

Unusual Pseudoaneurysm of the Dorsalis Pedis Artery after an Iatrogenic Injury

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Aneurysm and pseudoaneurysm of the dorsalis pedis artery (DPA) are rare vascular entities. Pseudoaneurysms of the DPA are commonly due to blunt trauma, sharp penetrating injury, fracture, or iatrogenic injury. Herein, we report the case of a patient with a rare iatrogenic pseudoaneurysm that occurred after blood sampling. The diagnosis was suspected based on palpitation of a pulsatile mass on the dorsal foot and confirmed by color Doppler ultrasound and computed tomography angiography. Surgical treatment was successfully performed by reconstruction with an autologous venous graft. The patient recovered well, with no ischemic complications.

Key words: 1. Pseudoaneurysm
2. Dorsalis pedis artery

Case report

A 50-year-old woman was referred to Konyang University Hospital with a mildly tender, pulsatile mass on her right dorsal foot. Physical examination revealed that its maximum diameter was approximately 3 cm and showed a weakly palpable thrill between the second and third cuneiform bones. During our focused history-taking, the patient stated that she had first noticed the mass roughly several weeks prior, when she was admitted to the internal medicine department for acute toxic hepatitis and blood sampling was performed on her dorsal foot. The mass had progressively grown since then. In a more thorough evaluation, no other vascular or bony abnormalities and no neurologic symptoms associated with the mass were present.

Computed tomography angiography (CTA) showed a pseudoaneurysm of the dorsalis pedis artery (DPA) (Fig. 1A). Color Doppler ultrasound was also per-

formed, and it revealed a hypoechoic mass measuring approximately 2.3 cm on the dorsal surface of the right foot (Fig. 2). The presence of diffuse thrombotic wall thickening and an eccentric mural thrombus without a vascular connection inside the mass confirmed our previous diagnosis of pseudoaneurysm. Under general anesthesia, she underwent aneurysmectomy and reconstruction of the DPA with an autologous vein graft. A vertical skin incision over the mass was made and the pseudoaneurysm of the DPA was identified (Fig. 3). We first confirmed the patency of both proximal and distal blood flow of the artery with intraoperative Doppler sonography. After the mass was excised, we placed a reversed great saphenous vein interposition graft harvested from the contralateral lower leg. A histopathologic study revealed that the intramural mass obtained from the excised pseudoaneurysm was a thrombus. The patient recovered uneventfully without any ischemic complications. On her follow-up evaluation,

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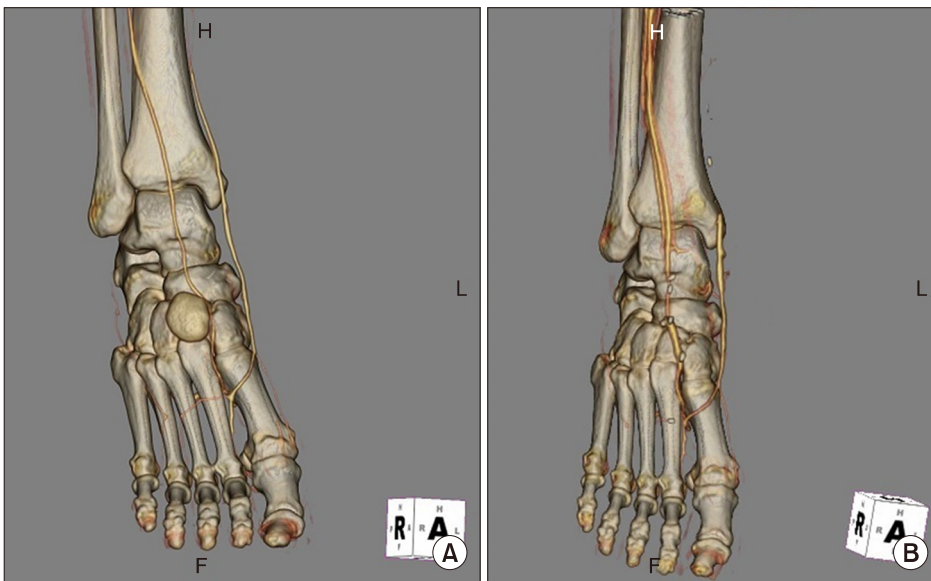


Fig. 1. Computed tomography with 3-dimensional reconstruction clearly demonstrates (A) the pseudoaneurysm on the dorsum of the foot with bones and other vessels associated with it. (B) After surgery, no mass was shown, and patency of the venous graft was confirmed.

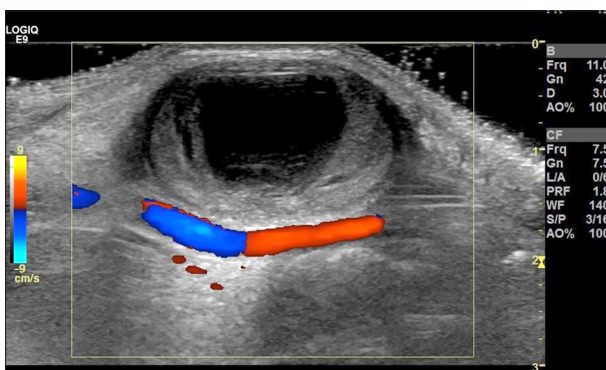


Fig. 2. Color Doppler ultrasound imaging reveals a hypoechoic 2.3-cm lesion to be a pseudoaneurysm with diffuse thrombotic wall thickening and no vascular connection.

