Superficial venous aneurysms of the small saphenous vein

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Historically, superficial venous aneurysms of the lower extremities are considered rare. However, owing to the increased use of duplex ultrasound imaging, these entities are being recognized more frequently. The clinical significance of superficial aneurysms is poorly defined; yet, pulmonary emboli arising from superficial aneurysms have been reported. Symptomatic patients typically complain of the sequelae of reflux, such as edema, pain, mass, and varicosities. Current treatment consists of simple open excision. We report two cases of small saphenous vein aneurysm and provide review of its pathophysiology, presentation, diagnostic evaluation, and therapy. (J Vasc Surg 2009;50:644-7.)

CASE REPORTS

Patient 1. A 46-year-old woman without a significant medical history presented with left leg varicose veins of >2 years that were refractory to standard compression therapy. Her complaints included heaviness and aching. She denied a history of deep venous thrombosis (DVT), but had undergone one uncomplicated term pregnancy.

Her left leg had a moderate amount of varicosities, without a popliteal mass, and there was no appreciable edema. Venous duplex imaging demonstrated reflux of the proximal, middle, and distal portions of the SSV with normal function or competence of the perforator veins (C3 EP AS PR). The SSV was noted to have a venous aneurysm measuring 2.4 × 2 cm in its proximal portion before joining the popliteal vein (Fig 1, A). A computed tomography (CT) scan to further evaluate this unusual finding confirmed the presence of a SSV aneurysm without thrombus (Fig 1, B).

Open resection of the aneurysm (Fig 2) in conjunction with ligation of the SSV was performed to reduce the risk of thromboembolism and to treat SSV reflux. After the patient received a preoperative prophylactic dose of low-molecular-weight heparin, the SSV was ligated and divided flush with its insertion to the popliteal vein and just distal to the venous aneurysm itself. Stab phlebectomy of the remaining varicosities also was accomplished. A small neck of normal caliber SSV was encountered proximal to the aneurysm connecting it to the popliteal vein. Similarly, the SSV distal to the aneurysm was of normal caliber giving the venous segment in question the appearance of a distinct venous aneurysm. The patient’s postoperative course was uncomplicated, and her symptoms resolved.

Patient 2. A 40-year-old man with a history of right great saphenous vein (GSV) high ligation and phlebectomies presented with recurrent varicosities associated with pain. His symptoms were refractory to standard compression therapy. He had no other significant medical history. He had extensive varicosities on the medial aspect of the right lower extremity at and below the level of the knee. These physical findings were associated with moderate edema but no chronic skin changes or breaks in skin integument.

Venous duplex imaging demonstrated reflux in the SSV and perforator veins (C3 EP AS PR AS PR). A 2-cm SSV aneurysm was...
observed in the popliteal fossa (Fig 3, A). Because the anatomic relationship of the aneurysm to the deep venous system was not apparent on duplex imaging, ascending venography was performed, demonstrating a fusiform aneurysm limited to the proximal SSV. Venography also demonstrated swirling of contrast in the aneurysm, with delayed emptying and a 2-cm-long neck of normal-caliber SSV distal to the popliteal vein. The rest of the deep venous system was normal.

A prophylactic dose of low-molecular-weight heparin was administered before open resection of the SSV aneurysm. Resection included flush ligation of the saphenopopliteal junction proximally and ligation of the vein distal to the aneurysm to reduce the risk of thromboembolism and to treat venous reflux (Fig 3, B).

The patient’s postoperative course was uncomplicated and his symptoms resolved.

DISCUSSION

The traditional definition of a venous aneurysm is dilation of a venous segment 1.5 times the diameter of the nonvaricose or normal segments proximal and distal to the diseased segment in question. Although a useful starting point, this definition is often an oversimplification because the venous segment in question may be part of a vein that is abnormal throughout a long varicose course. In addition, many tibial veins contain dilated segments that meet this definition. Providing a lasting definition of venous aneurysm is beyond the scope of this report; however, the patients presented here emphasize the importance of approaching this disease entity on a case-by-case basis.

