Unusual presentation of right-sided May-Thurner syndrome

Abdullah Nasif, MD, Amin Mohamed Ahmed, MD, Somya Al-Embideen, MD, Munier Nazzal, MD, MBA, Mohamed Osman, MD, MBA, and Ayman Ahmed, MD, FSVS, Toledo, Ohio

ABSTRACT

May-Thurner syndrome commonly presents with left leg swelling. Right-sided venous compression syndromes are rare. We report a 49-year-old gentleman who presented with right lower extremity swelling after leg trauma. He was found to have right distal common iliac vein compression by the overlying right internal iliac artery. He was treated with an endovascular approach with balloon venoplasty and stenting. This is a unique presentation of May-Thurner syndrome variation affecting the right lower extremity with limited description in the literature. (J Vasc Surg Cases Innov Tech 2021;7:768-71.)

Keywords: May-Thurner syndrome; Right-sided

May-Thurner syndrome (MTS) is a phenomenon commonly described as an acquired stenosis of the left common iliac vein secondary to compression by the right common iliac artery. Right-sided MTS is a rare phenomenon. It has been reported in a patient with left-sided inferior vena cava1 and in patients with a high aortic bifurcation.2 Given the rare presentation of this condition, diagnosis is commonly missed and management strategies are less defined compared with classic MTS. We report a case of right-sided MTS variation caused by compression of the right common iliac vein that was treated with an endovascular approach with significant improvement of the patient’s symptoms. Consent for publication was obtained from the patient.

CASE PRESENTATION

Our patient is a 49-year-old gentleman who is a former smoker. He was injured by a metal object on his right shin. After the trauma, he developed right leg swelling and redness. Initially, the patient was seen in a different hospital and was treated for cellulitis with antibiotics for 2 weeks with no improvement. An ultrasound scan for the lower extremity was negative for deep vein thrombosis (DVT). After 2 months of persistent leg swelling, despite using a thigh high compression stocking (20-30 mm Hg), he was referred to our office for further care. He presented with right lower extremity swelling that involved the entire lower extremity up to the groin. The swelling worsened toward the end of the day. He still used thigh high compression stockings regularly with no significant improvement and denied rest pain or tissue loss. On physical examination, there was +2 right lower extremity swelling, with palpable pedal pulses. There was no evidence of swelling of the left lower extremity. His venous reflux study showed clinically significant reflux (common femoral vein 1900 ms/great saphenous vein at the saphenofemoral junction 944 ms) with no evidence of reflux involving the rest of his right great saphenous vein. Computerized tomography venogram (CTV) was suboptimal demonstrating some collateral veins but no evidence of central venous thrombosis. However, it did show compression of the right common iliac vein (Fig 1). After a discussion with the patient, we decided to obtain a venogram with intravascular ultrasound (IVUS) and, depending on findings, possible iliac vein stenting.

We accessed the right common femoral vein under ultrasound guidance. Central venogram and IVUS demonstrated a >50% reduction in diameter confirming the compression of the right common iliac vein (Figs 2 and 3). Predilation of the vein with an 8 × 100 mm balloon was followed by dilation with a 16 × 40 mm balloon before placing a 16 × 120 mm ViCi Venous Stent (self-expanding nitinol stent). The stent was balloonized, and the venography showed the improved diameter of the common iliac vein. Completion venogram and IVUS showed resolution of the stenosis (Figs 2 and 3). Postoperatively, the patient was discharged on anticoagulant (apixaban) and antiplatelet therapy (aspirin) for 3 months and then switched to antiplatelet therapy only with continued use of a compression stocking. He was seen in the office 1 month postoperatively. He had complete resolution of the leg swelling. Duplex ultrasound at the time showed a patent iliac vein stent. In our institute, the postprocedure follow-up routine for patients with iliac venous stenting is 1, 6, 12, and 18 months and then yearly duplex ultrasound after that. On 1-year follow-up, the patient denied any symptoms affecting his right lower extremity and duplex ultrasound showed a patent right iliac vein stent.
DISCUSSION

