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Right-Sided May-Thurner Syndrome in a Patient with Left-Sided Inferior Vena Cava and Recent COVID-19 Infection

Senese, Ryan MD[1], Lu, Iris[2], Saavedra, Jonathan[3], Lev, Steven MD[4] and Ramanathan, Anantha K MBBS[1]

[1]*Department of Surgery, Nassau University Medical Center.*

[2]*New York Institute of Technology College of Osteopathic Medicine.*

[3]*American University of the Caribbean School of Medicine.*

[4]*Department of Radiology, Nassau University Medical Center.*

***Correspondence:**

A. Ramanathan, Dept of Surgery, Nassau University Medical Center, 2201, Hempstead Turnpike, East Meadow, NY 11554, USA, E-mail: aram02@gmail.com.

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ABSTRACT

Background: *May-Thurner Syndrome (MTS) is a rare vascular condition where the left common iliac vein is compressed between the right common iliac artery and the spine. We report a case of a patient with a left-sided inferior vena cava and right-sided May-Thurner syndrome. He had recent symptomatic COVID infection despite vaccination (Janssen).*

Case: *A 28-year-old male presented with right lower extremity pain and swelling for three weeks. A duplex ultrasound was performed revealing iliofemoral deep vein thrombosis. Pharmacomechanical thrombectomy with ultrasound assisted thrombolysis was performed with subsequent femoral venogram and angioplasty of the right common iliac vein.*

Conclusion: *May-Thurner Syndrome often remains underdiagnosed due to the chronic nature of the disease process. The presence of a left-sided IVC leading to right sided MTS with recent COVID-19 infection (and vaccination) was a unique feature of this case. May-Thurner Syndrome should be considered in the differential diagnosis of those present with DVTs or symptoms of venous hypertension.*

Keywords

Right sided May-Thurner syndrome, Left-sided Inferior Vena Cava, COVID-19.

Introduction

May-Thurner Syndrome (MTS) is a rare vascular condition where the left common iliac vein is compressed between the right common iliac artery and the spine due to its anatomic location [1]. It primarily affects middle aged women in the third to fifth decade, and most patients are asymptomatic [2,3]. In symptomatic individuals, it commonly presents as deep vein thrombosis or venous hypertension [3,4]. Due to the chronic nature of the disease process, patients often remain underdiagnosed. Anatomic variation exists, but it is uncommon. Reported anomalies include a left-sided inferior vena cava resulting in compression of the right common iliac vein by the left common iliac artery, termed right-sided MTS [3,5].

A known sequel of COVID-19 infection is a hypercoagulable state leading to arterial and venous thrombosis. The pathogenesis of this heightened prothrombotic state has been studied extensively [6]. On May 5th 2022, the Food and Drugs Administration

(FDA) put out an advisory on Janssen vaccine limiting its use, due to concern over thrombotic events, though rare [7]. A left-sided inferior vena cava (IVC) is a rare anatomical variation that occurs in .2 to .5% of the population [8]. All these factors were present in the case of a young male patient with recent COVID infection in spite of vaccination, who presented with extensive deep vein thrombosis. Imaging revealed a left-sided inferior vena cava and right-sided May-Thurner syndrome.

Case Report

A 28-year-old male was referred to our institution complaining of right lower extremity pain and swelling of three weeks duration. He reported discoloration in his right leg during periods of prolonged standing. The patient had a history of lower back injury resulting in a prolapsed disc three months earlier, and had symptomatic COVID-19 infection 7 months prior despite vaccination with the Janssen vaccine. The patient was very active and did weightlifting regularly. He denied any previous history of clots or a family history of blood disorders. He does not smoke but does use marijuana daily. His vitals were normal at presentation. He was very tall and languid (185 cm and 99.7 kg). His right lower extremity was diffusely swollen from his thigh down to the toes and the right calf was tender to touch. Sensation was intact and the foot pulses were palpable.

Right lower extremity duplex ultrasound showed deep vein thrombosis with no venous flow within the right common femoral and femoral veins. There was extension of the clot into the right external iliac vein. Thrombophilia screening did not reveal any abnormality. The patient was heparinized in preparation for pharmacomechanical thrombectomy.

Description of the Procedure

After placing the patient prone, pharmacomechanical thrombectomy was performed of the right femoral to common iliac veins, via right popliteal vein access. Pulse-sprayed tPA (10 mg) was delivered through an Angiojet Zelante® (Boston Scientific) catheter. As there was residual clot, an EKOS® (Ekosonic Endovascular System, Boston Scientific) catheter was placed through the same access and ultrasound assisted thrombolysis was performed for 6 hours using tPA 1 mg/ hr. Treatment was continued with IV heparin. The following day the patient was placed supine and a bilateral iliofemoral venogram was performed followed by angioplasty of the right common iliac vein. The venogram confirmed the presence of a left sided IVC that eventually crossed over to the right, with stenosis of the right common and external iliac veins. Collateral vessels were seen extending from the right common iliac vein to the IVC after crossing back to the right side. Improved caliber of the right common and external iliac veins was demonstrated after completion of angioplasty, as seen on completion venogram (Figure 1 shows a collage of the above). After the procedure, the patient was bridged from enoxaparin to warfarin, with outpatient follow up. The patient was noncompliant with anticoagulation and returned several weeks later with recurrence of symptoms, requiring stent placement, initially deferred due to his young age.

