

Pulmonary Embolism Caused by Popliteal Venous Aneurysm

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Venous aneurysms are uncommon in the lower limb and are more frequently found in the neck and thoracic and visceral veins. However, they have been reported to cause thrombosis, pulmonary thromboembolism, and other related complications. Popliteal venous aneurysms are often undetected because they are usually asymptomatic, but they may cause pulmonary thromboembolic events. We experienced a case of a 44-year-old man who was referred for recurrent pulmonary thromboembolism. He showed no other symptoms or signs except shortness of breath. A popliteal venous aneurysm was diagnosed incidentally because the examinations were performed to detect a deep vein thrombosis in relationship to the patient's history of pulmonary thromboembolism. We report a case of surgical treatment for a popliteal venous aneurysm that was complicated by pulmonary thromboembolism.

Key words: 1. Pulmonary embolism
2. Aneurysm
3. Popliteal vein

CASE REPORT

A previously healthy 44-year-old man was admitted for shortness of breath that had developed 1 day earlier. He denied having any chest pain or hemoptysis. There was no calf tenderness suggesting deep vein thrombosis or a palpable lower extremity mass. His previous medical history was remarkable for bilateral pulmonary thromboembolism, which had occurred about a month prior, for which he was treated with tissue plasminogen activator, heparin, and warfarin. His initial work-up including vital signs, physical examination, chest X-ray, and electrocardiogram were unremarkable except for a marginal oxygen saturation level of 90%. Based on his previous history of pulmonary thromboembolism, a pulmonary computed tomography (CT) angiogram was performed, which revealed bilateral multifocal filling defects in the pulmonary arteries, but showed a relatively preserved distal

flow, and was absent of any parenchymal lung lesions. He was initially admitted to the cardiology department and received anticoagulation therapy. To investigate the possible underlying medical causes, a lower extremity CT angiogram was performed two days later, which revealed a huge thrombus-filled venous aneurysm (6×11 cm in size) of the left popliteal vein (Fig. 1). A lower extremity (vein) Doppler sonography was performed the next day, which showed a huge wide-necked venous aneurysm (5×3×10 cm in size) with a floating pedunculated thrombotic mass within the lateral aspect of the popliteal vein lumen (Fig. 2A, B). Aneurysmectomy and saphenous vein interposition were performed to prevent a recurrence of pulmonary embolism on the posterior approach via an S-shaped incision to the popliteal fossa (Fig. 2C-E). The opened aneurysmal sac was filled with a huge pedunculated fresh thrombus, which could be easily embolized to the pulmonary vessels. After the operation, heparin

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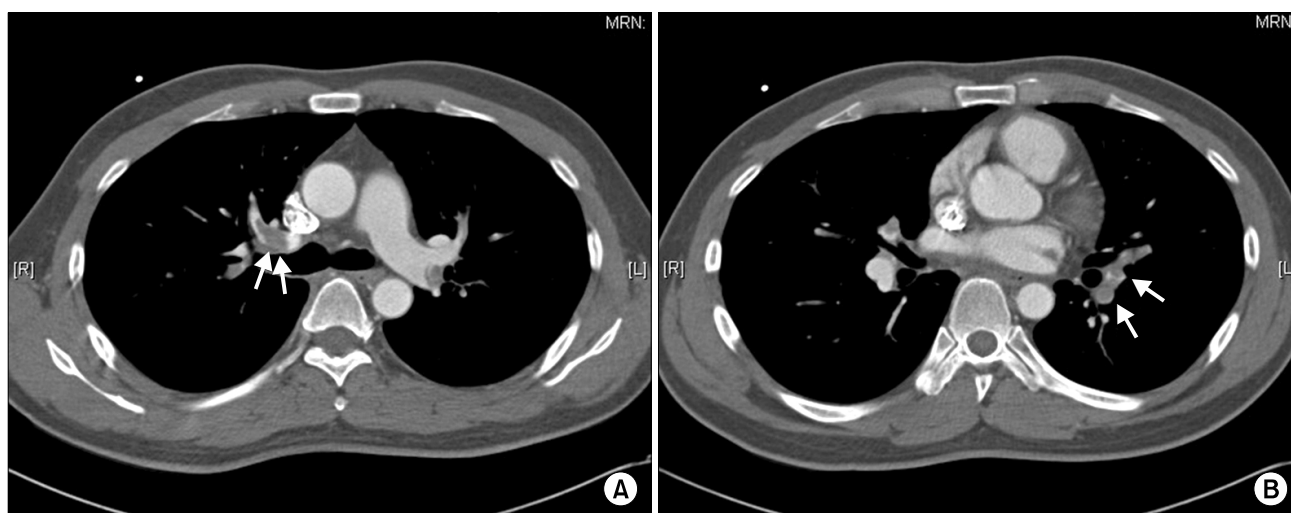


Fig. 1. Computed tomography angiogram confirming that the recurrent pulmonary thromboembolism can be seen. (A) Revealed bilateral multifocal defects in the right pulmonary artery (white arrows) and (B) the left pulmonary artery (white arrows).

and warfarin were administered. The patient has been asymptomatic for 2 years with no remarkable complaints or signs of pulmonary embolism or lower extremity thrombosis (Fig. 3).