Venous outflow obstruction presenting in young adults was not well understood until 1957 when Dr Robert May and Dr Joseph Thurner concluded in their study of 430 cadavers that thrombosis of the pelvic veins occurs approximately eight times more frequently on the left side than on the right side of the pelvis. They attributed this to spur-like formations in the left common iliac vein and described three types of these formations. The first protrudes into the lumen like a pier or pillar, the second divides the lumen completely, and the third obstructs it almost entirely. On the basis of their histologic data, they reported that those formations are not of a congenital origin but develop during the patient's lifetime.

The majority of patients with venous compression are asymptomatic, but those who are symptomatic can present in both acute and chronic settings. Extensive ipsilateral DVT can develop secondary to compression of the left common iliac vein. It can also present with pain, swelling, venous ulcers, and skin discoloration. Some patients may even develop postthrombotic syndrome that was reported by Cockett et al in 1965.

Our patient presented with right lower extremity swelling after trauma that was diagnosed initially by his primary physician as cellulitis. However, the swelling persisted despite a full course of antibiotics. Workup for DVT was negative. Given the rarity of right-sided MTS and the unusual presentation, the proper diagnosis was delayed for his condition with a resulting delay in the delivery of the correct treatment. Other rare cases of right-sided iliac vein compression have been reported such as MTS secondary to prostate enlargement, lumbosacral exostosis, or compression of the right iliac vein between the right internal and external iliac arteries.

Although the exact prevalence of MTS remains unknown, multiple studies estimated an asymptomatic anatomical variant within the general population at 22%-32%. Furthermore, 31% of patients with iliofemoral DVT at a large medical center in Germany were found to have MTS. Women are at higher risk of developing symptomatic MTS especially with multiple pregnancies, in the postpartum period, or if they are on contraceptive pills. Additional risk factors include...
prolonged immobilization, scoliosis, history of recurrent DVT. It is therefore recommended that physicians and medical providers include MTS in their differential diagnosis especially in younger patients who present with symptoms of lower venous disease. Although right-sided MTS variants have been described previously, the unusual presentation of our patient after trauma rather than the usual presentation of swelling and/or DVT is what makes it unique addition to the current literature. Our patient had no history of DVT or venous disease and was not responsive to conservative therapy, but he had a variant of MTS that was probably asymptomatic of years until his recent injury. We believe that the swelling only started after the trauma due to the inflammation associated with trauma; that increased the blood flow to and from the leg, which in the setting of outflow stenosis could result in lower extremity swelling.

The diagnosis of MTS is usually based on high suspicion and diagnostic testing. MTS should be suspected in patients with unprovoked DVT or unilateral lower extremity swelling with unremarkable workup including DVT ultrasound study and venous reflux testing. CTV and magnetic resonance venography (MRV) are important to evaluate the central venous system for any stenosis or external compression. However, venography with IVUS is currently the gold standard for visualizing the compression of the iliac vein and establishing a diagnosis of MTS. CTV/MRV can be used but have some practical limitations. CTV is unable to control for the volume status of the patient during scanning, unless strict protocols are followed. MRV is an expensive option to diagnose MTS; however, it can be of value in patients with contraindication to CT scans. Furthermore, transabdominal ultrasound study is a valuable noninvasive tool to evaluate the venous system, but it is limited by patient body habitus, fasting status, and more importantly being operator dependent.

Treatment of MTS depends on the presentation, severity of symptoms, and whether the patient has developed DVT. Conservative treatment such as compression stockings can be used for patients who are asymptomatic or have mild symptoms. For patients with moderate symptoms or DVT, endovascular treatment with stenting is recommended.

