

A Case Series of May-Thurner Syndrome: An Anatomical Variation Leading to a Life-threatening Condition

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ABSTRACT

May-Thurner syndrome is a rare clinical condition resulting from anatomical variation, where patients present with unilateral left lower limb swelling due to a thrombus in the left common iliac vein. This occurs as a result of compression of the left common iliac vein by the right common iliac artery. The condition is more commonly observed in females and can lead to life-threatening pulmonary thromboembolism. Early diagnosis and interventional management, such as stenting and placement of an Inferior Vena Cava (IVC) filter, can help prevent pulmonary embolism. In the present case series, four patients were included. Two of them presented with the classical clinical history of unilateral left lower limb oedema and calf muscle tenderness. One of these patients underwent stenting of the left common iliac vein and placement of an IVC filter. In the other two patients, abdominal complaints prompted the performance of Multidetected Computed Tomography (MDCT), and incidentally, left common iliac vein thrombus secondary to May-Thurner syndrome was detected.

Keywords: Calf muscle tenderness, Iliac vein compression syndrome, Lower limb swelling, Stent

INTRODUCTION

May-Thurner syndrome is a rare condition that leads to life-threatening unilateral iliofemoral deep venous thrombosis. It occurs due to an anatomical variation where the left common iliac vein becomes compressed between the right common iliac artery and the lumbar spine, particularly the fifth lumbar vertebrae. This condition is also referred to as Cockett's syndrome or iliac vein compression syndrome [1,2]. May-Thurner syndrome should be considered in young patients who present with unilateral left lower limb swelling, in patients who develop recurrent ipsilateral proximal Deep Venous Thrombosis (DVT) without any predisposing factors, and in patients who experience persistent symptoms despite adequate treatment for DVT [2].

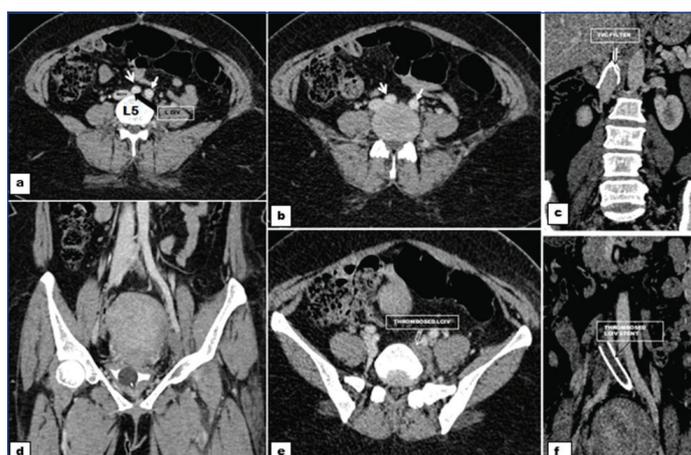
Case 1

A 44-year-old female patient presented to the Emergency Department with clinical complaints of unilateral left lower limb oedema for 15 days, along with calf pain for three days. On clinical examination, diffuse lower limb oedema and calf muscle tenderness were observed. The patient was referred to the radiology department for a left limb Doppler scan, with a clinical diagnosis of DVT.

The Doppler scan revealed an extensive acute thrombus involving the common and superficial femoral veins, extending superiorly to the common iliac vein. The suggestion was made to perform a contrast-enhanced MDCT [Table/Fig-1a,b,d,e] to assess iliac vein compression. The MDCT showed compression of the left common iliac vein by the right common iliac artery against the underlying L5 vertebral body, along with thrombus in the left common iliac vein, common femoral vein, superficial femoral vein, and popliteal vein (image not shown here).

Based on these findings, the final diagnosis of May-Thurner syndrome was made. The patient was advised to undergo left iliac vein stenting and an Inferior Vena Cava (IVC) filter. She underwent both procedures, but after three months of poststenting, she developed a thrombus within the left common femoral vein stent [Table/Fig-1c,f].

The patient was managed with anticoagulant therapy, and a follow-up lower limb venous Doppler scan a month later revealed chronic thrombus in the common femoral vein.



[Table/Fig-1]: Prestenting images (a,b,d,e) and Poststenting images (c&f).
Open arrow: Right common iliac artery; Closed arrow: Left common iliac artery;
Black arrow: Compressed left iliac vein; LCIV: Left common iliac vein; RCIV: Right common iliac vein; IVC: Inferior vena cava

(a,b): Contrast-enhanced Computed Tomography (CECT) axial section showing compression of the left common iliac vein by the right common iliac artery against the underlying L5 vertebral body; (d) CECT coronal section showing compression of the left common iliac vein by the right common iliac artery; (e) CECT axial section showing thrombus in the left common iliac vein; (c,f) Post IVC filter and left common iliac vein stenting with thrombus in stent.