DISCUSSION

Popliteal venous aneurysms (PVAs) are very rare [1-8], and the literature does not contain sizing criteria for guiding physicians in diagnosing a venous dilatation as an aneurysm [2]. A spectrum of progressive focal enlargement has been reported to occur before aneurismal formation [3].

The etiology of PVAs is unclear [1-8]. We suggested trauma, inflammation, congenital weakness, and localized degenerative changes as possible causes [1,2]. A combination of congenital and acquired mechanisms, as in congenitally predisposed patients with mechanical or rheological factors or both, are most likely involved [2]. PVAs are usually asymptomatic [1-8], and about 70% are first discovered with pulmonary embolism [4,7]. PVAs also appear as deep vein thrombosis, thrombophlebitis, or a mass [7].

The patient in the present case was previously healthy and absent of any clinical signs of deep vein thrombosis. The PVA was detected in the patient only after a lower extremity CT angiogram was performed as a workup for the recurrent

pulmonary embolism. Due to the symptom free nature of these lesions, all pulmonary embolism patients should undergo lower extremity imaging studies such as a venous echo Doppler or CT angiogram. A venography may be necessary to confirm the Doppler sonography findings and to provide accurate anatomic details that may be helpful to the surgeon. Several other diagnostic modalities have also been reported to be useful [1-8].

Medical treatments of pulmonary embolism are ineffective for treating PVAs, but anticoagulation is necessary [1-3,5]. Surgery is the most effective treatment for PVAs [1-8]. Several surgical techniques have been reported. Aneurysmectomy and tangential venorrhaphy are sufficient treatments for a saccular aneurysm, while a vein graft interposition is useful for a fusiform aneurysm [1-5,7,8]. A graft interposition is an autologous conduit available for reconstruction of the popliteal vein after resection of PVAs, and has been used to re-establish venous continuity and to match the caliber of the native popliteal vein [1,2]. To prevent postoperative thrombosis and to maintain good blood flow, a temporary arteriovenous fistula distal to the resection may be helpful [2]. Anticoagulation and compressive devices should be continued until definitive surgical recovery has been confirmed [1,2,4,5].

In conclusion, patients presenting with pulmonary embolism with no clinical symptoms of lower extremity thrombo-

