

Pulmonary thromboembolism in a patient with May-Thurner syndrome: a case report

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SUMMARY

A 41-year-old woman was admitted to the emergency room with symptoms compatible with deep vein thrombosis affecting the left lower extremity and pulmonary thromboembolism. A CT scan was consistent with pulmonary emboli and thrombosis of the iliac veins extending to the inferior vena cava, which persisted even after correct systemic fibrinolytic therapy. For this reason, a venography was performed and local thrombolysis was administered. Venography revealed a compression of the left common iliac vein caused by the right common iliac artery, so that the patient was diagnosed with May-Thurner syndrome. The clinical features of this anatomical condition and sometimes lethal clinical syndrome are discussed.

Key words: Deep vein thrombosis (DVT) – Pulmonary thromboembolism – May-Thurner syndrome

INTRODUCTION

May-Thurner syndrome (MTS), also known as “Cockett syndrome”, or iliac vein compression syndrome, is a clinical picture related with an anatomically variable condition resulting in compression of the left common iliac vein between the right common iliac artery and the underlying spine (the lower lumbar vertebrae). This condition is a frequent

anatomic variant observed in 22-32% of cadavers (Kibbe et al., 2004), but the acute manifestations of the disease, mainly consisting in deep vein thrombosis (DVT) affecting the left lower extremity (LLE), with or without accompanying pulmonary embolism, is by far less frequent. Some authors have proposed to use the term “May-Thurner anatomy” to refer to the anatomical condition (Oguzkurt et al., 2005), and May-Thurner syndrome only if clinical manifestations ensue. These include pain, swelling, venous stasis ulcers, skin pigmentation changes and, eventually, deep vein thrombosis (with or without associated pulmonary embolism) and post-thrombotic syndrome. Spontaneous iliac vein rupture, sometimes leading to fatal bleeding (Hughes et al., 2013), has been also described (Kim et al., 2015).

It is unclear why some individuals develop the clinical syndrome. Possibly, as in other cases of DVT, prolonged immobilization, dehydration, multiple pregnancies, the postpartum period, contraceptive therapy, surgical intervention or febrile illness may contribute (Narese et al., 2015), but, as said, factors involved in the development of life-threatening clinical manifestations are largely unknown, and deserve active research. Here, the authors report the case of a patient that presented with standard features of DVT and pulmonary embolism, and showed a protracted, life-threatening clinical course, affected with a May-Thurner syndrome.

CASE REPORT

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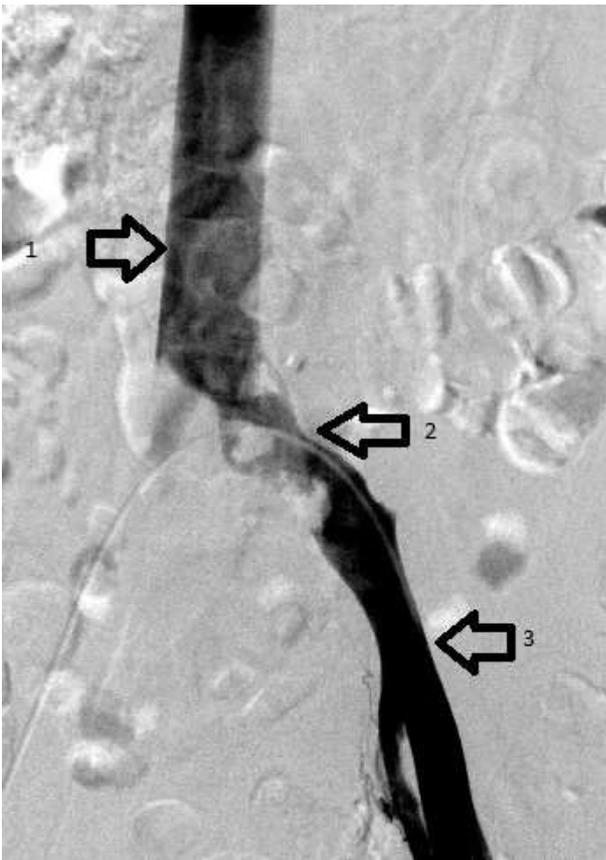


Fig. 1. Contrast venography showing compression (arrow 2) of the left common iliac vein (arrow 3) by the right common iliac artery, causing thrombi formation. Also there can be seen inferior vena cava (arrow 1).