Case 2

A 48-year-old female patient presented to the Surgery Department with clinical complaints of unilateral left lower limb oedema for seven days, along with calf pain for two days. On clinical examination, diffuse lower limb oedema and calf muscle tenderness were observed. A venous Doppler scan revealed acute thrombus in the common femoral, superficial, and popliteal veins. The patient was then referred for a CT venogram to assess the extent of the thrombus [Table/Fig-2a-d].

The CT venogram showed compression of the left common iliac vein by the right common iliac artery, resulting in complete thrombus formation in the left common iliac vein, external iliac vein, and common femoral vein extending to the popliteal vein.

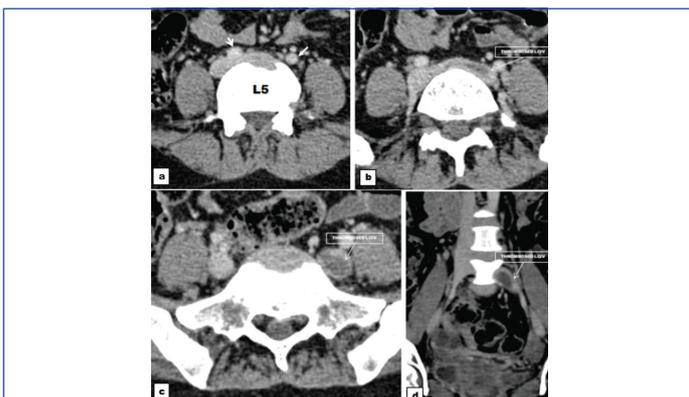


[Table/Fig-2]: a,b) CECT axial section showing compression of the left common iliac vein by the right common iliac artery against the underlying L5 vertebral body. Thrombus in the left common iliac vein; c,d) CECT Coronal section showing compression of the left common iliac vein by the right common iliac artery with thrombus in the left common iliac vein.
Open arrow: Right common iliac artery; Closed arrow: Left common iliac artery; LCIV: Left common iliac vein; RCIV: Right common iliac vein

The advised treatment plan for the patient was left iliac vein stenting and an IVC filter. However, the patient refused interventional management and instead opted for a medical approach using anticoagulant therapy. Unfortunately, no follow-up information on the patient is available at this time.

Case 3

A 34-year-old female patient presented to the Obstetric Department with clinical complaints of urinary incontinence, experiencing continuous dribbling of urine through the vagina since postoperative day 5. She reported a history of hysterectomy 15 days prior. The patient was referred for MDCT of the abdominal and pelvic region to rule out vesicovaginal fistula. In contrast-enhanced MDCT [Table/Fig-3a-d], a vesicovaginal fistula was detected, along with an incidental finding of compression of the left common iliac vein by the right common iliac artery against the underlying L5 vertebral body. Additionally, a partial thrombus was observed in the left common iliac vein. The patient was treated with anticoagulant therapy and advised to undergo stenting. Unfortunately, authors were unable to follow-up with the patient later.

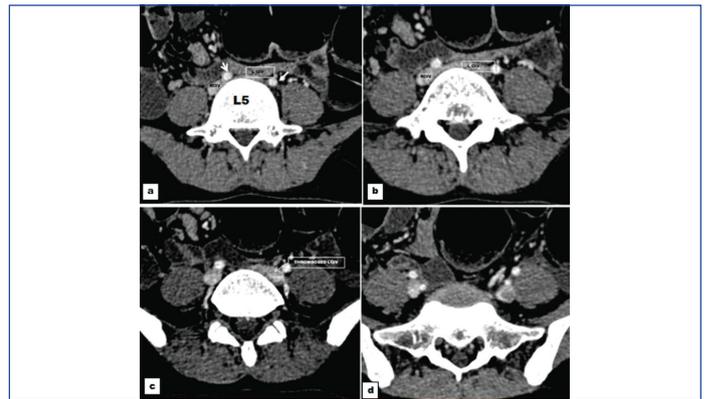


[Table/Fig-3]: a,b) CECT axial section showing compression of the left common iliac vein by the right common iliac artery against the underlying L5 vertebral body; c) CECT axial section showing near complete luminal thrombus in left common iliac vein, d) CECT Coronal section showing near complete luminal thrombus in left common iliac vein.
Open arrow: Right common iliac artery; Closed arrow: Left common iliac artery; LCIV: Left common iliac vein

