A Case of True Brachial Artery Aneurysm with Severe Left Upper Limb Ischemia

Kengo Nishimura, MD, PhD¹ Takafumi Hamasaki, MD, PhD¹ Syunsuke Fukino, MD, PhD¹

¹Department of Surgery, Tottori Prefectural Kosei Hospital, Tottori, Japan

Address for correspondence Kengo Nishimura, MD, PhD, 150 Higashisyouwa-machi, Kurayoshi 682-0804, Japan (e-mail: nishimurakengo@hotmail.co.jp).

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Abstract

Keywords

- ▶ upper limb ischemia
- ▶ true brachial artery aneurysm
- ▶ arteriovenous fistula

Brachial artery (BA) aneurysms are rare, and most are false aneurysms. Although true BA aneurysms have been reported, most have been reported without symptoms. A 65-year-old man was referred due to a left upper limb mass with rest pain and slight ulceration of the left second and third fingers. As enhanced computed tomography revealed the patency of only the left proximal and distal BA as well as the thrombosed mass, excision of the aneurysm and BA replacement were performed with a great saphenous vein graft. The postoperative course was uneventful, and the rest pain and ulceration were resolved.

Upper extremity aneurysms are relatively rare compared with other peripheral arterial aneurysms, and most are false aneurysms.¹ Especially, true brachial artery (BA) aneurysms are rare. Although the majority of the BA aneurysms are thought to be the result of trauma,² their natural history and incidence are still unclear.^{3,4} BA aneurysms have no symptoms until thromboembolic or neurological complications occur and most of the aneurysms have been repaired by open surgery.^{2,4,5} We herein report a rare case of a left BA aneurysm with severe upper limb ischemia.

Case Report

Although a 65-year-old man underwent the creation of a radiocephalic arteriovenous fistula at the left wrist in 2004 at another hospital, the fistula was occluded and so he underwent fistula creation at the right wrist in 2005. Moreover, he noticed a mass just above the left elbow joint that had slowly grown since 2010. However, he was referred to our hospital due to the mass measuring approximately 4 × 4 cm with rest pain and slight ulceration of the left second and third fingers in 2015. He underwent hemodialysis three times a week and had a medical history of cerebral hemorrhage, type B aortic dissection, hypertension, atrial flutter, and chronic pancreatitis. The patient's height was 171 cm and body weight was 54 kg. The patient's blood pressure in the left upper arm was

122/79 mm Hg and pulse was 75/minute, while the pressure in the left forearm was not measured. Physical examination was unremarkable except for the mass just above the left elbow joint and left hemiplegia as well as no pulse of the left BA, radial, and ulnar arteries, respectively. Laboratory examination showed amylase, 198 IU/L; alkaline phosphatase, 583 IU/L; lactate dehydrogenase, 260 IU/L; total cholesterol, 266 mg/dL; blood urea nitrogen, 47.8 mg/dL; creatinine, 8.23 mg/dL, prothrombin time and international normalized ratio, 1.63, and C-reactive protein, 3.80 mg/dL. Ultrasound showed a left upper limb thrombosed mass just above the left elbow joint. Enhanced computed tomography revealed the left patent proximal BA and ulnar artery as well as the fusiform thrombosed mass measuring 3 × 3 cm at the distal BA (–Fig. 1A–C). Cardiac ultrasound showed an almost normal left ventricular function (ejection fraction: 52%) and mild aortic regurgitation. Thus, we diagnosed him with a left BA aneurysm with severe upper limb ischemia. In a supine position, after we harvested the left great saphenous vein (GSV) of a medial thigh, the proximal and distal BAs were exposed (–Fig. 2). As the distal BA mostly showed a calcified intima, excision of the aneurysm and BA replacement were performed with a GSV graft after endarterectomy at the distal anastomosis. The wall of the fusiform aneurysm measuring 3.4 × 2.0 cm was solid without adhesion around the tissues (–Fig. 3A).

Fig. 1 (A) Enhanced CT reveals the mass measuring 3 × 3 cm. (B) Enhanced CT shows the left patent proximal BA (solid arrow) and ulnar artery (dotted arrow). (C) Enhanced CT shows the fusiform thrombosed mass (solid arrow) at the left distal BA as well as the patent proximal BA. BA, brachial artery; CT, computed tomography.