Venous aneurysms in the lower extremities can be divided into aneurysms of the deep and superficial venous systems. This distinction is important, because aneurysms of the deep system appear to have a greater association with thromboembolism and more severe venous morbidity than those of the superficial system. Aneurysms of the superficial venous system of the lower extremities were once thought to be exceedingly rare, but Pascarella et al1 showed they are more common than previously thought. In their report, 366 patients were screened with duplex ultrasound imaging, which identified 65 superficial venous aneurysms in 43 patients.
patients, of which 61 were in the GSV, and only 4 were found, as in our experience, to be in the SSV. The finding that only 6% of superficial venous aneurysms were in the SSV confirms an earlier report by Gillespie et al.2 and underscores the unique nature of the two patients presented in this experience.

Although the cause of venous aneurysms is nebulous, reflux and venous hypertension were present in both of our patients and represent possible contributing factors. Other proposed causes include processes causing venous wall weakening such as trauma, inflammation, and hereditary factors. A historic reference describing this condition introduced the terms “endophlebohypertrophy” and “endophlebosclerosis” to describe venous wall pathology leading to dilation and aneurysm formation.3

It is certainly plausible that superficial venous aneurysms are end-stage varicose veins resulting from chronic venous insufficiency. And in fact, the histology of venous aneurysms and varicose veins are similar: Both have a thickened intima and deficient, or absent, smooth muscle layers.4,5 Moreover, a recent report examining venous aneurysm tissue suggested that the focal structural changes of the venous wall may be related to increased expression of select matrix metalloproteinases.6 The distinct fusiform appearance of the venous aneurysms in our experience supports this concept and suggests a local etiologic process confined to the venous segment in which the aneurysm formed.

Patients with superficial venous aneurysms frequently manifest pain, edema, and a mass in the affected extremity. As reported here, patients also may present with varicose veins. In 13 cases of superficial venous aneurysms identified by Gillespie et al,2 three were associated with primary varicose veins. Occasionally, superficial venous aneurysm can present with thromboembolism, including pulmonary embolism. Although the incidence of pulmonary embolism due to superficial vein aneurysms is unknown, one of the 13 patients identified by Gillespie had such an event.2 Pulmonary embolism is thought to be less common in superficial than deep venous aneurysms, perhaps due to vigorous emptying of the deep system associated with contraction of the muscular venous pump.7 Such rapid emptying has been hypothesized to play a role in dislodging thrombus that may accumulate in deep venous aneurysms. Rupture is a noted complication in arterial aneurysms but is rare in those of the venous system.8

The diagnosis of lower extremity venous aneurysms can be challenging and requires a high index of suspicion. The initial diagnostic modality is duplex imaging because it is accurate and inexpensive. Duplex imaging can determine aneurysm size and identify thrombus, and the color flow function allows differentiation of nonvascular pathology such as Baker cyst.9 Other noninvasive modalities include CT and magnetic resonance imaging. Like venography, these are often only needed should venous anatomy associated with the aneurysm location remain ambiguous after duplex ultrasound imaging.

Indications for treatment of superficial venous aneurysms of the lower extremity are dictated by symptoms of reflux, such as pain, edema, and varicosities, in addition to prevention of venous thromboembolism.2 Current endovenous ablation techniques are usually not feasible owing to aneurysm size and location.1 Thus, treatment is primarily surgical and can be accomplished with simple ligation and excision.2 This is ordinarily straightforward, because venous continuity of the superficial system does not need to be reestablished, in contrast to resection of deep venous segments.
CONCLUSIONS

Once thought to be exceedingly rare, superficial venous aneurysms in the lower extremity are now recognized more commonly. This is likely due to the liberal use of duplex ultrasound imaging. Aneurysms of the GSV are more frequent than those of the SSV; however, treatment principles are similar. Venous thromboembolism may occur secondary to superficial aneurysms, but sequelae of reflux are the usual presentation. Simple excision will improve patient symptoms and prevent pulmonary embolism.

REFERENCES


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