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DIAGNOSIS AND CURRENT TREATMENT IN MAY-THURNER SYNDROME: LITERATURE REVIEW

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Abstract: May-Thurner syndrome is an anatomical change characterized by compression of the left common iliac vein by the right common iliac artery. Venography is the preferred diagnostic method. When patients become symptomatic, surgical or endovascular treatment is indicated. Currently, endovascular treatment is the method of choice, as it was concluded that there is better recanalization of the venous system, with few risks inherent to the technique and a shorter hospital stay. The project aims to carry out a literature review on the diagnosis and current treatment of May-Thurner Syndrome.
Keywords: May-Thurner syndrome, iliac vein compression, iliac vein, deep vein thrombosis

INTRODUCTION

May-Thurner syndrome, Cockett syndrome, Venous bands or Internal adhesions of the iliac vein, is characterized by extrinsic compression of the left common iliac vein by the right common iliac artery against the spine(10,12).

In 1851, Rudolph Virchow first described compression of the left iliac vein. In 1957, Maio and Thurner found, in a series of autopsies of 430 cases, twenty-two of cases with focal vascular thickening of the intima with formation of septa. This is explained by the crossing of the right common iliac artery over the left common iliac vein and consequent compression of the iliac vein against the lumbar vertebral body. The result is progressive fibrosis of the left iliac vein, which may trigger occlusive symptoms. They theorized that mechanical compression caused by arterial pulsations of the right iliac artery led to the development of intimal hypertrophy of the iliac vein wall associated with changes in elastin and collagen content. This phenomenon led to the development of three different histological types of spurs or bands. The bands can be lateral, medial or diaphragmatic. Intraluminal changes of the intima may present with deep vein thrombosis or venous hypertension without thrombosis in the left lower limb. The cause of this physiological phenomenon that causes a pathological process is not yet known (1,3,4,5, 8, 9).

In 1956, Cockett and Thomas associated the symptoms of pain, edema and deep vein thrombosis with the findings described by Maio and Thurner. Kim et al in 1992, described three clinical stages of the disease associated with iliac vein compression. Stage I relates to asymptomatic iliac vein compression. Stage II to the development of a venous spur, and stage III to the development of deep vein thrombosis of the left iliac vein (4,8).

The incidence and prevalence of May-Thurner syndrome are still unknown. The overall prevalence of symptoms of iliac vein compression syndrome varies between eighteen percent and forty-nine percent in patients with deep vein thrombosis in the left lower extremity (1,22).

Iliac vein compression syndrome predominates in young women and varies between twenty and forty years, which has not yet been explained. The lower left extremity is the most affected, due to compression of the iliac vein by the right iliac artery. This syndrome is most commonly associated with deep vein thrombosis. The most common variant in May-Thurner syndrome is compression of the external iliac vein. There are other variants described in the literature, such as: left compression of the common iliac vein by the left internal iliac artery, compression of the right common iliac vein by the right internal iliac artery, compression of the inferior vena cava by the right common iliac artery(1,2,5, 17, 18).

The test of choice for the diagnosis of May-Thurner syndrome is conventional venography,

which has a diagnostic and therapeutic utility associated with endovascular therapy (12).

May-Thurner syndrome is treated when patients are symptomatic. The treatment of May-Thurner syndrome has evolved over time from open surgery to less invasive endovascular repair. Endovascular therapy has been the treatment of choice in symptomatic patients, although there are no long-term studies on the subject. After stent placement, anticoagulation is used for at least six months to prevent in-stent restenosis (10,12,28). The objective of this work is to review the main diagnostic methods and current treatment for May-Thurner syndrome.

DIAGNOSIS AND TREATMENT

Patients with May-Thurner syndrome present with skin pigmentation changes, pain, swelling in the legs, varicose veins, recurrent chronic ulcers and pulmonary embolism (3,7).

The diagnosis of May-Thurner syndrome is performed through clinical, non-invasive and invasive examination. The non-invasive diagnosis can be performed using Doppler ultrasound, which allows assessing the functional and hemodynamic status of the affected vein. It is the initial first-line investigation to rule out a possible deep vein thrombosis in patients with suspected iliac vein compression in the left lower extremity (19,23).

