

# Primary tibial vein aneurysm with recurrent pulmonary emboli

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We report the case of a 42-year-old man with pleuritic chest pain, shortness of breath, and associated tachycardia. Three months before, he had been treated for similar features with the diagnosis of pulmonary emboli. Computed tomography scan showed multiple bilateral pulmonary emboli. He had no clinical evidence of deep venous thrombosis, but an accurate venous duplex examination revealed a thrombosis of the posterior tibial vein aneurysm. Thrombolysis, a temporary inferior cava filter (ICV filter), and tangential aneurysmectomy and lateral venorrhaphy were performed. Accurate duplex scan evaluation of lower limb venous system is mandatory in all cases of pulmonary embolism; anticoagulation may be ineffective in preventing pulmonary embolism, and the surgical repair is treatment of choice of this pathology because it is safe and effective. (*J Vasc Surg* 2010;■■:■■■.)

Primary venous aneurysms are rare, and in most of the cases, pulmonary embolism (PE) represents the first sign. The visceral and extremities veins, neck, and central thoracic veins are the most common sites of disease.

Venous aneurysms are often of little clinical significance, but sometimes they can be potentially life-threatening.

In 1976, Dahl and associates<sup>1</sup> described a popliteal venous aneurysm-associated thrombosis and PE. To our knowledge, there are no reports describing PE due to tibial venous aneurysm thrombosis.

We describe the case of recurrent PE arising from a tibial venous aneurysm, which emphasizes the importance of accurate diagnosis and surgical management in preventing further embolic events.

## CASE REPORT

A good performance status 42-year-old man experimented acute shortness of breath without pleuritic chest pain or hemoptysis. The chest x-ray was normal, but a ventilation-perfusion scan demonstrated multiple segmental perfusion abnormalities consistent with highly suggestive PE. Concomitant venous duplex ultrasonography with compression maneuver demonstrated bilaterally patent popliteal-femoral venous systems. Accurate evaluation of distal vein was not performed. No emboli source was identified. Etiology for PE was, at the time, unknown. He was placed on anticoagulant therapy and discharged on acenocoumarol 4 mg/day until a prothrombin time (PT) at 2 to 3 international normalized ratio (INR) was maintained. Tests for thrombophilia were negative.

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Competition of interest: none.

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The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a competition of interest.

0741-5214/\$36.00

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doi:10.1016/j.jvs.2010.02.284

Three months later, he newly experienced acute shortness of breath associated with pleuritic chest pain and tachycardia; (PT) INR was 2.1. Chest computed tomography (CT) scan revealed bilateral lung-filling deficits, which suggested multiple pulmonary emboli. Again, he had no clinical evidence of deep venous thrombosis, but an accurate venous duplex imaging (Fig 1) and subsequent CT scan (Fig 1) revealed a thrombosis of the right posterior tibial vein aneurysm with bilaterally patent venous systems. A systolic hypotension (blood pressure [BP] <90 mm Hg) and an echocardiographically right ventricular failure were demonstrated, and increased cardiac biomarkers suggested a severe hemodynamic instability. The patient was treated with 100 mg recombinant tissue plasminogen activator (rt-PA) peripherally over 2 hours with a marked clinical improvement. The chest CT scan after treatment was normal.

A temporary inferior cava (ICV) filter (Cook Celect Vena CavaFilter; Cook Medical, Bloomington, Ind) was placed to prevent risk of embolism during aneurysm repair. We subsequently performed a tangential aneurysmectomy (Fig 2) and lateral venorrhaphy on the patient; a large amount of clot was found in the aneurysm. Postoperative course was uneventful. He was discharged on acenocoumarol therapy.