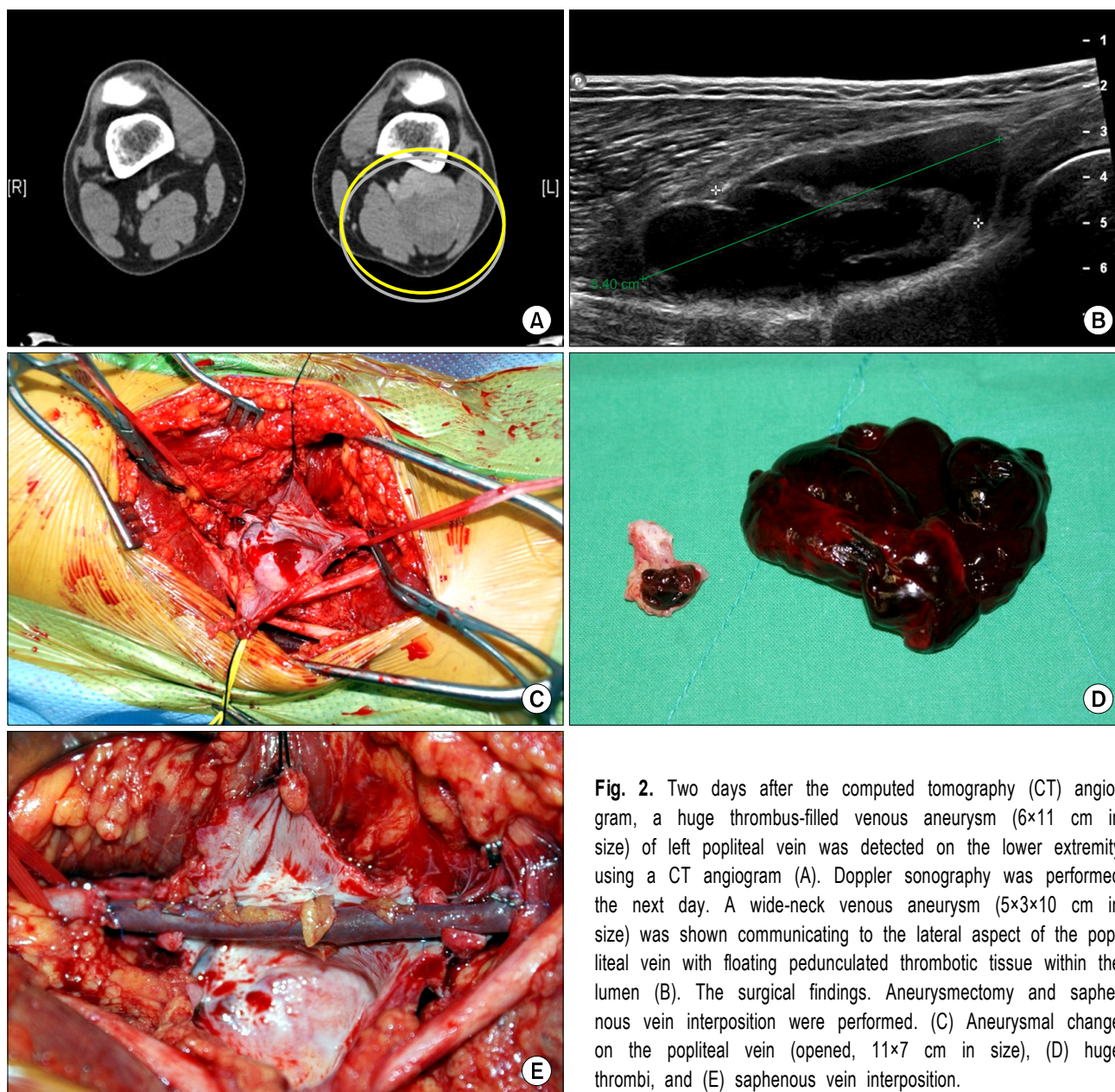


Fig. 2. Two days after the computed tomography (CT) angiogram, a huge thrombus-filled venous aneurysm (6×11 cm in size) of left popliteal vein was detected on the lower extremity using a CT angiogram (A). Doppler sonography was performed the next day. A wide-neck venous aneurysm (5×3×10 cm in size) was shown communicating to the lateral aspect of the popliteal vein with floating pedunculated thrombotic tissue within the lumen (B). The surgical findings. Aneurysmectomy and saphenous vein interposition were performed. (C) Aneurysmal change on the popliteal vein (opened, 11×7 cm in size), (D) huge thrombi, and (E) saphenous vein interposition.

sis must be considered to have a PVA. Venography, Doppler sonography, or lower extremity CT angiograms are necessary for diagnosing PVAs. Surgery is the first line of treatment for PVAs. Anticoagulation may be needed postoperatively until the absence of thrombosis can be confirmed.

Therefore, it is very important for physicians to suspect PVAs until it is otherwise ruled-out in the appropriate setting for patients presenting with pulmonary embolism. Venogra-

phy, Doppler sonography, and computed tomography are also important in the management of such patients to reduce the possibility of a fatal recurrent pulmonary embolism.

CONFLICT OF INTEREST

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

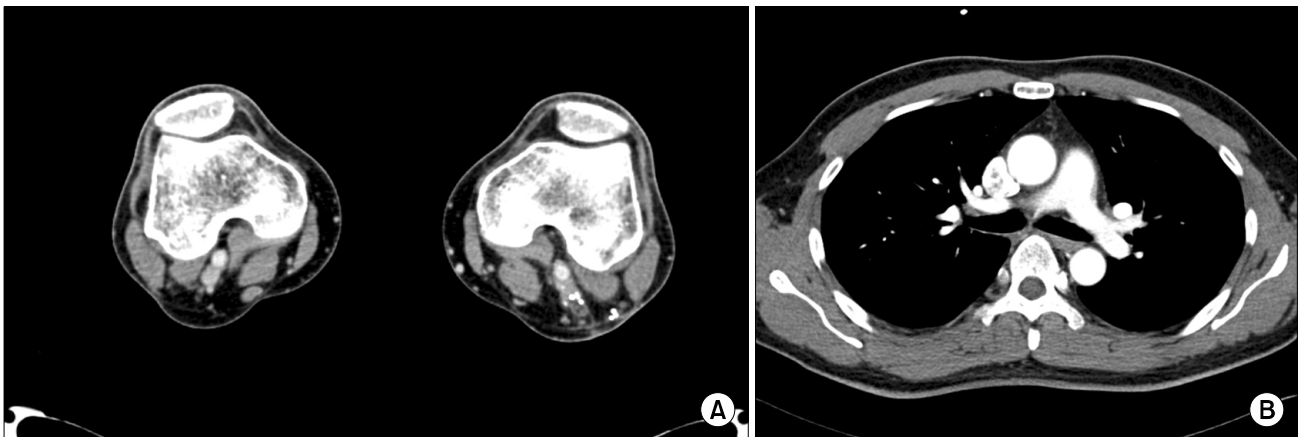


Fig. 3. Lower extremity computed tomography (CT) angiogram findings 1 month later. (A) The aneurysm shrank with some remnants. Thrombosis of the deep veins of both the lower extremities and graft at the left popliteal fossa cannot be seen. Pulmonary thromboembolism CT scan findings 1 month later. (B) Improvement of previous pulmonary thromboembolism is noted.

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