent (10-mm diameter, 60-mm length SMART; Cardinal Health, Dublin, OH) was deployed in the lumen of the previous stent and the lumen of the own artery of the liver. During the control angiography, the liver was contrasted through the pancreatic arcade to the left hepatic artery (Fig. 2A-C).

During the postoperative period, an antiplatelet drug was administered at a dose of 100 mg/d. The patient was discharged in satisfactory condition 8 days after the operation. Three months after discharge, the patient was examined by contrasted CT. The images showed that the thrombi in the lumen of the stent were not preventing blood supply to the liver; therefore, there was no need to repeat the intervention. Imaging was performed every 6 months and no negative changes

were observed. Two years after the operation, the patient's condition was satisfactory and imaging was reduced to once per year. At the 6-year follow-up (Fig. 3), the patient was well and there were no significant interval changes in other visceral arteries or veins.

## Discussion

The cause of the huge aneurysm of the CHA in the current case was suspected to be SAM, based on the CT and angiography findings. SAM, which was first reported as a distinct pathologic entity in 1976, is characterized by necrosis of the outer tunica media-adventitia junction [2]. Although a definitive diagnosis of SAM requires histopathologic evaluation of the arterial lesions, in our case, due to the number of arteries with diffusive extension and the string-of-beads appearance, as well as the absence of evidence of vasculitis on clinical and laboratory assessments, the arterial changes

were suspected to be caused by SAM. Fibromuscular dysplasia remains a possible alternative diagnosis, but it generally occurs in the renal arteries and in young females [3]. Other differential diagnoses, including infection (eg, mycotic aneurysm and endocarditis), connective tissue diseases (eg, Bechet's disease and polyarteritis nodosa), neurofibromatosis, and inherited defects in vessel wall structural proteins (eg, type IV Ehlers Danlos and Marfan syndrome), were excluded as there were no signs of infection or evidence of a systemic connective tissue disorder.

Different methods of treatment for aneurysms of the visceral arteries are available, and the choice of treatment depends on the specific case. Imazuru et al. reported surgical treatment for a huge hepatic artery aneurysm (67–88-mm diameter), and in this report for patients with a 2–5 cm diameter hepatic artery aneurysm, electing for the surgical intervention may be more controversial, while a diameter  $\geq 5$  cm indicates a huge hepatic artery aneurysm, and usually some surgical treatment or intervention is required [4]. Aburano et al. used a stent graft in the treatment of a common hepatic artery aneurysm [5]. Many medical professionals consider it dangerous to conduct endovascular interventions on arterial lesions caused SAM that show tendency to dissection or development of aneurysm, since there is the possibility of additional dissection of an artery wall [6,7]. Obara et al. reported a case of a patient with large splenic artery and celiac artery aneurysms associated with SAM who was treated with an aortic stent graft and coeliac embolization [8]. In our case, having analyzed all studies and assessed the anatomy of the vessels, which allows holding intervention, as well as accounting for the patient's age, we decided to treat with endovascular treatment. The treatment with stenting was effective, and the patient has recovered well without any complications.

In conclusion, our report describes successful treatment of an elderly woman with a huge aneurysm of the CHA suspected to be caused by SAM. This case demonstrates that en-

dovascular stenting is effective, even for cases of huge visceral arterial aneurysm.

---

## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.radcr.2018.09.008](https://doi.org/10.1016/j.radcr.2018.09.008).

---

## REFERENCES

- [1] Arneson MA, Smith RS. Ruptured hepatic artery aneurysm: case report and review of literature. *Ann Vasc Surg* 2005;19:540–5.
- [2] Slavin RE, Gonzalez-Vitale JC. Segmental mediolytic arteritis: a clinical pathologic study. *Lab Invest* 1976;35(1):23–9.
- [3] Baker-LePain JC, Stone DH, Mattis AN, Nakamura MC, Fye KH. Clinical diagnosis of segmental arterial mediolysis: differentiation from vasculitis and other mimics. *Arthritis Care Res* 2010;62(11):1655–60.
- [4] Imazuru T, Uchiyama M, Matsuyama S, Iida M, Shimokawa T. Surgical treatment of a huge hepatic artery aneurysm without revascularization—case report. *Int J Surg Case Rep* 2018;51:95–8.
- [5] Aburano H, Morinaga K, Shigenari N, Inoue D, Okuda M, Minami T, et al. Common hepatic artery aneurysm treated with an endovascular stent graft: a case report. *Abdom Imaging* 2010;35:215–17.
- [6] 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;15:493–7.
- [7] Ryan JM, Suhocki PV, Smith TP. Coil embolization of segmental arterial mediolysis of the hepatic artery. *J Vasc Interv Radiol* 2000;11:865–8.
- [8] Obara H, Matsubara K, Inoue M, Nakahata S, Kuribayashi S, Kitagawa Y. Successful endovascular treatment of hemosuccus pancreaticus due to splenic artery aneurysm associated with segmental arterial mediolysis. *J Vas Surg* 2011;54:1488–91.