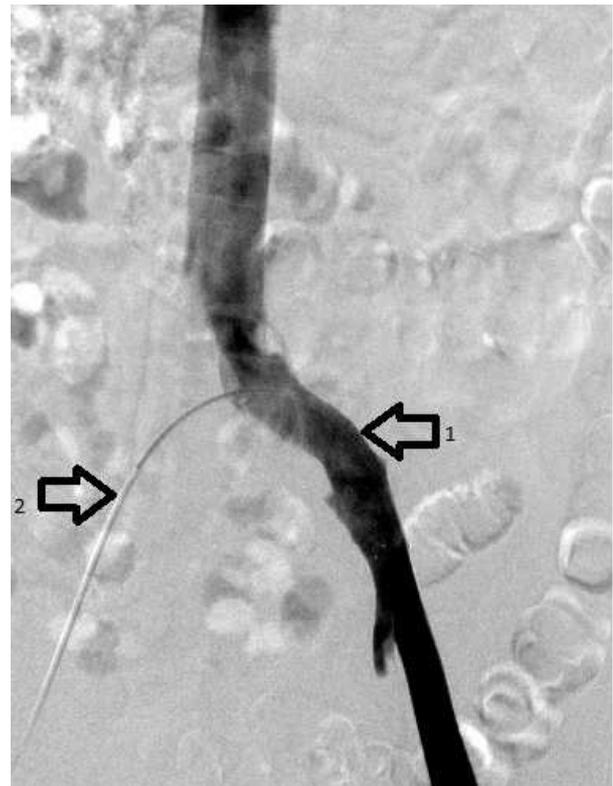


Fig. 2. A self-expanding stent was placed in the left common iliac vein (arrow 1), in which a narrowing of vein lumen is evident. This narrowing may indicate the presence of an organized thrombus or a spur. Also catheter to perform the venography can be seen (arrow 2).

A 41-year-old woman presented with lumbar pain that had started 2 days before. This was interpreted as a lumbosciatic pain, and was treated with analgesics. Despite medical intervention, the patient's pain worsened and radiated down the left lower extremity, affecting the thigh and leg. The patient rated this pain at 7 on a scale of 0 to 10 (with 10 indicating the most severe pain) and characterized this pain as dull. This was accompanied with generalized swelling and erythema, and the appearance of varicose veins of the same LLE. She also reported mild chest pain that had started suddenly hours before coming to the emergency room, with breathlessness, sweating and dizziness.

Previous medical problems included obesity, hormonal contraception (since about 2 years before) and depression (treated with amitriptyline and sertraline).

On physical examination the patient was hemodynamically stable. Her body mass index (BMI) was 39.6, and she was in intense discomfort, with mild tachypnea. A marked edema involving the whole LLE was also evident.

Laboratory evaluation at admission is shown in Table 1.

Table 1. Laboratory data of the patient at admission

LABORATORY DATA	VALUE
Hemoglobin	12.9 g/dL
Leukocytes	14.8 x 10 ⁹ /L
Platelets	145000/ μ L
Prothrombin time	12 seconds
INR	1
Serum creatinine	0.8 mg/dL
D-Dimer	12333 ng/mL
pH	7.43
pO ₂	118 mmHg
pCO ₂	20 mmHg
HCO ₃	13.3 mEq/L

The patient underwent a chest-abdomen computed tomography (CT scan), that revealed thrombi in segmentary arteries of both lungs, and deep vein thrombosis, that extended superiorly through the IVC approximately 3 cm distal to the renal arteries (Fig. 3).