---

**Fig 3.** Intravascular ultrasound (IVUS) images: (A) preintervention compressed lumen of the right common iliac vein; (B) totally compressed distal right common iliac proximal external iliac veins; (C) normal caliber of the right external iliac vein; (D) poststenting of the iliac vein. *R EIA*, Right external iliac artery; *R IIA*, right internal iliac artery.
REFERENCES

1. Burke RM, Rayan SS, Kasirajan K, Chaikof EL, Milner R. Unusual case of right-sided May-Thurner syndrome and review of its management. Vascular 2006;14:47-50.

2. Fretz V, Binkert CA. Compression of the inferior vena cava by the right iliac artery: a rare variant of May-Thurner syndrome. Cardiovasc Intervent Radiol 2010;33:1060-3.

3. May R, Thurner J. The cause of the predominantly sinistral occurrence of thrombosis of the pelvic veins. Angiology 1957;8:419-27.

4. Mousa AY, AbuRahma AF. May-Thurner syndrome: update and review. Ann Vasc Surg 2013;27:984-95.

5. Cockett FB, Thomas ML. The iliac compression syndrome. Br J Surg 1965;52:816-21.

6. Hung JB, Hsu CW, Tsai SH. Prostatism and May-Thurner syndrome. Am J Emerg Med 2013;31:445.e1-2.

7. Wasserburger J, Haponyuk A, Modhia UM, Langsfeld M, Paterson AJ, Rana MA. Lumbosacral exostosis as a rare cause of iliac vein compression and significant limb swelling. J Vasc Surg Cases Innov Tech 2019;5:529-31.

8. Tai E, Jaberi A, Oreopoulos CD, Forbes TL, Tan KT, Mafeld S. Diagnosis and management of right external iliac vein “sandwich”: a rare cause of iliofemoral deep venous thrombosis. J Vasc Surg Cases Innov Tech 2019;5:534-8.

9. McMurrich JP. The occurrence of congenital adhesions in the common iliac veins and their relation to thrombosis of the femoral and iliac veins. Am J Med Sci 1908;135:342-6.

10. Ehrich WE, Krumbhbaar EB. A frequent obstructive anomaly of the mouth of the left common iliac vein. Ann Heart J 1943;26:757-50.

11. Heller T, Teichert C, Hafer J, Weber MA, Kroger JC, Meinel FG. Prevalence of May-Thurner syndrome in patients with deep vein thrombosis at a large medical referral center. Rofo 2019;191:II07-17.

12. Manton W, Fish D, Unger J, Keagy B. Incidence of and risk factors for iliofemoral venous obstruction in patients with active or healed venous leg ulcers. J Vasc Surg 2011;53:1503-8.

13. Wax JR, Pinette MG, Rausch D, Cartin A. May-Thurner syndrome complicating pregnancy: a report of four cases. J Reprod Med 2014;59:333-6.

14. Zander KD, Staat B, Galan H. May-Thurner syndrome resulting in acute iliofemoral deep vein thrombosis in the postpartum period. Obstet Gynecol 2008;111(2 Pt 1):565-9.

15. Murphy E, Davis CM, Journeycake J, DeMuth RP, Arko FR. Symptomatic iliofemoral DVT after onset of oral contraceptive use in women with previously undiagnosed May-Thurner syndrome. J Vasc Surg 2009;49:797-703.

16. Otero Fernández R, Bravo Rodríguez F, Delgado Acosta F, González Barrios I. May-Thurner syndrome and surgery for scoliosis. Radiología 2008;50:245-7. [in Spanish].

17. Tarannum N, Hwssl K, Azam MS, Premchand RK. May-Thurner syndrome and recurrent DVT: a case report. Indian J Clin Cardiol 2020;1:13-6.

18. Chen Z, Zhang XC, Sun Y, Xu M. Diagnosis and treatment of non-thrombotic right iliac vein compression syndrome. Ann Vasc Surg 2019;61:568-70.

19. Knuttinen MC, Naidu S, Oklu R, Kriegshauser S, Eversman W, Rotellini L et al. May-Thurner diagnosis and endovascular management. Cardiovasc Diagn Ther 2017;7(Suppl 3):S159-64.