Figure 1: A – Left sided IVC, Compression of right common iliac vein, collateralization; B- IVC crossing to the right superiorly; C- Balloon angioplasty.

Discussion

May-Thurner syndrome is a vascular condition where the left common iliac vein is compressed by an overlying right common iliac artery resulting in thrombosis (Figure 2A) [1]. Right-sided MTS, when the right common iliac vein is compressed by the left common iliac artery, is a rare occurrence [3,5,9,10]. Our report describes a case of right-sided MTS secondary to a left sided IVC that eventually crossed over to the right (Figure 2).

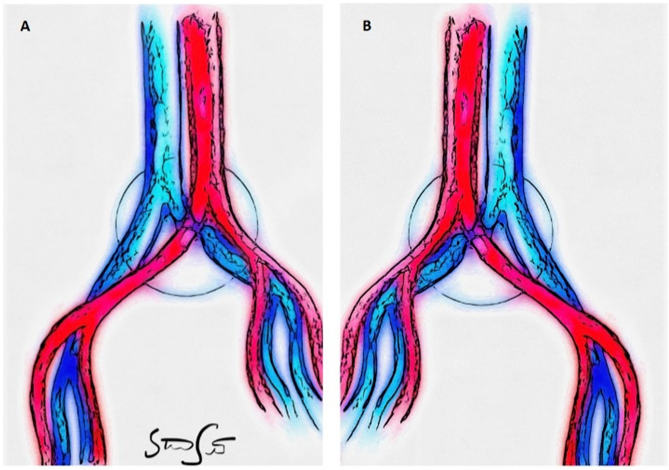

Figure 2: A - Classic May- Thurner Syndrome: left common iliac vein is compressed by an overriding right common iliac artery; B - Right sided May Thurner Syndrome with compression of the right common iliac vein by the left common iliac artery.

Symptomatic MTS is predominantly seen in younger and middle aged women, especially after prolonged immobilization or pregnancy, although it can also affect men [2,11]. Many individuals remain asymptomatic, but in symptomatic patients, it typically presents as DVTs or venous hypertension [2-4]. These patients will complain of lower extremity swelling, pain or venous claudication. On physical examination, patients

can have swelling, skin hyperpigmentation, varicose veins, telangiectasia, or venous ulcers. Because of the chronic nature of the disease process, patients often learn to live with these changes and remain underdiagnosed. Therefore, proper and thorough diagnostic evaluation is imperative. Our patient who had a history of chronic right lower extremity pain, swelling and discoloration presented with iliofemoral DVT in his right lower extremity. In the presence of unilateral limb swelling, venous duplex ultrasound is the first choice imaging modality as it is non-invasive and inexpensive [2-4]. Assessment of iliac veins is not part of the routine lower extremity ultrasound protocol [12]. Therefore, MTS is frequently missed in patients who present with leg pain and swelling.

Computed tomography (CT) and magnetic resonance (MR) venography are superior imaging modalities in delineating anatomy and demonstrating the presence of collaterals. Both modalities have greater than 95% sensitivity and specificity for diagnosing MTS with the ability to detect other causes of venous compression including bone anomalies, a pelvic mass or an underlying malignancy related lymphadenopathy, hematoma and cellulitis [2]. In our patient, venogram revealed a right-sided MTS due to a left-sided IVC and collateral vessels arising from the right common iliac up to the IVC and joining it after the latter crossed back to the right side.

Treatment of MTS is mainly reserved for patients with symptomatic obstruction presenting with thrombosis and or chronic venous insufficiency. Angioplasty and stenting of the compressed iliac veins has been shown to be safe and effective [13]. The Palma crossover, where the distal attachment of the contralateral great saphenous vein is anastomosed to the ipsilateral common femoral vein to restore blood flow is another alternative if minimally invasive therapies render no resolution [3,14]. Asymptomatic patients can be conservatively managed with compression stockings. Our patient was successfully treated with pharmacomechanical thrombectomy and ultrasound assisted thrombolysis of the right femoral to common iliac veins and subsequent angioplasty. Completion venogram showed improved caliber of the right common and external iliac veins. Stent placement was deferred due to concerns for stent thrombosis in this young patient with a not-so-distant history of COVID-19 infection in spite of vaccination. The patient however was noncompliant with anticoagulation and later returned with recurrence of DVT and required placement of stent. The causes of recurrent thrombosis have been analyzed in the literature [13].

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2) worldwide pandemic has caused an increased incidence of thromboembolism events. Multiple pathophysiologic mechanisms have been demonstrated in patients with active infection including but not limited to endothelial inflammation, disruption of intercellular junctions, increased cytokine and activation of platelets. These mechanisms can continue even after the patient recovers from the active infection [6]. The role of Janssen vaccine in this case is unclear although there have been concerns for thrombosis [7]. Similarly, a brief period of immobilization due to spinal trauma may also have played a role.

Conclusion

Due to the chronic nature of May-Thurner Syndrome, diagnosis is frequently missed, especially in those who present with leg pain and swelling without evidence of DVT on ultrasound. Diagnosis can be further complicated in those with atypical presentation. Our patient presented with iliofemoral venous thrombosis due to right-sided May-Thurner syndrome and a left sided IVC, with a history of spinal trauma, and a not-so-distant COVID 19 infection in spite of vaccination. While more research needs to be done into how the interplay of these factors produce thrombosis, heightened awareness of these conditions will help with early diagnosis and treatment.

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