The patient received systemic fibrinolytic therapy (Urokinase 100,000 U/h) and anticoagulation with

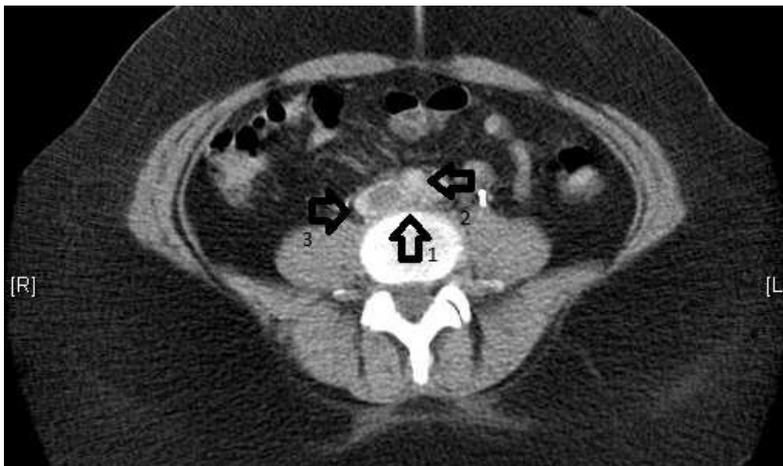


Fig. 3. TAC image showing the left common iliac vein (arrow 1), with narrowing lumen, between the right common iliac artery (arrow 2) and the vertebra, coming to the inferior vena cava (arrow 3).

enoxaparin. The pulmonary and caval thrombi persisted, so an in situ thrombolysis (1,300,000 UI in 500 cc saline solution, at the speed of 20 mL/h for three days) was indicated. During this time a venography was performed, and a compression of the left common iliac vein (by the right common iliac artery) was observed (Fig. 1). The patient was diagnosed with May-Thurner Syndrome. After this finding, a self-expanding stent in the left common iliac vein was implanted (Fig. 2). Two months after discharge the patient started again with erythema and edema of the LLE again. An ultrasound examination revealed the formation of a new thrombus. For this reason anticoagulation treatment has been maintained (initially with heparin and afterwards with Apixaban), and the patient is doing well 3 years after the first event.

DISCUSSION

This patient presented with a venous thromboembolism secondary to a left iliac vein thrombosis. Radiological techniques clearly show a compression of the left common iliac vein by the right common iliac artery and the underlying spine. The combination of this clinical picture and radiological findings is consistent with the diagnosis of May-Thurner syndrome. In addition to the thromboembolic event, the patient developed some signs and symptoms described in the May-Thurner syndrome: she complained generalized leg swelling and erythema, and the appearance of varicose veins of the same LLE. Although leg swelling and varicose veins may only indicate chronic venous insufficiency (Eberhardt and Raffetto, 2005), these features, as well as the development of diffuse erythema and pain, may suggest superimposed thrombophlebitis. Pulmonary thrombi were evident in the lung CT scan, despite the reported observation that compression and narrowing of the LIV could protect patients affected from May-Thurner syndrome from pulmonary embolism, or at least from massive embolism (Chan et al., 2011). In this sense, pulmonary thrombi were relatively small in

this patient, only affecting segmentary arteries.

The embryological development of the iliac vessels is a very complex process (Brazeau et al., 2013). Three primitive venous systems are present in the embryo: the vitelline, umbilical and cardinal venous systems. The inferior cava forms as a result of the fusion of segments of the posterior cardinal veins, right supracardinal vein, anastomosis between the right supra and subcardinal veins, and right subcardinal vein.

In the inferior vena cava, the left veins of the cardinal system obliterate. The anastomosis between the right and left posterior cardinal veins preserves its patency and forms the left iliac vein, explaining its relative right sided position. Since the aorta in the embryo is located anteriorly and at the left side of the cava vein, necessarily the right iliac artery crosses over the left iliac vein. This complex development of the inferior cava and iliac veins and their relationship with the developing aorta and iliac arteries explain the numerous anatomical variations in their disposition, as well as the different variants of the May-Thurner syndrome described (Caggiati, 2011), including "right-sided May-Thurner syndrome" (Abboud et al., 2010), in which the left common iliac artery compresses the right common iliac vein.

Importantly, compression of the veins (either left or right iliac veins) by the right common iliac artery is only possible because of the vicinity of these vessels to the lumbar vertebra, which favours compression when the supine position is adopted (Brazeau et al., 2013).

