INTRODUCTION

Popliteal vein aneurysms (PVAs) are rare diseases [1], and may bring about serious complications such as pulmonary embolism [2]. Once a serious complication occurs, patients with PVAs can reach fatal conditions. Early suspicion and recognition of these diseases are very important to prevent catastrophic complications. PVAs tend to be found in patients with severe thromboembolic features without warning symptoms, such as leg pain and swelling [2]. Unusually, but fortunately in our case, the patient had local pain without thromboembolic features. This was helpful in its early diagnosis and treatment.

CASE

A 48-year old man presented with left popliteal pain that had developed 3 months previously. The pain was aggravated when the knee joint was extended in the standing position. He had first visited an orthopedic clinic where a magnetic resonance imaging (MRI) scan showed a cystic lesion around the left popliteal vein with no abnormal findings explaining the pain (Fig. 1A).

His previous medical history was unremarkable. There were no deep vein thrombosis-related symptoms like calf swelling or tenderness, and no pulmonary thromboembolic events. Ultrasound (US) Doppler examination done immediately at the time of his visit to our clinic with the patient in a standing position revealed a 2.2×1.6 cm sized saccular aneurysm at the posteromedial aspect of the left popliteal vein at the level of the popliteal crease (Fig. 1B).

Preoperative computed tomography (CT) venography was done to evaluate the lesion and adjacent structures. The PVA was confirmed at the same location as seen in the US Doppler. The aneurysm measured 2.0×1.5 cm in the supine position (Fig. 2A). A lung perfusion scan was done to rule out pulmonary thromboembolism; no perfusion defect was found.

PVA resection and popliteal vein repair were planned. US mapping was done for accurate surgical incision in the operation room. The patient was placed in the prone position after spinal anesthesia. An S-shaped skin incision...
Postoperative anticoagulation was done to prevent venous thrombosis. Heparin was injected for 3 days after the operation. Medication was then switched to warfarin and maintained for three months. The patient was discharged at the sixth postoperative day without symptoms or complications. CT venography and US Doppler at 1 month and 1 year after the operation confirmed that the popliteal vein was intact without aneurysmal change (Fig. 2B). The patient fared well after discharge.

DISCUSSION

PVAs are very rare. Recognition of this aneurysm is important because it can lead to catastrophic results such as pulmonary embolism. The aneurysmal change results from increased hemodynamic pressure at the site of venous mural weakness. Trauma, inflammation, congenital weakness and degenerative changes are possible causes [1]. Aneurysmal dilatation may prelude to formation of focal thrombi as a result of the venous turbulent flow. The presence of thrombi in a patent venous system differs from the pathophysiology of deep vein thrombosis. PVAs tend to be found in patients with severe thromboembolic features without warning symptoms, such as leg pain and swelling [2]. Unusually, but fortunately in our case, the patient had local pain, which was helpful for early diagnosis and treatment. The local pain may have originated from the PVA itself or from direct compression of neural structures by the aneurysmal dilatation.

The characteristic microscopic features of PVA are known as the fragmentation of elastic lamellae and fibrosis replacing the medial smooth muscle [3]. In our case, histologic stains showed destruction of the local architecture in the intima and media with invasion of fibrous tissues and fragmentation of the elastic lamellae (Fig. 4).

The size criterion for treatment of PVAs has varied in different publications, with twice and three times the normal vein size (5-7 mm) being advocated [4,5]. However, which modality is best to use and the influence of body
Diagnostic modalities that can be used include ascending venography, CT, MRI and duplex US. Of these, US is considered the best method. US is noninvasive and portable; the physician can evaluate aneurysm size, thrombus extent and venous patency immediately and safely in different locations including the operation theater and outpatient office. CT or other modalities provide more accurate anatomic information, but they tend to underestimate aneurysm size because they are performed with the patient in the supine position. US can measure the true aneurysm size with the patient in the upright position because it is free from positional restrictions. Even a non-specialist surgeon can perform US.

PVA treatment options are considered on a case-by-case basis. In patients with pulmonary embolism, surgery is the treatment of choice. Surgery is also recommended in cases of aneurysms with thrombus in the sac, as well as for saccular type or large fusiform aneurysms because of the potential risk of thromboembolism. Tangential aneurysmectomy with lateral venorrhaphy is recommended for saccular type aneurysms. Aneurysm resection with graft interposition is needed for fusiform or saccular type aneurysms where simple resection is unsatisfactory. However, if the aneurysm is of saccular type without thrombus in the lumen and is smaller than 2 cm, close observation can be safe without complications [6]. Postoperative anticoagulation typically involves 3 months of oral anticoagulation with international normalized ratio follow-up [1].

In conclusion, we report a rare case of PVA with focal leg pain that is thought to be the result of a mass effect. Because of the potentially catastrophic course of PVA, accurate diagnosis and alert treatment are needed, even if the patient is asymptomatic. Tangential aneurysmectomy and venorrhaphy can be performed safely without complications. The patient should have a long-term follow-up and serial ultrasonography examinations, particularly in the presence of relevant signs and symptoms.

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2) Hong D, Song SW. Pulmonary embolism caused by popliteal venous aneurysm. Korean J Thorac Cardiovasc Surg 2013;46:76-79.
3) Gasparis AP, Awadallah M, Meisner Fig. 3. The surgical findings. (A) Popliteal vein was entirely exposed and the tibial nerve was safely looped beside. (B) Aneurysmal resection was done and the remaining popliteal vein was repaired with a 7-0 polypropylene suture.

Fig. 4. Histologic staining of the specimen reveals destruction of the local architecture in the intima and media with invasion of fibrous tissues and fragmentation of the elastic lamellae (Elastin staining, ×100).
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