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EFFICACY OF ENDOVASCULAR TREATMENT FOR REMOVING BLOOD CLOGS IN PATIENTS WITH MAY-THURNER SYNDROME

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Corresponding Author:	Melquizidel Galvis, UNAB Foscal Clinic COLOMBIA
First Author:	MELQUIZIDEL GALVIS, UNAB
Order of Authors:	MELQUIZIDEL GALVIS, UNAB
	DANIELA D VERA, UNAB
	OMAR FLORES SANDOVAL, UPA
	MARCELO HIGUERA, ANDES
	PEDRO HIGUERA, UNAB
	ADRIANA REYES, UNAB
	SERGIO SERRANO, UNAB
	ANDRES ORTIZ, FOSCAL
	OLIVERIO VARGAS, UNAB
	DANIEL MANTILLA, UNAB
Abstract:	Purpose May-Thurner syndrome accounts for 2-3% of all deep vein thrombosis (DVT). There are currently no management guidelines for the diagnosis and treatment of May-Thurner syndrome. However, for symptomatic patients, endovascular treatment is considered the management of choice. The aim of this study was to evaluate whether different endovascular treatment approaches are independently and significantly associated with fewer complications and better clinical outcome in patients with May-Thurner syndrome. Materials and Methods This study is a retrospective cohort of patients diagnosed with May-Thurner syndrome treated with mechanical aspiration plus thrombolysis or mechanical aspiration alone. Results 97 patients with May-Thurner syndrome were included of which 33 (34.0%) were treated with mechanical aspiration alone while 64 (66.0%) were treated with mechanical aspiration plus thrombolysis. Patients who underwent mechanical aspiration had a higher patency rate at one year with a statistically significant difference compared to patients who underwent Actilyse plus mechanical aspiration (96.97% vs. 64.06%, p-value: 0.001). Post-thrombotic syndrome was present in 25.77% of all patients with no statistically significant difference between the two groups (21.21% vs 28.13% p, 0.461). Minor complications in our study did not present a statistically significant difference in the two groups (9.09% vs 12.5% p: 0.616). Conclusion Both procedures are equally safe for patients with low rates of minor and major complications, however, patients treated with mechanical aspiration alone reported higher efficacy.

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JVIR

Dear JVIR my name is Melquizidel Galvis, I am an interventional radiologist at the clinica fundacion oftalmologica de Santander Colombia. For me it is an honor to contribute to scientific growth through medicine, on this occasion I have had the privilege of conducting a study of a rare pathology during my years of work, I have built a cohort of patients with May Thurner syndrome, a pathology for which I have had great interest due to the limited scientific literature about it. The objective of this study was to compare the efficacy and safety of the various endovascular approaches in these patients. I hope we can continue doing science, best regards.

Melquizidel Galvis
interventional radiologist
melquisgalvis741207@gmail.com

EFFICACY OF ENDOVASCULAR TREATMENT FOR REMOVING BLOOD CLOGS IN PATIENTS WITH MAY-THURNER SYNDROME

Melquizidel Galvis-Méndez 1,2, Daniela D Vera-Camargo 4, Omar E Flores-Sandoval 5, Marcelo Higuera 4, Pedro Ivan Higuera 3, Sergio Serrano-Gómez 6, Adriana Reyes 6, Andrés F Ortiz-Giraldo 2,7, Oliverio Vargas-Pérez 1,2, Daniel E Mantilla-García 1,2.

1. Interventional Radiology Department. Universidad Autónoma de Bucaramanga, Bucaramanga, Colombia.
2. Interventional Radiology Department. Fundación Oftalmológica de Santander - Clínica Ardila Lülle, Floridablanca, Colombia
3. Radiology Resident. Radiology Department Universidad Autónoma de Bucaramanga, Bucaramanga, Colombia.
4. Physician. Radiology Department. Fundación Oftalmológica de Santander - Clínica Ardila Lülle. Floridablanca, Colombia.
5. Medical student practitioner. Universidad de Pamplona, Bucaramanga, Colombia.
6. Epidemiology. Research Group-UNAB. Universidad Autónoma de Bucaramanga, Bucaramanga, Colombia.
7. Interventional Neuroradiologist fellow. Interventional Radiology Department. Fundación Oftalmológica de Santander - Clínica Ardila Lülle. Floridablanca, Colombia

