

# Oral Contraceptives and Deep Vein Thrombosis

Are oral contraceptives a risk factor for progression to DVT in patients with undiagnosed May-Thurner anatomy?

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**M**ay-Thurner syndrome is characterized by compression of the left common iliac vein by the right iliac artery against the fifth lumbar vertebrae.<sup>1</sup> Although the risk of deep vein thrombosis (DVT) is increased in this setting, it is not absolute, with the incidence of DVT significantly less than the estimated incidence of this variant anatomy. It has been proposed that progression to thrombosis in May-Thurner anatomy is influenced by other factors negatively altering a patient's coagulation profile.<sup>1-4</sup>

Oral contraceptive (OC) use is known to increase an individual's risk of DVT, and additionally, a left-sided predominance of DVT in women on OCs has been

noted. However, women with DVT on OCs are not typically evaluated for this anatomic variant.

Herein, we present the case of a 16-year-old female with previously undiagnosed May-Thurner syndrome who developed acute left-sided DVT 1 month after the initiation of OC therapy. We suggest that May-Thurner syndrome may be underdiagnosed and undertreated in young women in this setting.

## CASE REPORT

A 16-year-old female presented with a 2-day history of acute left lower extremity swelling and pain. The patient had no previous personal or family history of DVT, bleeding, or clotting disorders. She additionally

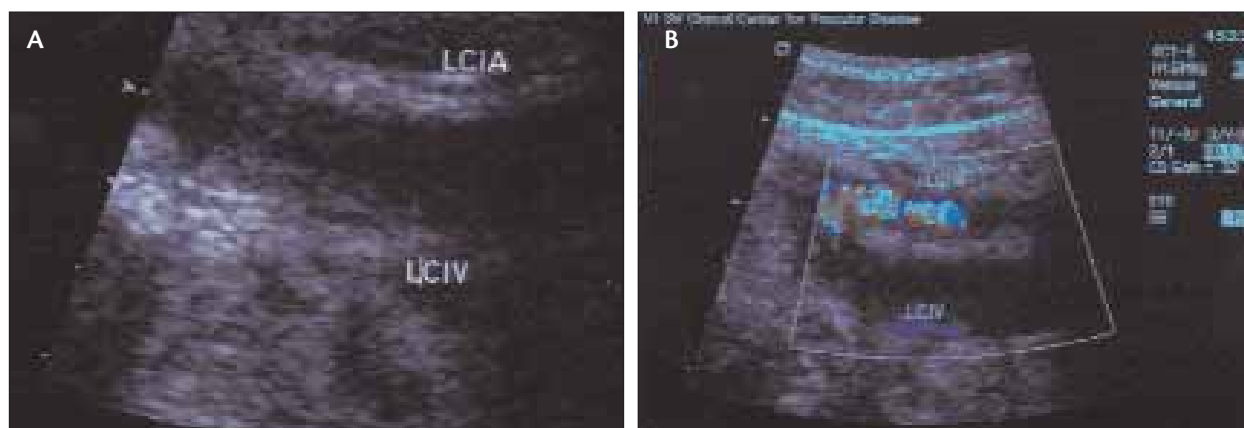
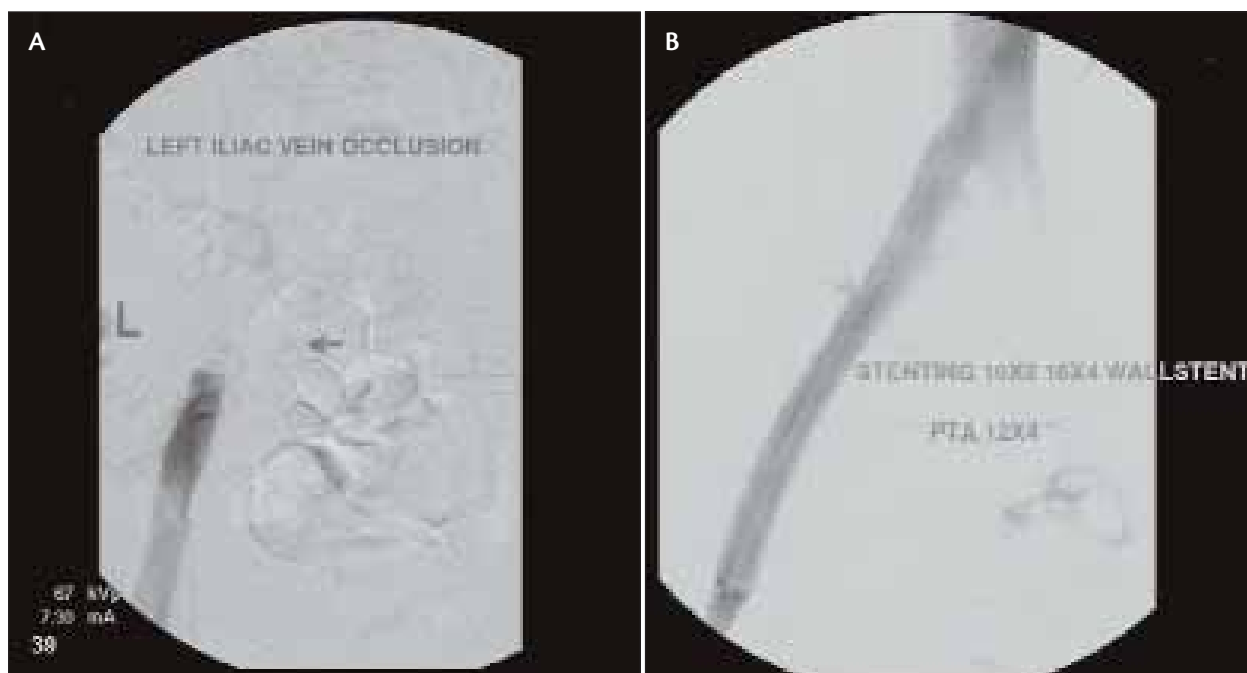


