An atypical cause of extensive left-lower-extremity DVT: May-Thurner syndrome

Qiao Zhou, MD; Bonny Lee, BS; Robert Lee, BS; and Michael Stewart, MD

May-Thurner syndrome is a rare condition requiring both clinical acumen and correct imaging studies to diagnose. We present a case of a 49-year-old male who was initially admitted for chest pain and was later found to have extensive left-lower-extremity deep vein thrombosis. Subsequent computed tomography (CT) imaging was able to reveal a right common iliac aneurysm compressing the left common iliac vein. Radiologic findings and procedural angiographic studies are reviewed with reference to pertinent literature.

Case report

A 49-year-old male with a history of human immunodeficiency virus (HIV), hypertension, hyperlipidemia, alcohol abuse, and prior transient ischemic attack (TIA) came to the emergency room (ER) with a chief complaint of chest pain. His chest pain was constant, sharp, 8 out of 10 in severity, left-sided, radiating to his left arm, and associated with shortness of breath, cough, and dizziness. In the ER, electrocardiography (EKG), cardiac enzyme measurements, and chest x-ray were done and came back negative. His pain resolved later in the ER, and he was admitted for further workup of his chest pain. The patient underwent a nuclear stress test and echocardiography, both of which were reported as unremarkable.

During his hospital stay, the patient developed swelling in his left lower extremity due to extensive deep vein thrombosis (DVT), which was confirmed by peripheral vascular lab (PVL) venous exam. The patient also complained of pain and discomfort in the left flank and left lower quadrant (LLQ). He initially underwent a renal PVL exam and renal ultrasound, and they came back negative. A CT scan of his abdomen/pelvis showed extensive DVT with inflammatory changes to the left iliac and femoral veins, extending to his LLQ, likely secondary to thrombosis. There was also a large right common iliac artery aneurysm, which markedly compressed the left common iliac vein, suggestive of May-Thurner syndrome (Figs. 1A-D). Vascular surgery was consulted, and intravascular lysis of the venous clot and iliofemoral stenting were performed (Figs. 2A-B). Then, two days later, aneurysm repair was done as well (Fig. 3). After the aneurysm repair, the patient was stable and discharged on anticoagulation therapy.

Discussion

May-Thurner syndrome, also known as iliocaval compression syndrome, is a DVT attributed to extrinsic compression of the left common iliac vein against the lumbar vertebral body due to impingement from an overriding right common iliac artery. The left common iliac vein is more likely prone to compression, given the more longitudinally transverse course it takes, compared to the more vertically oriented right common iliac artery. Furthermore, the left common iliac artery is subjected to chronic pulsations from the overriding right iliac artery wall, which incites the development of a spurlike defect containing elastin and collagen in the lumen of the left common iliac vein (1, 2). This spur provides a foothold where blood can pool and collect, promoting clot formation (3). Interestingly, a sizeable proportion of the general population demonstrate significant hemodynamic changes in the left iliac vein from the adjacent right common iliac artery but are completely asymptomatic, without any clinical sequelae. This observation
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Fig. 1. Sagittal (A, B), coronal (C), and axial (D) CT images demonstrate a 3.1-cm right common iliac artery peripherally calcified aneurysm that compresses the left common iliac vein, leading to thrombosis of the left common femoral and iliac vasculature.

Fig. 2. Initial ascending venogram (A) shows thrombosed left femoral vein and iliac system. Completion venogram following thrombectomy (B) demonstrates near resolution of thrombus and a widely patent stent after Angiojet thrombolysis catheter was used along with tPA for clot lysis.
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Fig. 3. Percutaneous endovascular right common iliac artery aneurysm repair with Endologix and right internal iliac artery embolization.

...raises the possibility that this phenomenon is not a pathological entity but a normal anatomic variant (4).

The incidence of lower-extremity DVT is higher on the left side than on the right. In patients with documented left-sided lower-extremity DVT, 18-49% of the documented cases are purported to be secondary to May-Thurner syndrome (5). Demographically, a sizeable portion of patients with this disease are women of childbearing age who are encumbered with long periods of immobility or pregnancy.

Clinically, these patients present with the salient findings (including pain and edema) and also with chronic findings (namely, pigmentation changes, varicose veins, and skin ulcerations). A significant portion of patients with longstanding, untreated May-Thurner syndrome subsequently acquire post-thrombotic syndrome (6). Patients with recurrent lower-extremity thrombosis that is refractory to treatment and who have pan-negative hypercoagulability lab tests for protein C deficiency, antiphospholipid syndrome, Factor V Lieden, and prothrombin mutations should be screened for anatomic etiologies, including May-Thurner syndrome.

The initial imaging modality to assess for DVT is an ultrasound (US) exam; however, it is not able to fully illustrate the extent of iliac vein compression, nor is the presence of an intraluminal spur (7). Intravascular US has shown promise (8). CT of the abdomen, in of itself, cannot decisively delineate the degree of compression secondary to obtaining the image during the arterial phase of the bolus, which limits reconstruction capabilities. CT venography has come to the forefront as an noninvasive means of establishing the presence and degree of compression with high specificity and sensitivity (9, 10). Moreover, magnetic resonance imaging (MRI) venography can further characterize the anatomic configuration of the compression with greater resolution, as well as other incidental findings that may contribute to impingement on the iliac veins (11). Notwithstanding its invasive nature, the true gold standard for imaging the iliac vein is endovascular venography, which can duly diagnose and treat the underlying abnormality.

A classification system defines the different clinical stages of iliac vein compression.

- Stage I includes asymptomatic iliac vein compression.
- Stage II encompasses development of a venous spur.
- Stage III entails development of left iliac vein DVT (10).

Traditional open repair entails circumventing the stenotic portion of the common iliac vein with an autologous vein, devising a means for elevating the right iliac artery off of the common iliac vein, and repositioning the iliac artery with excision of the intraluminal spur. With the advent of endovascular methods, the traditional opened interventions have given way to a two-pronged endovascular approach centered on thrombolysis or thrombectomy via percutaneous angioplasty with subsequent stenting, thereby both reducing clot burden and achieving patency in the left common iliac vein (12-14). Although there is the theoretical concern of fistula formation from the aneurysm itself, we expect that, most likely, the aneurysm will recede following endovascular embolization. Localized thrombolysis with urokinase or tissue plasminogen activator (tPA) has proven effective in dissolving the clot (15). The patients were placed on anticoagulants for six months after thrombectomy and stent placement (16). The consideration for other sources of extrinsic mass effect on the left common iliac artery would include an occult pelvic mass or lymphadenopathy.

It should be noted that DVTs of anatomic etiologies such as May-Thurner’s are not amenable to traditional treatment therapies (namely, long-term anticoagulation) due to their compressive nature, leading to blood stasis. As such, therapeutic stenting with aneurysmal repair was the clear option in our case. However, the upcoming ATTRACT will be the first large, prospective, randomized study to compare traditional anticoagulation vs. catheter-directed thrombolysis for standard proximal DVTs, following the primary outcomes for post-thrombotic syndrome in both groups (17). It will be interesting to read the conclusions of that study, as its recommendations may have impact on DVT treatment decisions in the future. In addition, treatment for extensive iliofemoral DVT (as investigated in the CaVenT study) has set precedence in illustrating the efficacy of catheter-directed thrombolysis in preventing post-thrombotic syndrome and maintaining iliofemoral patency over conservative medical management with anticoagulants alone (18).
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References


