

INTRODUCTION

- The common iliac veins (CIVs) arise from the junction between the external iliac and internal iliac veins. From the junction between these veins at the level of the sacroiliac joint, the left CIV follows an oblique direction to connect at the inferior vena cava at the fifth lumbar vertebral level, joining the contralateral CIV.
- Slight anomalies in vascular anatomy are common, but there are some significant anomalies that are rarer. One anomaly that can occur is duplication, in which either CIV can be doubled in part or throughout its length.
- May-Thurner syndrome (MTS) is a condition in which the left CIV is compressed between the right common iliac artery and the lumbar vertebral body, causing physiological changes within the vasculature. External compression of the CIV in MTS leads to focal sclerosis and increased risk of venous stasis disease with or without thrombus formation

CASE

A 40-year-old female with a medical history of deep venous thrombosis (DVT) in the left lower extremity (LLE) in 2001, Factor V Leiden, and Methylenetetrahydrofolate Reductase Deficiency presented to the cardiology clinic in 2020 with a complaint of pain, cramping, and restlessness in the bilateral lower extremities, exacerbated by physical activity, with the LLE being more severe than the right. She reported that these symptoms have been present since her DVT in 2001. The patient also reported that her LLE has chronically been bigger than her right. On the physical exam, her LLE was found to be diffusely larger than the right, with medial, ropey varicosities (CEAP Class 2).

A reflux study and magnetic resonance venography (MRV) was performed which revealed venous insufficiency of the bilateral great saphenous veins and left small saphenous vein, as well as MTS of the distal left common iliac vein. With a confirmed diagnosis of MTS, the patient was then scheduled for venography with possible angioplasty and stenting.

The patient was taken to the cardiac catheterization lab (cath lab) and venography revealed a duplicated left CIV (Figure I). Percutaneous transluminal venoplasty (PTV) was performed on both branches of the duplicated CIV and the superior branch was stented with a Vici 14x90 mm stent, and the inferior branch with a Vici 14x60 mm stent. Kissing balloon inflation of both branches of the left CIV was then done. Venography revealed patency of both branches at the end of the procedure (Figure II).

After the procedure, the patient's edema resolved, until a year later when she returned to the clinic with recurrence of the LLE edema. The patient was brought



Figure I: Venography revealing a duplicated left common iliac vein. The white arrow shows the superior branch of the duplicated left common iliac vein, and the yellow arrow shows the inferior branch of the duplicated left common iliac vein.



Figure II: Post-procedural venography revealing patency of both branches of the duplicated left common iliac vein (white arrow: superior branch; yellow arrow: inferior branch).



Figure 3: Venography revealing occlusion of the inferior branch of the duplicated left common iliac vein. Only the superior branch remains patent (white arrow).

back to the cath lab and was found to have an occlusion of the stent in the inferior branch of the left CIV (Figure III). Attempts of venoplasty of the inferior branch were unsuccessful. The patient's edema was then treated with Furosemide and conservative management with exercise, elevation, compression stockings, and a lymphedema pump, which has provided great improvement in symptoms.

DISCUSSION

- The pelvic vasculature forms in weeks five to seven of embryological development from the cardinal veins. Anomalies in pelvic vasculature arise due to maldevelopment of the posterior cardinal veins during this time.
- Duplication of the common iliac veins has only been reported a few times in medical literature:
 - Edwards et al. in 1951, Sperling et al. in 1975, Mayer et al. in 1988.
- Surgical procedures involving the retroperitoneum are common and therefore necessitate a firm grasp of pelvic vasculature and any possible variations in the anatomy
 - Lack of knowledge of these anomalies increases the risk of vascular injury, which is a major cause of intraoperative hemorrhage
- Anomalies in pelvic vasculature can be associated with certain pathologies such as Klippel-Trenaunay syndrome, a complex congenital disorder characterized by capillary and venous malformations and limb overgrowth, with or without lymphatic malformations
 - One study found that in 559 patients with Klippel-Trenaunay syndrome, 19 patients had variations in the iliac veins.
- These common iliac vein anomalies most often appear isolated and may be the cause of edema, venous insufficiency, and thromboembolism.
 - 5-6.7% of adults with spontaneous DVT have an anomaly of the inferior vena cava.
- The incidence and prevalence of MTS believed to be underreported because most patients are asymptomatic and do not require treatment.
 - Symptomatic patients tend to have pain and swelling of the LLE, although variants involving the right and bilateral lower extremities have been reported
- Diagnosis of MTS is based off of clinical presentation and doppler, however, MRI, CT, and venography (gold standard for diagnosis) can be helpful in determining the location of thrombosis and/or iliac vein compression.

CONCLUSION

- Awareness of the possible anomalies in pelvic venous anatomy is crucial in performing surgeries and carrying out interventional procedures.
- It is also essential to understand the associated pathologies of these anomalies and the symptoms they may directly cause.
- We conclude that the duplication and obstruction of the CIV in this patient may have contributed, alongside her coagulopathies and MTS, to edema, DVT, and chronic venous insufficiency of the LLE.