Corresponding Author:
Melquizidel Galvis-Méndez, MD, Department Interventional Radiology. Fundación Oftalmológica de Santander – Clínica Ardila Lülle. Calle 157 #20-59, floor zero, office 07, Floridablanca. Santander. Colombia. Email: melquisgalvis741207@gmail.com

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Orcid
Melquizidel Galvis
melquisgalvis741207@gmail.com
https://orcid.org/0000-0001-6238-9590
Daniela D Vera Camargo
dd@unab.edu.co
https://orcid.org/0000-0002-4901-7490
Omar E Flores Sandoval
oeflores05@icloud.com
https://orcid.org/0000-0003-3808-250X
Marcelo Higuera
me.higuera@uniandes.edu.co
https://orcid.org/0000-0002-9075-9445
Pedro Ivan Higuera
pejoiv@hotmail.com
https://orcid.org/0000-0001-9587-8497
Adriana Reyes
areyes116@unab.edu.co
https://orcid.org/0000-0002-9852-9345
Sergio Serrano
sserrano393@unab.edu.co
https://orcid.org/0000-0001-6418-7116
Andres F Ortiz-Giraldo
aortiz131@unab.edu.co
https://orcid.org/0000-0002-2625-0230
Oliverio Vargas-Perez
oliveriovargas@hotmail.com
https://orcid.org/0000-0003-3389-711X
Daniel Mantilla
mantigar@hotmail.com
https://orcid.org/0000-0002-5727-3195

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Figure 1: Illustrative image of the compressive phenomenon of the right common iliac artery on the left common iliac vein. AA: Abdominal aorta, LCA: Left common iliac artery, LCA: Right common iliac artery, IVC: Inferior vena cava, RVC: Right common iliac vein, LVC: Left common iliac vein. Created with BioRender.com by Melquizidel Galvis et al.

EFFICACY OF ENDOVASCULAR TREATMENT FOR REMOVING BLOOD CLOGS IN PATIENTS WITH MAY-THURNER SYNDROME

RESEARCH HIGHLIGHTS

- Both endovascular techniques of treatment of May Thurner syndrome has been shown to be equally safe.
- Mechanical aspiration was shown to be the most effective treatment.
- No treatment was associated with an increased post-thrombotic syndrome.

EFFICACY OF ENDOVASCULAR TREATMENT FOR REMOVING BLOOD CLOGS IN PATIENTS WITH MAY-THURNER SYNDROME

Abstract

Purpose: May-Thurner syndrome accounts for 2-3% of all deep vein thrombosis (DVT). There are currently no management guidelines for the diagnosis and treatment of May-Thurner syndrome. However, for symptomatic patients, endovascular treatment is considered the management of choice. The aim of this study was to evaluate whether different endovascular treatment approaches are independently and significantly associated with fewer complications and better clinical outcome in patients with May-Thurner syndrome.

Materials and Methods: This study is a retrospective cohort of patients diagnosed with May-Thurner syndrome treated with mechanical aspiration plus thrombolysis or mechanical aspiration alone.

Results: 97 patients with May-Thurner syndrome were included of which 33 (34.0 %) were treated with mechanical aspiration alone while 64 (66.0 %) were treated with mechanical aspiration plus thrombolysis. Patients who underwent mechanical aspiration had a higher patency rate at one year with a statistically significant difference compared to patients who underwent Actilyse plus mechanical aspiration (96.97% vs. 64.06%, p-value: 0.001). Post-thrombotic syndrome was present in 25.77% of all patients with no statistically significant difference between the two groups (21.21% vs 28.13% p, 0.461). Minor complications in our study did not present a statistically significant difference in the two groups (9.09% vs 12.5% p: 0.616).

Conclusion: Both procedures are equally safe for patients with low rates of minor and

major complications, however, patients treated with mechanical aspiration alone reported higher efficacy.

Key Words: May-Thurner Syndrome, Venous Thrombosis, Femoral Artery, Endovascular Procedures

Glossary

DVT: Deep vein thrombosis

CAT: Computerized axial tomography

DAPT: Dual antiplatelet therapy

OC: Oral contraceptive

Introduction

May-Thurner syndrome (also known as iliac vein compression syndrome or Cockett's syndrome) is a partial or complete vascular compression of the left iliac vein by the right common iliac artery against the fifth lumbar vertebra or the pelvic brim (Figure 1). Chronic compression by the artery's pulsatile flow causes intimal hyperplasia, leading to a reduction of the anteroposterior diameter and a widening of the transverse diameter. These alterations may lead to blood flow obstruction, deep vein thrombosis (DVT), chronic venous stasis, or venous hypertension (1,2). DVT secondary to May-Thurner syndrome comprises between 2% and 3% of lower limb DVTs (3).