Figure 1. Preoperative ultrasound demonstrating (A) incompressible left common iliac vein with (B) absence of Doppler flow.



**Figure 2.** Intraoperative venogram (patient is prone) showing (A) complete occlusion of the left common iliac vein via a left popliteal vein approach. The patient was treated with the AngioJet power pulse spray with 10 mg of tenecteplase. Resolution of the occluded segment with good stent placement and rapid filling of the IVC in the absence of flow-limiting lesions (B).

denied recent trauma or signs of systemic or local infection. The patient's medical history was significant only for allergies managed with cetirizine. Additionally, 1 month before presentation she was started on OCs for acne. She denied previous surgical history, as well as tobacco, drug, and alcohol use.

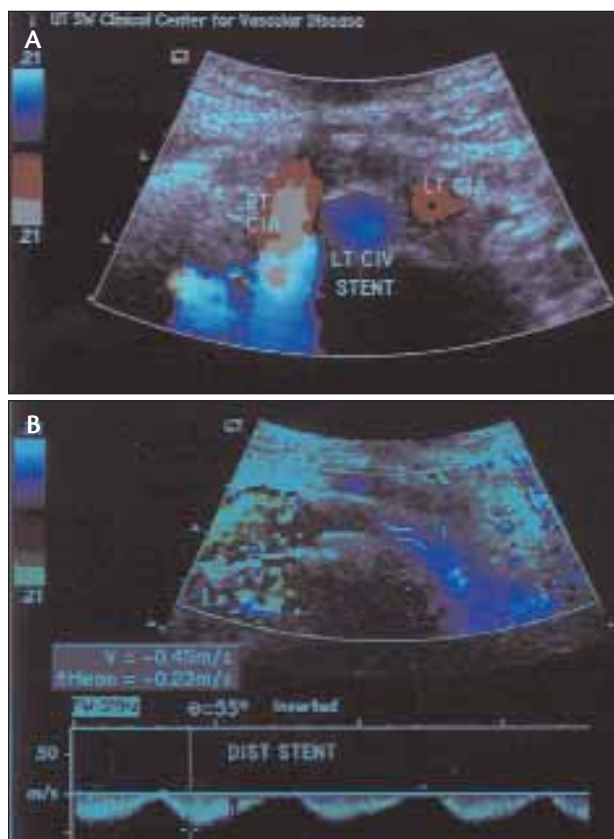
Pertinent physical exam revealed full symmetric palpable femoral, popliteal, and pedal pulses. The patient's left leg was significantly swollen compared to the right with calf circumference measurements of 14 inches on the left and 12 inches on the right. There were no signs of bleeding, recent traumatic injury, or infection. Noninvasive laboratory studies revealed incompressible left common and external iliac veins with absence of Doppler flow. The lumen of both vessels appeared to be full of thrombus (Figure 1). Findings were consistent with venous thrombosis involving the left common and external iliac veins. She was started on enoxaparin at a dose of 1 mg/kg and warfarin for a goal international normalized ratio (INR) of 2 to 3.