CTA showed that the pseudoaneurysm had disappeared, with a patent graft and distal flow, and no other changes of blood flow in the left lower leg were present (Fig. 1B).

Discussion

Aneurysm and pseudoaneurysm of the DPA are rare vascular entities that have been reported to account for 0.5% of peripheral arterial aneurysms [1]. Most commonly, they occur as pseudoaneurysms secondary to blunt trauma [2] such as sprain or bruising of the foot and ankle. Often, the blunt trauma that causes a pseudoaneurysm to form is considered to be trivial and is easily ignored; therefore, both pa-

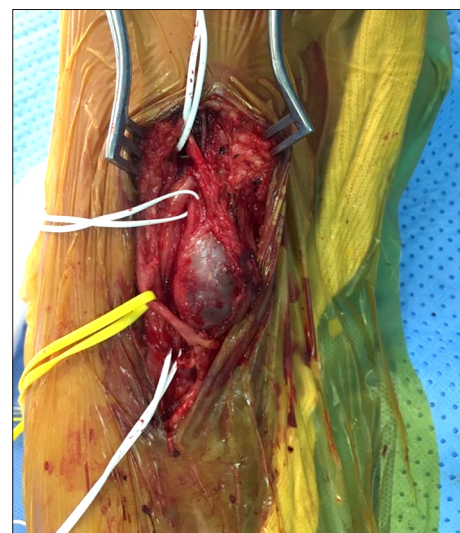


Fig. 3. The pseudoaneurysm of the dorsalis pedis artery was isolated with vessel loops.

tients and clinicians notice it relatively long after the initial event, so diagnosis and treatment are delayed. Other causes of pseudoaneurysm are penetrating trauma [3], fracture [4], and iatrogenic injury such as surgery of the foot and ankle, ankle arthroscopy, or arthrodesis [4,5].

Among these iatrogenic causes, pseudoaneurysms caused by a needle injury after venous puncture or arterial cannulation have very rarely been reported [5] and our experience of an unusual pseudoaneurysm of the DPA caused by iatrogenic injury after

blood sampling is considered to be an extremely rare case. Nonetheless, we believe that clinicians should be aware that a trivial vein injury from a needle puncture could cause aneurysm of an artery.

The symptoms of this condition that are usually reported include a distinct, palpable mass on the dorsum of the foot with or without pulsatility or bruits depending on the communication with the arterial flow. Secondary symptoms as a consequence of the pseudoaneurysm have also been demonstrated to involve neurological deficits, such as pain or paresthesia, and localized ischemia of the distal foot.

Once clinical suspicion emerges based on a thorough history-taking and physical examination, imaging modalities such as CTA, magnetic resonance angiography, color Doppler ultrasonography, and angiography can confirm the diagnosis of the DPA aneurysm or pseudoaneurysm [1,4]. Color Doppler ultrasound and CTA examinations permit a fast and exact diagnosis and are the most commonly recommended imaging modalities. Arteriography can also be useful for the evaluation of blood flow in the distal extremity to help determine the treatment strategy [6]. In this case, color Doppler ultrasonography enabled us to visualize the origin of the mass, which did not communicate with the DPA, and confirmed our diagnosis of the pseudoaneurysm. It also further demonstrated thrombus formation within the arterial lumen. CTA enabled topographic localization of the aneurysm and other associated vascular patterns, helping us to determine the most appropriate treatment strategy. Other conditions should be included in the differential diagnosis, including hematoma, abscess, arteriovenous fistula, and soft-tissue tumor [1].

Prompt surgical management is often recommended in order to prevent possible complications, including distal thromboembolism, rupture, neurologic alterations due to compression, and motor alterations such as restricted dorsiflexion of the foot. Surgery should be chosen prudently, depending on the anatomy of the vascularity and the patient's comorbidities, such as diabetes mellitus. With no distal occlusion of other arteries (i.e., the posterior tibial artery and arcuate artery), ligation of the dorsal ar-

tery and resection of the pseudoaneurysm may be a good option. However, for patients with diabetes mellitus, hypercholesterolemia, hypertension, smoking, or any other cause of poor blood flow, vascular reconstruction with an autologous venous patch is recommended to prevent any possible development of arteriosclerosis or diabetic occlusion later in life. In the present case, successful repair was accomplished by excision of the pseudoaneurysm and placement of a venous graft.

Further follow-up has not been yet conducted in our study. However, several reports of long-term successful results of treatment of this type of aneurysm have been published. At postoperative follow-up evaluations months or even years after surgery, the patients had complete resolution of symptoms, no recurrence of swelling, and patent DPAs [1,7,8].

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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