Hematoxylin-eosin (HE) staining of the aneurysm showed marked atheromatous degeneration with cholesterol in the intima, while Elastica van Gieson (EVG) staining revealed a decrease of elastic fibers in the tunica media (►Fig. 3B).

The postoperative course was uneventful. The left ulnar artery was palpable, the rest pain and ulceration were resolved, and he was discharged on the 15th postoperative day.

Discussion

True BA aneurysms are rare. Igari et al previously reported five aneurysms of the upper limbs from 2000 to 2012, and

only one of the aneurysms was a true BA aneurysm with an asymptomatic mass.⁶ The Cleveland and the Mayo Clinics identified only one case of a true BA aneurysm in 581 brachial artery reconstructions performed between January 1989 and December 2000,⁷ and only two cases over a 20-year period,¹ respectively. Although we have often treated false aneurysms or shunt blood vessel dilatation or aneurysms in the upper limbs, the present true BA aneurysm is the first case in our hospital. Most pseudo-BA aneurysms are the result of trauma,² while the reported etiology of a true BA aneurysm has been quite limited. Moreover, although the BA just above the elbow joint might have been punctured for hemodialysis, he had no history of trauma at the left upper arm, diabetes, or infection. Thus, the etiology is still unclear in the present case.

HE staining of the aneurysm showed marked atheromatous degeneration in the intima, while EVG staining revealed a decrease of elastic fibers in the tunica media, being consistent with the results of Chemla et al³ and Tetik et al.⁴ We previously reported that the pathological hallmark of a middle colic artery aneurysm is considered to be remodeling of the arterial wall, involving fragmentation and a decrease of elastic fibers in the tunica media.⁸ In the present case, pathological findings similar to the degeneration of elastic fibers were shown. Although the case has been quite limited, the pathological findings indicated that degenerated elastic fibers can probably play an important role in a true BA aneurysm as well as a middle colic artery aneurysm.

Conclusion

Here, we report a rare case of a left BA aneurysm with severe upper limb ischemia. The degenerated elastic fibers can probably play an important role in a true BA aneurysm.

Fig. 2 Intraoperative image shows that the proximal (left) and distal (right) brachial arteries are exposed.

Fig. 3 (A) This is the resected specimen after formalin fixation. The wall of the fusiform brachial artery aneurysm measuring 3.4×2.0 cm is solid without adhesion around the tissues. The arrows show the border between the aneurysmal and normal walls. (B) EVG (Elastica van Gieson) staining of the aneurysm (dotted quadrangle in A) shows a decrease of elastic fibers in the tunica media.

Conflict of Interest

All authors declare that they have no conflict of interest.

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References

- 1 Gray RJ, Stone WM, Fowl RJ, Cherry KJ, Bower TC. Management of true aneurysms distal to the axillary artery. *J Vasc Surg* 1998; 28(4):606–610
- 2 Peripheral arterial aneurysms. In: Haimovici H, ed. *Haimovici's Vascular Surgery*. 4th ed. Cambridge, MA: John Wiley & Sons, Inc.; 1996:893–909
- 3 Chemla E, Nortley M, Morsy M. Brachial artery aneurysms associated with arteriovenous access for hemodialysis. *Semin Dial* 2010; 23(4):440–444
- 4 Tetik O, Ozcem B, Calli AO, Gurbuz A. True brachial artery aneurysm. *Tex Heart Inst J* 2010;37(5):618–619
- 5 A Fakhree M B, Azhough R, Hafez Quran F. A case of true brachial artery aneurysm in an elderly male. *J Cardiovasc Thorac Res* 2012; 4(1):25–27
- 6 Igari K, Kudo T, Toyofuku T, Jibiki M, Inoue Y. Surgical treatment of aneurysms in the upper limbs. *Ann Vasc Dis* 2013;6(3): 637–641
- 7 Schunn CD, Sullivan TM. Brachial arteriomegaly and true aneurysmal degeneration: case report and literature review. *Vasc Med* 2002;7(1):25–27
- 8 Nishimura K, Hamasaki T, Ota R, et al. Elective treatment of middle colic artery aneurysm. *Ann Vasc Dis* 2014;7(3):328–330