In this exam, in the absence of obstruction, it is observed that the sound coming from the vein resembles a gale, decreasing with inspiration and increasing with expiration, that is, varying with the respiratory cycle. This variation is due to the compression of the inferior vena cava by the diaphragm during inspiration and the relaxation of the compression during expiration. On Doppler examination, when this sound variation dependent on the respiratory cycle is not observed, iliac vein occlusion may be suspected. Other ultrasound findings in the preoperative evaluation that suggest compression of the underlying iliac vein are characterized by a smaller vein caliber in the cross section at the level of compression by the right iliac artery with asymmetry when compared to the contralateral vessel, at the same level, continuous fluid through the segment proximal and stenotic to this segment (instead of flow phases) during breathing, increased flow velocity, and decreased responses during Valsalva and compression maneuvers (11,33).

Doppler ultrasound is used to visualize deep vein thrombosis in the iliac vessels. However, with this method it is not possible to differentiate a pseudo-occlusive extrinsic compression from an iliac vein occlusion, in addition to not detecting spurs (12,13).

If May-Thurner syndrome is suspected after ultrasound, a cross-sectional image is used to analyze the pelvic region more accurately. Computed tomography is used to visualize atherosclerotic changes, degenerative changes in the lumbar vertebral body, and vascular tortuosity. However, this method has limited resolution in the pelvic region due to bone artifacts. Computed tomography and magnetic resonance imaging provide similar diagnostic capabilities compared to imaging phlebography (24, 29).

Invasive diagnosis can be performed by measuring intravenous pressure and phlebographic study. The study of intravenous pressure is performed with the patient in the supine position, at rest and after exercise. When there is a pressure gradient greater than or equal to 2 mmHg between the right and the left at rest, or when it is greater than 3 mmHg after exercise, a stenosis is detected (14).

Phlebography defines the diagnosis of May-Thurner syndrome. It is the reference standard for assessing the permeability of

the iliac vein, in addition to being useful for clarifying the diagnosis in cases of doubt with ultrasound, aiming at therapeutic intervention and control examination. The examination consists of an ascending phlebography and complemented by an analysis of the iliac veins and inferior vena cava through a bilateral common femoral vein puncture combined with a descending phlebography (11,34).

Ascending phlebography is performed in the intravenous forms by puncturing the superficial vein on the dorsum of the foot, or intraosseous, a practice practically abandoned. Descending phlebography is performed through the puncture of the common femoral vein, in which the reflux during the Valsalva maneuver and the circulation of the iliac veins and inferior vena cava are analyzed(11,15,16).

Regarding venography, two findings are important and are related to the appearance of synechiae in the vein. The findings on venography are the formation of a tight waist with balloon dilation, that is, a positive balloon test. This was seen in eighteen out of twenty patients in the respective study with acute or subacute deep vein thrombosis (34).

For some authors, magnetic resonance angiography is the gold standard diagnosis for May-Thurner Syndrome, as it estimates the amount of flow, which helps in the diagnosis. It can be performed with or without contrast (25).

Endovascular treatment begins with venography and intravascular ultrasound to confirm May-Thurner syndrome, the degree of stenosis from compression of the iliac vein and pelvic venous collaterals. Intravascular ultrasound shows the diameter, morphology, characteristics of the vessel wall, presence of spurs and the extent of external comprehension. They provide data for the decision regarding the endovascular treatment, the choice of the stent and its correct placement (26,25,27).

Percutaneous transluminal angioplasty of the segment affected by the iliac vein compression syndrome is used to temporarily expand the stenosed region, helping to place the stent posteriorly (25).

