Successful Retrieval of the Detached Porous Metallic Tip of a Mechanical Aspiration Catheter during Thrombectomy in a Case with May–Thurner Syndrome: A Case Report

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Abstract

Early detection and treatment of deep venous thrombosis (DVT) are of vital importance for the treatment procedure to meet with success and avoid possible long-term complications. In particular, patients with iliofemoral DVT have the highest risk of developing postthrombotic syndrome and postphlebitic syndrome, which can lead to lifelong complications. May–Thurner syndrome (MTS) has been recognized as a frequent cause of DVT since it was first described by May and Thurner in 1957. Surgical repair has been the traditional treatment for DVT, but as treatment options were developed for acute–subacute DVT resulting from MTS, endovascular intervention became an alternative to surgery.2–4 Thrombectomy with manual catheter-directed aspiration, thrombectomy by mechanical devices, and thrombolytic drug-based techniques are all in use for declotting. Vascular rupture, distal embolization, and arteriovenous fistula have been reported as complications of percutaneous mechanical thrombectomy (PMT); however, no cases have been reported to date describing complications due to device failure during mechanical thrombectomy. This presentation describes the detachment of the distal metallic tip of the mechanical aspiration catheter (Aspirex S, Straub Medical AG, Wangs, Switzerland) while performing thrombectomy in a case of MTS and the bailout technique required to overcome this complication. To our knowledge, this is the first case of its type that has been reported in the literature.

Case Report

A 72-year-old male patient referred with diffuse swelling of the left leg of approximately 2-months’ duration was brought to our emergency department. The swelling had gradually
become more severe, especially over the last 2 weeks. Physical examination revealed a tender erythematous swelling of the left leg extending from the ankle to the thigh with a noticeable increase in diameter compared with the right leg; arterial pulses were palpable in bilateral lower extremities. Lower extremity Doppler ultrasound (US) examination revealed an extensive iliofemoral DVT. Thoracic and abdominal computed tomographic (CT) scan with intravenous contrast was obtained to rule out an occult pulmonary embolism and evaluate for the presence of thrombus extension. The pulmonary arteries were free of thrombi. CT images and maximum intensity projection reconstruction images revealed normal arterial anatomy and left iliac vein compression by the left common iliac artery, suggesting a diagnosis of MTS. Left thigh edema and evident thrombosis of the common femoral vein that extended downward to involve the superficial femoral vein were also detected by CT (Fig. 1). The decision was made to perform percutaneous endovascular therapy.

The patient was initially administered by bolus intravenous (i.v.) injection of 5,000 IU heparin and started on i.v. heparin infusion of 15 IU/kg/h (initial maximum rates of 1,200 IU/h). The procedure was performed under local anesthesia. Initially, a retrievable inferior vena cava (IVC) filter (Option, Angiotech Pharmaceuticals, Vancouver, British Columbia, Canada) was placed just below the levels of renal veins via right jugular vein approach (Fig. 2). Endovascular access for thrombectomy was established by US-guided puncture of the ipsilateral popliteal vein using a 21-G chiba needle with the patient in the prone position. A 6F vascular sheath was placed (Avanti, Cordis Europa NV, Roden, The Netherlands) into the popliteal vein. A 0.018-inch guidewire with a hydrophilic-coated distal tip was advanced through the stenotic segment of the common iliac vein into the IVC using a 5F vertebral catheter for support. PMT was performed using a 6F Aspirex S mechanical thrombectomy catheter. Thrombectomy device was initially checked whether any technical or physical failures exist, and no defect was determined. The system was advanced into the IVC to clear the thrombotic remnants. Catheter was advanced through the compressed-stenotic common iliac vein segment by minimal quadrant rotational maneuver. However, the distal tip of the thrombectomy device became detached while the shaft of the device was being pulled back through the stenotic segment of the common iliac vein (Fig. 3). The shaft was removed,
while the guidewire was left in place with the detached metallic part remaining within the proximal region of the stenotic iliac segment (Fig. 4). We did not remove the guidewire to avoid releasing the foreign body into the venous system. A 12 mm self-expandable Wallstent (Boston Scientific Inc., Natick, MA) was placed to widen the stenotic segment of the common iliac vein. A snare catheter was introduced into the IVC through the guidewire; the detached tip was then caught and pulled through the guidewire to the level of the popliteal vein (Fig. 5). After removing the vascular sheath, the detached tip was withdrawn from the popliteal vein through a 2 cm percutaneous incision (Fig. 6). The procedure was terminated to avoid additional complications that might have resulted from either the incision or anticoagulation. Patient was administered with low-molecular-weighted heparin—enoxaparin (Clexane, Sanofi, Paris, France) for a period of 6 days (subcutaneous administration of Clexane 6,000 anti-Xa/0.6 mL, twice per day with a 12-hour interval) till the following treatment session.

One week later, the remaining thrombus was treated with manual aspiration thrombectomy using a 9F guiding catheter via the ipsilateral popliteal vein. An additional 12 mm self-expandable metallic stent (Protégé, eV3 medical,
Plymouth, MN) was placed to achieve patency of the common iliac and the external iliac veins. A check venography demonstrated uninterrupted blood flow through the vein (Fig. 7).

Discussion

MTS is a frequent but rarely diagnosed condition in which patients develop iliofemoral DVT due to an anatomical variation of the left iliac vein. In 1957, May and Thurner explained this phenomenon by revealing the presence of abnormal vascular thickening of the left common iliac vein at the point where it was crossed by the overlying right common iliac artery and compressed against the fifth lumbar vertebra. Despite the relatively high incidence of this anatomical variation, the clinical prevalence of MTS-related DVT is surprisingly low, reportedly occurring in only 2 to 3% of all lower extremity DVTs. However, the well-known predominance of left-sided DVT suggests that diagnoses of MTS may be missed, leading to a decrease in prevalence and an apparent low rate of occurrence.

The traditional therapeutic modality for the treatment of MTS is an open surgical repair of the affected vein; however, the standard of care has since evolved into using thrombolytics combined with endovascular interventions. Catheter-directed thrombolysis combined with PMT has been recommended primarily as a less invasive treatment option for the management of DVT in patients with MTS. The use of self-expanding stents with 12 to 14 mm diameters has been suggested. Hölper et al reported the 2-year iliac vein patency rates of iliac stents to be between 95 and 100% in MTS patients. PMT devices allow for rapid clot removal as well as decreased frequency, dose, and duration of fibrinolytic therapy. The advantages of these devices over local thrombolysis include rapid establishment of lumi-

References

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