The patient was taken to the operating room 8 days after initial presentation for venography, thrombolysis, and possible intervention. An 8-F sheath and pigtail catheter were used to obtain a venogram after accessing the right common femoral vein. Initial inferior vena cava (IVC) venography showed a patent IVC, measur-

ing 16 mm without thrombus. Before thrombolysis, a G2 filter (Bard Peripheral Vascular, Tempe, AZ) was inserted in the IVC between L2 and L3. The completion venogram showed good wall apposition and positioning of the filter. All wires and catheters were then removed, groin pressure was held for 10 minutes with good hemostasis, and sterile dressing was applied.

The patient was repositioned prone. The left popliteal vein was accessed under ultrasound guidance with a micropuncture kit and exchanged over a wire for an 8-F sheath. The injection venogram of the left lower extremity revealed occlusion of the left iliac system from the left external iliac to the bifurcation of the left iliac vein and the IVC.

The initial venogram is shown in Figure 2A. Power-pulse spray using the AngioJet (Possis Medical, Inc., Minneapolis, MN) with 10 mg of tenecteplase was used and allowed to sit for 10 minutes. After placement of the lytics, the DVX catheter (Possis Medical) was used to remove the residual clot. Completion venography confirmed thrombus resolution but revealed persistent high-grade stenosis in the left common and external iliac veins. Intravascular ultrasound confirmed minimal remaining thrombus and external compression of the left common iliac artery consistent with May-Thurner anatomy. A 12- X 40-mm balloon was used to perform angioplasty of the stenotic seg-



**Figure 3.** Postoperative ultrasound demonstrating spontaneous flow in the left common iliac vein. The stents appeared patent with no evidence of extrinsic compression or intrinsic luminal narrowing. The patent vessel is in the transverse section (A), and the stent is in the longitudinal direction (B).

ment with minimal improvement. Overlapping 16- X 60-mm and 16- X 40-mm Wallstents (Boston Scientific Corporation, Natick, MA) were then deployed from the left common iliac into the left external iliac arteries. The 16- X 60-mm stent was placed first. Completion venography showed resolution of the stenotic segment with good stent placement and rapid filling of the IVC in the absence of flow-limiting lesions (Figure 2B). All catheters and wires were removed, and pressure was held in the left popliteal fossa with good hemostasis. Sterile dressing was applied.

The patient was admitted overnight for observation. Postoperatively, she experienced no bleeding complications and had marked improvement of left lower extremity pain and swelling. She was transitioned to warfarin, goal INR 2 to 3, with an enoxaparin bridge. She was discharged home on postoperative day 1.

On 1-month follow-up, the patient had complete resolution of left lower extremity pain and swelling.