According to AbuRahma et al, the rates of primary patency at one year after management with thrombectomy, angioplasty, and stent placement were 83 percent. These results are superior when compared to thrombectomy alone, with a one-year venous patency of 24 percent. Kwak et al demonstrated that the use of thrombectomy and after the use of metallic stents in 16 patients with Mary-thurner syndrome, achieved patency rates of 95% to 100% in two years. Hartung et al demonstrated rates of secondary patency of 86 percent to 100 percent in the 120 months following intravenous treatment with thrombectomy and stent implantation for patients with May-thurner syndrome and acute venous thrombosis. According to Patel et al, complete resolution of symptoms occurred in all patients after the use of stents. In addition, no evidence of valve regurgitation was observed on follow-up ultrasound after stent placement in the femoral and popliteal veins. Primary patency rates at one to two years with endovascular treatment range from 79 percent to 100 percent in patients with deep vein thrombosis due to iliac vein compression syndrome. These literature data support the idea that the best treatment for young patients with underlying Mary-Thurner syndrome involves thrombolysis or mechanical thrombectomy combined with angioplasty and stenting in iliac vein stenosis (33,34).

Although there is no consensus on venous anticoagulation, most authors follow a protocol that uses heparin during the procedure and then for 24 to 72 hours. They

also use ASA 75-250 mg/day or Clopidogrel 75 mg/day for six months in the preoperative period(8,30).

An advantage has been demonstrated in the use of urokinase compared to streptokinase and tissue plasminogen activator in terms of faster clot lysis and better specificity(35).

Systemic thrombolysis achieves adequate clot destruction, however it has serious side effects such as intracranial hemorrhage and significant retroperitoneal hematomas. Current evidence suggests that clot destruction by distal catheter thrombolysis is superior when compared to combination therapy with warfarin and heparin, to treat thrombosis at both proximal and distal sites. In addition, venous patency after distal catheter thrombolysis has been maintained for six months after therapy, which proves to be superior in the long term over standard anticoagulation, with a 72 percent patency with distal catheter thrombolysis versus a 12 percent with anticoagulation. Thus, catheter-directed endovascular treatment is more effective in removing clots and improving symptoms when compared with anticoagulant therapy alone (34,35).

In May-thurner syndrome, the use of anticoagulation and thrombectomy alone can result in new thromboses in about 3/4 of patients. This finding reinforces the potential use of distal catheter thrombectomy and stent placement (35).

Current American College of Chest Physicians (ACCP) guidelines suggest that distal catheter thrombolysis must be used in patients with a good life expectancy, that is, greater than one year, good functional status, with extensive venous thrombosis involving the femoral and that has a clinical presentation of less than fourteen days. Exclusion criteria for distal catheter thrombolysis include patients with extensive trauma or patients in the postoperative period. There are several sites for distal catheter thrombolysis, according to the national registry, these include the popliteal vein (42 percent), the common femoral vein (28 percent), the internal jugular vein (21 percent), and the pedal vein. (19 percent), and in all cases, vascular access by ultrasound is recommended, as it reduces the rates of hemorrhagic complications, as it reduces the risk of multiple punctures(35).

According to US National Registry data, complications associated with distal catheter thrombolysis include intracranial hemorrhage in less than 1 percent, retroperitoneal hematoma in 1 percent, and musculoskeletal, gastrointestinal and genitourinary bleeding in 3 percent (35).

The venous stent has evolved as the initial procedure of choice for the treatment of iliofemoral chronic stenosis and total occlusions, with open surgery being reserved for cases of failure in the treatment with stents. Disappearance of pain ranges from 86% to 94%, relief of swelling in the limb from 66% to 89%, and ulcer improvement occurs from 58% to 89% after stent implantation (36).

Regarding the stent, access site complications occur in less than 1% and bleeding requiring transfusions in less than 0.03%. Other complications such as stent fracture, erosions, late embolization and infections are extremely rare. However, it is not clear whether there is a relationship between complications with any specific type of stent used(36).

FINAL CONSIDERATIONS

External compression of the iliac vein causes intraluminal changes in the intima of the vessel wall, which can result in deep vein thrombosis or venous hypertension without thrombosis (1). Venography is the modality of choice for the diagnosis of May-Thurner Syndrome. However, intravascular

ultrasound, computed tomography and magnetic resonance imaging have been successful in demonstrating compression (1).

Single therapy with oral anticoagulation has proved to be inadequate in patients with Mary-Thurner syndrome. To adequately treat acute DVT in young women with underlying May-Thurner syndrome and prevent postthrombotic symptoms, mechanical thrombolysis or thrombectomy associated with angioplasty and stent implantation is the most effective therapy. (1.33).

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