No guidelines are available for the diagnosis or treatment of May-Thurner syndrome. However, endovascular treatment is the preferred option for symptomatic patients (4). Several endovascular treatments are available, including catheter-directed thrombolysis

with stent placement, balloon angioplasty with or without stent placement, and pharmacomechanical catheter-directed thrombolysis with stenting and anticoagulation (5). This study aims to determine which endovascular treatment is associated with fewer complications and better clinical outcomes for patients with May-Thurner syndrome.

Methodology

This study is a retrospective evaluation of patients with May-Thurner syndrome who were endovascularly treated between January 1, 2009, and December 31, 2021. Following the institutional ethics committee approval, an anonymized database of the interventional radiology service was analyzed using coded variables with information regarding medical records, medical consultations, and image reports. The univariate analysis used absolute and relative frequencies expressed as percentages to describe categorical variables and measures of central tendency and dispersion for quantitative variables. Means and standard deviations were used for normally distributed variables, and medians. The normality of the data distribution was evaluated using the Shapiro-France test. In the bivariate analysis, the effect of the treatments on the analyzed variables was assessed using a T-Student test for continuous variables, a Chi-square test for qualitative variables, and a 95% confidence level (p-value < 0.05) for both tests.

Patients cohort

The cohort included 97 patients with an imaging diagnosis of May-Thurner syndrome. These patients were 18 or older and had been treated with catheter-directed thrombolysis, mechanical thrombectomy, angioplasty, or endovascular stenting. The cohort excluded patients with more than 14 days of symptom evolution. Also, it

excluded patients with a history of neoplasia since it is an inherent contraindication for pharmacological thrombolysis.

The variables analyzed included patients' sex and clinical characteristics, obstruction or stenosis in the iliac vein attributes, anticoagulation and antiplatelet aggregation protocol, protection method, and type of endovascular treatment. Also, they included related complications, possible complication-triggering factors, one-year patency, and the need for reintervention during the 24 hours and seven days following treatment.

Imaging diagnostic protocol

A lower limbs Doppler ultrasound was performed in all patients with indications of DVT, followed by computerized axial tomography (CAT) of the pelvis and lower limbs' arterial and venous phases. These evaluations intended to rule out vascular anatomical variants and compression by extrinsic masses that could impede the use of intravenous thrombolytics. The outcomes of these evaluations defined the obstruction severity, which was considered during the treatment planning.

Endovascular treatment protocol

In the angiography room, the left popliteal vein was punctured using a micropuncture set (MPIS 4 fr Medtronic) and Doppler ultrasound guidance under septic and aseptic conditions. A hydrophilic guidewire was inserted, and an 8 fr sheath and dilator (Terumo) were implanted. Then, peripheral digital subtraction phlebography and indirect inferior vena cavography were performed to identify the iliocaval obstruction site and filling defects caused by clots. The patients were prone during the procedure and under local anesthesia with 1% xylocaine without epinephrine.

Mechanical aspiration was performed using a Neuron MAX 0.88 fr catheter (Penumbra Alabama) to extract as many clots as possible. Patients without absolute (i.e., recent major surgery, active hemorrhage, or cerebral hemorrhage or cerebral ischemia in less than two months) or relative (i.e., intracardiac clot, recent minor surgery, blood dyscrasia, blood pressure greater than 185/110, INR greater than 1.2) contraindications to thrombolytic agents underwent an initial loading dosage of 8 mg Actilyse (Boehringer), with a 10-minute waiting time. Then, they underwent a second thromboaspiration with a Neuron MAX 0.88 fr catheter. In these patients, Actilyse was infused into the popliteal vein through a side-hole catheter (Lafontaine Merit Medical, Utah) at a dosage of 0.02mg/Kg/hour as a maintenance dose, covering most of the affected venous territory. Some cases had dense and abundant clots, some with signs of adhesion or integration to the wall. In these cases, we used mechanical fragmentation devices such as the Cleaner^{TM} (Argon Medical Device) to disrupt the thrombus with a sinusoidal wire amplitude of 15 mm for the vena cava and 9 mm for the iliac, femoral, and popliteal veins. Then, we performed a thromboaspiration with the AngioJet Thrombectomy System (Boston Scientific) using a period below 480 seconds to avoid globular hemolysis and renal failure, followed by a thromboaspiration with a Neuron MAX 0.88 fr catheter.

