May-Thurner Syndrome: an underestimated syndrome

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Learning objectives

To present the computed tomography (CT) findings and the endovascular treatment outcomes.
Background

In 1957, May and Thurner described three varieties of intra-luminal spurs occurring in the left common iliac vein close to its junctioin with the inferior vena cava (IVC). The incidence of May-Thurner syndrome (MTS) is unknown and ranges from 18%-49% among patients with left-sided lower extremity deep vein thrombosis (DVT). Left iliac vein compression is the most common variant seen in May-Thurner syndrome and the goals of treatment are to reduce symptoms and to reduce the risk of complications.
MTS is the result of compression of the left common iliac vein between the right common iliac artery and the overlying spine, with subsequent development of DVT in the left lower extremity.

The overall prevalence of symptomatic MTS ranges from 18% to 49% among patients with left-sided lower extremity DVT. It is predominantly seen in young to middle-aged females (20-40 years).

The syndrome most commonly presents as acute iliofemoral DVT with sudden onset of left leg swelling and pain. In the acute phase, patients can also present with pulmonary embolism. Prolonged immobility, recent surgery and pregnancy are well known predisposing factors. MTS could also present with chronic symptoms of left lower extremity venous hypertension, venous insufficiency without thrombosis. Patients usually complain of left lower extremity pain and swelling in the acute phase and varicose veins, skin discoloration and ulceration around the ankle owing to chronic venous stasis.

Anatomically, the right common iliac artery crosses over the left common iliac vein and then runs adjacent to the right iliac vein, where it continues as the right external iliac artery parallel to the right external iliac vein. The left iliac vein is compressed between the right common iliac artery anteriorly and the sacral promontory or the fifth lumbar vertebra posteriorly just before the iliocaval junctiion.

The combination of chronic mechanical compression and pulsatile vibratory pressure from the adjacent artery causes chronic repetitive microtrauma leading to endothelial injury of the vein. Endothelial damage leads to deposition of elastin and collagen, which over the long term leads to intramural webs, channels and spur (Figure 1). This spur may have several morphological features, which cause a predisposition to DVT.

Three morphologic types of MTS exist: focal extrinsic compression by the overlying iliac arteries, diffuse atrophy and cordlike obliteration (Figure 2). These types represent different chronicity of the obstruction; with diffuse atrophy and cordlike obliteration of the left common iliac vein through progressive degrees of thrombotic fibrosis after focal iliac compression. Knowing the morphologic type can be useful for predicting endovascular technical difficulties and for allocation of time in the angiographic suite.

Recently, the use of multidetector CT or MR venography has been advocated for diagnosis. Both have high sensitivity and specificity in evaluating DVT and allow identification of the venous compression and pelvic venous collaterals. The most common venous collateral pathways include the ascending lumbar, presacral, transpelvic and abdominal wall vein.
Multidetector CT performed in the pelvis venous phase after the injection of iodinated contrast material reliably shows the iliac vein compression, which is best seen in the transverse plane. CT can also show the extent of iliofemoral vein thrombosis (if present) and help exclude other causes of venous compression such as pelvic masses.

Left common femoral or iliac venography confirms the presence of venous obstruction and allows the assessment of hemodynamic significance. It is the ultimate diagnostic test and allows treatment to be offered in the same setting.

Treatment is dependent on the presence of DVT. Currently, endovascular thrombolysis with treatment of the venous compression with stents is advocated. Endovascular therapy involves catheter-directed thrombolysis with the use of pharmacological agents (tissue plasminogen activator) and/or various mechanical thrombectomy devices. These devices allow rapid removal of clot burden and rapid restoration of blood flow. They are helpful in preventing post-thrombotic syndrome, as early thrombolysis allows preservation of valve function. Subsequent to thrombolysis, the predisposing factor to the DVT, the underlying venous compression is usually treated with stenting. Self-expanding stents are most commonly used. Long-term anticoagulation and compression stockings are required to prevent recurrent DVT formation and stent occlusion. Excellent 1-year patency rates of 90%-100% (mean 96%) following successful stent placement have been reported.
**Fig. 1:** Left common iliac vein compression by the right common iliac artery. Chronic changes in the left common iliac vein secondary to endothelial damage with (a) intraluminal spurs, (b) webs and (c) channels are depicted.

**Fig. 2:** Drawing shows morphologic classification of left common iliac vein in May-Thurner syndrome based on CT venographic findings. Type 1 is focal compression of left common iliac vein at crossing point of right common iliac artery. Type 2 is diffuse atrophy of left common iliac vein between compression site and confluence of internal and external iliac veins. Type 3 is cordlike obliteration of left common iliac vein.

© Jeon UB et al. May-Thurner syndrome complicated by acute iliofemoral vein thrombosis: helical CT venography for evaluation of long-term stent patency and changes in the iliac vein. AJR 2010; 195:751-757

**Fig. 3:** Case 1: 21-year-old female presented with shortness of breath. A: axial IV contrast enhanced image shows pulmonary embolism on CT angiography of the lungs. B-C: Pelvic
imaging demonstrated compression of the left common iliac vein by the right common iliac artery with accompanying thrombus. D: MIP. Pelvic venous collaterals. E: VR shows the extended into the left lower extremity. F-G: Conventional angiography demonstrated a long segment, chronic appearing narrowing through the left common and external iliac vein. H: Subsequent angioplasty. I: Stent placement and patency on post-stent imaging.

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Fig. 4: Case 2: 60-year-old female presented with edema and pain. A-C: Sagittal MPR and axial imaging demonstrated compression of the left common iliac vein by the right common iliac artery with accompanying thrombus. D-E: Manual Aspiration Thrombectomy and stent placement with wide patency on post-stent imaging.

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Fig. 5: Case 3: 20-year-old female presented with DVT. A-B: Coronal and avail imaging demonstrated compression of the left common iliac vein by the right common iliac artery with accompanying thrombus in IV contrast enhanced image. C-D: DSA. Trombus extended into the left lower extremity affecting popliteal, superficial femoral vein and iliac axis. E-F: Catheter-directed thrombolysis. G: DSA. Control post-Catheter-directed thrombolysis.

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Conclusion

It is important to recognize that persistent edema of the left leg may be caused by May-Thurner syndrome, especially in young women. This diagnosis is confirmed with iliac venography, which demonstrates the iliac vein compression. Endovascular management should be the primary treatment. With early recognition and aggressive management, May-Thurner syndrome can be a well-managed disease.
References