As said, compression of the left iliac vein by the pulsatile iliac artery is a common anatomical condition, observed in 22-32% of cadavers (Kibbe et al., 2004), but, fortunately, the clinical prevalence of venous thrombosis in relation with this anomaly is very low (Goto et al., 2016). Moreover, compression of the left common iliac vein by the right iliac artery has been also recorded in living patients who underwent abdominopelvic surgical procedures. For instance, in a detailed study on 119 patients, Kato et al. (2014) reported severe compres-

sion in 37% of women with gynecologic neoplasia undergoing pelvic lymphadenectomy, and although left lower extremity vein thrombosis was recorded in 16 patients, no relationship was observed between the degree of compression and the presence of deep vein thrombosis. This result underscores the hypothesis that, in addition to the May-Thurner anomaly – defined, as said, by excessive compression of the vein by the pulsatile artery and the 5th lumbar vertebra – a precipitating factor must exist.

Several abnormalities and narrowing of the left common iliac vein just as it passed under the right iliac artery, similar to that reported in this case, have been described (Cerquozzi et al., 2012). In cases of May-Thurner syndrome iliac vein spurs develop. Several studies have confirmed the classic observations that the prevalence of left iliac vein spurs is about 20% (Mitsuoka et al., 2014). Interestingly, in a series of 90 autopsied patients, it was observed a band formation and hypertrophy of the tunica media of the left iliac vein in 50% of cases, but only in one case the right iliac vein was affected; this finding reinforced the hypothesis that repetitive pulsatile trauma caused by the iliac artery could be responsible for the alteration of the normal anatomy of the vein wall and spur formation (Mitsuoka et al., 2014), although spurs may be also congenital (Negus et al., 1968).

Both obesity and the hormonal contraception were surely involved in transforming the anatomical May-Thurner condition, which had been asymptomatic for so many years, into symptomatic May-Thurner syndrome. This is because obesity and hormonal contraception are both known risk factors for having deep vein thrombosis and, if they are added to anatomical problems (as in May-Thurner condition), the risk is multiplied. In fact, a meta-analysis comparing obese and control subjects showed that obesity was associated to venous thromboembolism with an odds ratio of 2.33 (95% CI 1.68-3.24) (Ageno et al., 2008). For this reason, it is important to keep in mind that in cases in which subtle clinical data such as left lower extremity pain, swelling, venous stasis ulcers, telangiectasia or varicose veins, or skin pigmentation changes take place, acquired risk factors should be avoided, and an image technique should be performed, since these data support the diagnosis of May-Thurner syndrome and may herald severe complications (Shebel and Whalen, 2005). Among the radiologic procedures, ultrasonography, usually the initial diagnostic technique, is very useful in determining deep vein thrombosis, but has significant limitations in visualizing abnormalities of the iliac veins, and is therefore not useful in the specific diagnosis of May-Thurner syndrome. In contrast, CT scan is very useful in this entity (Lamba et al., 2014), whereas contrast venography is considered to be the gold standard diagnostic procedure (Hurst et al., 2001).

In addition to surgery, a very frequent approach in the past, nowadays the use of endovascular techniques in the treatment is successful and has less risk than invasive surgical treatments. Endovascular treatment options include catheter-directed thrombolysis, angioplasty, and stent placement, and, as reported in this case, it is frequently necessary to combine several procedures. Angioplasty is usually performed in order to expand the lumen of the compromised vessel and facilitate the implantation of a stent (Kim et al., 2006). Stent placement is probably the best option. On the other hand, if despite this treatment new thrombotic events take place, life-long anticoagulation should be considered. The implantation of cava filters is not seemingly associated to any advantage in these cases, since there is an increased risk of deep vein thrombosis of the lower legs and life-long anticoagulation is probably needed (Mukesh et al., 2010).

As a conclusion, May-Thurner syndrome constitutes a major clinical problem, due to the fact that its true prevalence is unknown, since it can be considered as a clinical complication of a common anatomical condition. Possibly, spur formation marks the evolution of this anatomical variant to a clinical syndrome. In this case, only subtle signs and symptoms, such as unilateral pain, leg swelling, or varicose veins, may alert the physician to undergo diagnostic procedures in order to establish a correct diagnosis and avoid major, life-threatening complications, such as pulmonary embolism or fatal vein rupture.

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