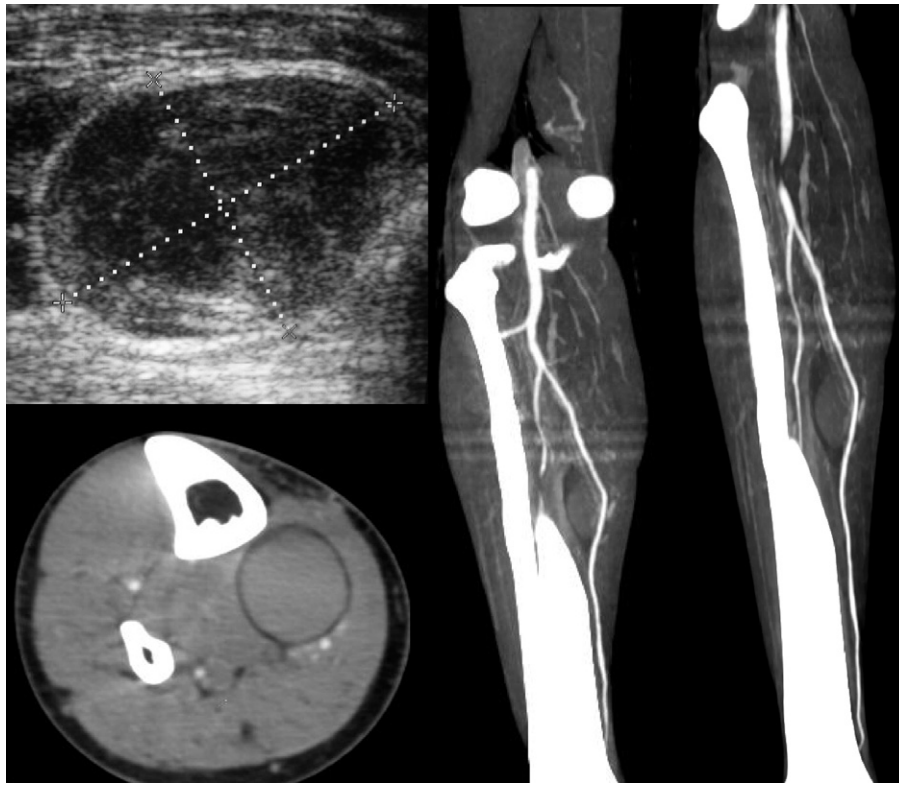
Three months later, the ICV filter was removed with the anticoagulant therapy.

On 12-month follow-up, a duplex scan demonstrated patent deep venous system (Fig 3), and the patient was asymptomatic.

## DISCUSSION

To our knowledge, only one case of tibial vein aneurysm<sup>2</sup> was previously described, but no reports of pulmonary emboli due to tibial vein aneurysm were reported. The first description of venous aneurysm as a clinical entity was in 1915 by Osier, during autopsy studies. A soft tissue mass, which changes in size with limb position or Valsalva maneuver, suggests venous aneurysms of the extremities. They are usually asymptomatic, and the diagnosis is often misleading or made for exclusion.

Primary popliteal vein aneurysm is a rare entity with approximately 122 cases documented.<sup>3,4</sup> The pathogenesis of venous aneurysm is not clear; several mechanisms have



**Fig 1.** Diagnostic imaging: duplex scan shows the right posterior tibial vein and computed tomography scan confirming right posterior tibial vein aneurysm with intraluminal thrombus.

been suggested: inflammation, infection, congenital vein wall weakness, mechanical trauma, hemodynamic, and localized degenerative changes.<sup>5</sup>

Diagnosis is usually performed by noninvasive imaging such as duplex scanning in combination with CT scan or phlebography.