Case 4

A 24-year-old female patient presented to the Emergency Department with complaints of abdominal pain for three days, accompanied by vomiting and abdominal distension. The patient was referred for MDCT of the abdominal and pelvic region to investigate the possibility of intestinal obstruction. In contrast-enhanced MDCT [Table/Fig-4a-d], colonic pseudo-obstruction was observed, along with an incidental finding of compression of the left common iliac vein

by the right common iliac artery against the underlying L5 vertebral body. Additionally, a thrombus was identified in the left common iliac vein. The patient received anticoagulant therapy and was advised to undergo stenting. Unfortunately, authors were unable to follow-up with the patient later.



[Table/Fig-4]: a,b) CECT axial section showing compression of the left common iliac vein by the right common iliac artery against the underlying L5 vertebral body; c,d) CECT axial section showing partial thrombus in left common iliac vein.

DISCUSSION

While there are several risk factors for developing deep venous thrombus, such as malignancy, recent major surgery, trauma, obesity, pregnancy, prolonged immobilisation, and hormone therapy, one commonly overlooked risk factor is an anatomical variant. May-Thurner syndrome is the most common anatomical variant that predisposes patients to left lower limb DVT [3]. Venous stasis is a well-known predisposing factor and one of the components of the Virchow triad, along with hypercoagulability and endothelial injury, which contribute to the development of thrombosis. May and Thurner described variant anatomy as one of the causes of venous stasis [4].

In 1957, May and Thurner first described a condition resulting from a variant anatomy referred to as 'spurs,' which are localised intraluminal fibrous bands on the left common iliac vein. These spurs were reported in 22% of 430 cadavers [5-7]. The first study on live patients was conducted in 1965 by Cockett FB et al., using venography [7]. It has been postulated that about 2%-3% of all lower limb DVT cases are related to Cockett's syndrome [8]. A study shows that approximately 72% of cases of May-Thurner Syndrome (MTS) occur in young women between the ages of 25 and 50 [9].

This condition results from impaired venous return and endothelial injury of the left common iliac vein, which occurs due to chronic pulsatile compression of the vein by the right common iliac artery. This compression leads to the deposition of elastin and collagen, further obstruction venous outflow and causing extensive thrombosis in the extremities [1, 10].

Routine physical examination is not sufficient to diagnose MTS; therefore, radiological investigations play an important role in its diagnosis. Although Doppler ultrasound helps assess DVT in the extremities, it is technically challenging to image venous compression and stenosis due to the deep location of the iliac veins. Contrast venography, which utilises transvenous pressure measurements, is considered the gold standard test for diagnosing MTS. However, its invasive nature and potential postprocedural complications limit its use. Therefore, non-invasive imaging modalities such as Multidetector Computed Tomography (MDCT) scans and Magnetic Resonance Venography (MRV) play a crucial role in diagnosing MTS [1, 11].

The critical aspect of treating MTS is clearing the thrombus and maintaining vascular patency for an extended duration. Endovascular treatment, which involves thrombectomy followed by venoplasty and stenting, offers immediate symptom relief and demonstrates long-term patency rates while reducing the incidence

of post-thrombotic syndrome [2,12]. Surgical management options, such as saphenofemoral crossover bypass, cross-pelvic venous bypass, femoro-caval bypass, ilio-iliac prosthetic bypass, and aortic elevation, are reserved for patients who do not respond to endovascular procedures [13,14].

In the present series, authors present four cases of MTS, and two out of the four patients exhibited a classical clinical history of unilateral left lower limb oedema and calf muscle tenderness. One of the patients underwent stenting of the left common iliac vein and received an IVC filter. As described by Goetz RL et al., MTS tends to be more common in female patients within the age range of 25 to 50 years, as indicated by current epidemiological studies [9]. Similar patterns were observed in the present case series as well. Additionally, similar to the case report presented by Mehra S and Choudhary M two of the present cases did not clinically present with the classical symptoms of left lower limb swelling, but incidental findings of MTS were detected through MDCT [15].

CONCLUSION(S)

The possibility of May-Thurner syndrome should be ruled out in a young patient presenting with left lower limb swelling and recurrent deep venous thrombosis. MDCT helps non invasively assess left iliac vein compression, and early endovascular stenting can prevent life-threatening pulmonary thromboembolism.

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