Ultrasound examination revealed spontaneous flow in the left common iliac and external iliac veins. The stents appeared patent with no evidence of extrinsic compression or intrinsic luminal narrowing (Figure 3). Preservation of lower extremity valvular function was seen. The patient was continued on warfarin for 6 months, and she was placed on lifelong aspirin for stent patency. She has experienced no recurrent DVT or symptoms of postthrombotic syndrome with 1-year follow-up. The IVC filter was removed at 6 weeks from the right jugular approach without complications.

## DISCUSSION

May-Thurner syndrome is caused by compression of the left common iliac vein against the fifth lumbar vertebra by the right common iliac artery.<sup>1</sup> Chronic pulsatile compression causes intimal proliferation within the iliac vein and predisposes patients with this anatomy to an increased incidence of DVT. High morbidity rates may result from sequelae of DVT, including pulmonary emboli and symptoms of postthrombotic syndrome, namely chronic edema, pain, hyperpigmentation, varicosities, and skin ulceration.

The estimated incidence of May-Thurner variant anatomy is approximately 22% to 24%;<sup>1-3</sup> however, many patients are asymptomatic and undiagnosed. Because the reported annual DVT incidence is only one to three individuals per 1,000 people each year,<sup>4</sup> it has been suggested that the actual risk of progression to thrombosis in this setting may be influenced by additional factors that alter a patient's coagulation profile.

OCs are known to negatively affect a patient's coagulation profile, increasing an individual's DVT risk three to 11 times that of the normal population. Importantly, a left-sided predominance of DVT has been demonstrated in both pregnancy and OC use.<sup>5-10</sup> Nonetheless, although the possibility of May-Thurner anatomy has been alluded to as a cause of this laterality of DVT occurrence, there have been no reports of patients screened for this particular condition after developing a left-sided DVT.

Underscoring the importance of diagnosis, women with DVT are routinely treated with anticoagulation alone, a treatment that is ineffective in the setting of iliofemoral venous obstruction without adjunctive measures.<sup>11,12</sup> In fact, despite adequate anticoagulation, continued clot propagation is seen in up to 40% of patients with iliac vein obstruction.<sup>11</sup> Even after thrombectomy, up to 73% of patients with this anatomy will experience recurrent thrombosis.<sup>13</sup> Angioplasty and endovascular stenting of the

obstructing segment of the iliac vein has proven to be the most efficacious therapy in this population.<sup>13-16</sup>

Kwak et al have evaluated the use of metallic stents after thrombectomy in 16 patients with idiopathic May-Thurner anatomy demonstrating primary and secondary patency rates of 95% and 100% at 2 years.<sup>14</sup> These patients additionally remained free from recurrent thromboses during surveillance.

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Further, because the typical patient presenting with this syndrome is an otherwise healthy young female, failure to diagnosis and properly treat this condition at presentation predisposes these patients to the debilitating morbidity of postthrombotic syndrome. This syndrome results from valvular disruption and is characterized by venous claudication, edema, discoloration, pain, and venous stasis ulcers months to years after the initiating thrombosis. Again, anticoagulation alone does not preserve valve patency or prevent these sequelae. However, properly identifying women with this condition and treating them with thrombectomy and stenting of obstructive anatomy has been shown to decrease the occurrence of postthrombotic syndrome by aiding in the preservation of valvular function.<sup>17</sup>

In this article, we described an otherwise healthy 16-year-old female with previously undiagnosed May-Thurner anatomy who presented with acute DVT 1 month after the initiation of OCs. The presence of variant anatomy in this patient was appropriately identified and treated. She has had an excellent outcome with resolution of her symptoms with no evidence of recurrent thrombus or postthrombotic syndrome on follow-up.

## CONCLUSION

The presence of previously undiagnosed May-Thurner anatomy in otherwise healthy females may predispose these patients to an increased risk of left-sided DVT after initiation of OCs. We suggest that surgeons and general practitioners treating left-sided DVT in this setting maintain a high suspicion for this condition. Patients with underlying May-Thurner anatomy warrant thrombolysis/thrombectomy followed by

angioplasty and stenting of underlying anatomy in addition to anticoagulation for their current DVT. ■

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