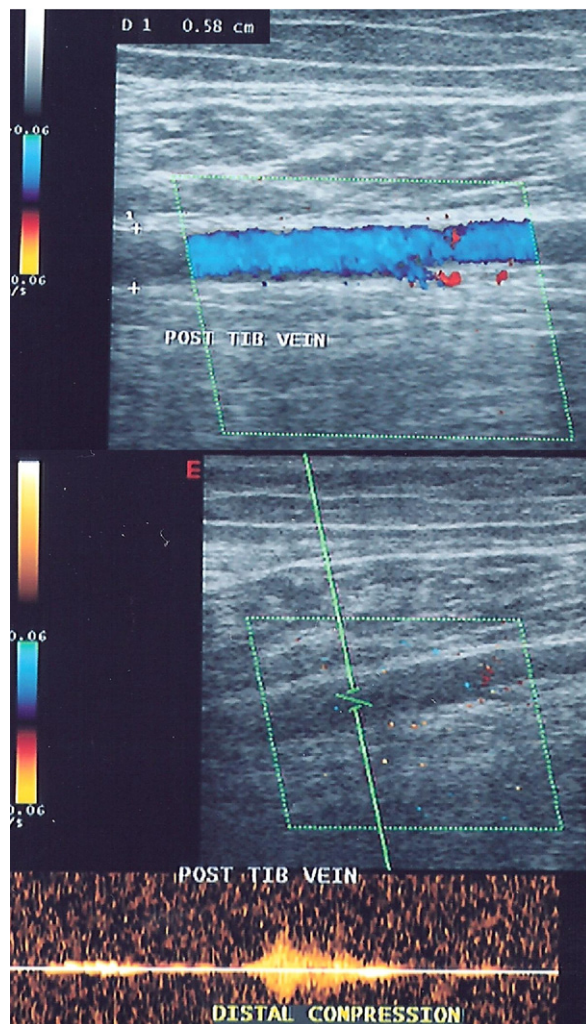
We strongly believe that venous duplex imaging is the best diagnostic assay to evaluate lower limb deep vein aneurysms, but it is less accurate to detect thrombi in smaller calf veins; a CT scan or ascending venography before surgical repair is needed to investigate deep veins and delineate venous anatomy.<sup>6</sup> Venous duplex scanning is easy to perform, and it enables definition of the size and the extent of thrombus within the aneurysm.

Venous aneurysm is defined as a persistent isolated dilation of twice the normal vein diameter<sup>7</sup> or three times as great.<sup>8</sup>

PE represents the most frequent of venous aneurysm onset. The associated risk is unpredictable and may be unrelated to the presence or absence of thrombus on imaging studies.<sup>6</sup> According to the literature, we believe that the anticoagulation therapy may be ineffective in preventing PE; therefore, surgical repair is mandatory in all patients with symptomatic deep vein aneurysm and is recommended in asymptomatic patients.

Our experience suggests that, in patients with pulmonary emboli with severe hemodynamic instability and ve-

**Fig 2.** Intraoperative images show the saccular aneurysm arises from the near wall of the left posterior tibial vein; opening wall reveals friable thrombus.



**Fig 3.** Diagnostic imaging: at 12-month follow-up, a duplex scan demonstrated patent deep venous system, and the patient was asymptomatic.

nous aneurysm, it is preferable to perform thrombolytic therapy to improve cardiopulmonary function and reduce the aneurysm thrombus; subsequently, an IVC filter is suggested before surgical repair by tangential aneurysmectomy

with lateral venorrhaphy. Opening the excised aneurysm confirmed the presence of a large amount of clot. This surgical technique is recommended for saccular venous aneurysms. On occasion, fusiform aneurysms can be resected and ligated; in selected patients, grafts can be placed, especially when larger vein aneurysms, such as in the popliteal or femoral vein, occur. Notwithstanding, most of the authors suggest vein ligation of distal vein (ie, tibial) to reduce thrombosis or dilation recurrence risk.

After surgical repair, we recommend 3 months<sup>9</sup> of anticoagulant therapy and 2 months of external pneumatic compression to increase the venous return velocity and reduce the thrombosis risk.<sup>10</sup>

## CONCLUSION

Our article underlines the importance of accurately evaluating lower limb venous system by duplex scan in all cases of PE; anticoagulation may be ineffective in preventing PE, and surgical repair is the treatment of choice of this pathology because it is safe and effective.

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Submitted Dec 10, 2009; accepted Feb 24, 2010.