Patients were transferred to the intensive care unit for hemodynamic and neurological monitoring. They received a subtherapeutic dose of 200 IU/hour sodium heparin and had the fibrinogen levels checked every eight hours. The Actilyse drip was suspended in patients with decreased fibrinogen levels (<100 mg/dL) for 2 hours and then restarted. The first phlebography control was generally performed 12 hours after starting the

Actilyse maintenance infusion regimen. Depending on its results, a second phlebography was performed after 24 hours.

Once the phlebography and cavography showed a cleared thrombosis, patients were transferred to the catheterization room, where the location of the stenosis or iliocaval venous obstruction was identified. Then, angioplasty was performed using high-pressure (24 and 30 atmospheres) balloon predilatation in a 1:1 fashion. The stents used included the Zilver Vena stent (Cook Medical), the Abre Venous stent (Medtronic), the Protégé GPS stent (Medtronic), and the Wallstent (Boston Scientific) and had diameters between 14 mm and 16 mm and lengths between 40 mm and 60 mm. During this procedure, patients were in the supine position. A double femoral puncture was used to determine the inferior vena cava's starting point and avoid the flayer inside the cava. In 90% of cases, we did not perform intra-stent angioplasty to prevent thrombi migration into the device. Once the angioplasty was finished, the patients were taken again to the intensive care unit for 12 hours. Then, they were transferred to a room, where an ascending-elastic-compression bandage was placed with a 20 mmHg distal pressure and a 30 mmHg proximal pressure. The patients were encouraged to start walking and discharged 24 hours later.

Antiaggregation and anticoagulation

Dual antiplatelet therapy (DAPT) with acetylsalicylic acid and clopidogrel at oral dosages of 100 mg and 75 mg per day, respectively, was initiated in the immediate postoperative period. However, the DAPT was only used in 12 patients since they presented three thromboses events in less than 21 days. The DAPT was suspended and replaced by antiplatelet therapy with warfarin derivatives, improving stent patency and

thrombosis. Management with 30-40 mmHg graduated compression stockings were used in addition to the antiplatelet therapy. Patients were asked to wear compression stockings permanently during the day and suspend their use for sleeping. No direct thrombin inhibitors such as Dabigatran or factor Xa inhibitors such as rivaroxaban were used. Doppler ultrasound was performed after the first, second, third, and sixth months and after a year. Also, patients were referred to the internal medicine service to rule out paraneoplastic syndrome and to hematology to study thrombophilias and for one-year anticoagulation management.

Results

Our study included 97 patients, most of them (77.3%) being women (p 0.44). Of these patients, 33 (34.0%) were treated only with mechanical aspiration and 64 (66.0 %) with Actilyse and mechanical aspiration. In our patient cohort, the most common predisposing factors were a history of diabetes (54.6%, p 0.08), thrombophilia (26.8% p, 0.68), or hypertension (25.8%, p 0,02), with three patients (3.1%, p 0.98) presenting more than one of these predisposing factors. On the other hand, the most common risk factor was oral contraceptive (OC) use (12.4%), with 12.1% of patients treated with mechanical aspiration and 12.5% with Actilyse and mechanical aspiration reporting the use of OCs. Trauma was also a relevant risk factor (8.2%), which was present in 9.1 % of patients treated with mechanical aspiration and 7.8% with Actilyse and mechanical aspiration (p 0.96).

May-Thurner Syndrome characteristics

Only patients treated with Actilyse and mechanical aspiration presented anatomical variations, with 4.7% of them laking of the inferior vena cava (p 0.2). However, these patients had abundant lateral circulation despite the anatomical variation.

Endovascular procedure

All patients treated with mechanical aspiration and 92.1% of patients treated with Actilyse and mechanical aspiration required stenting (p 0.09). Primary angioplasty without stent placement was performed in 3.0 % of patients treated with mechanical aspiration and 4.7% with Actilyse and aspiration (p 0.69). Meanwhile, a vena cava filter was used in 54.6 % and 23.4% of patients treated with mechanical aspiration and Actilyse with mechanical aspiration (p 0.002), respectively.

A single aspiration was sufficient in most patients treated with mechanical aspiration (21 patients (63.6%)) since only five patients (15.2%) required an additional aspiration. However, seven of these patients needed additional mechanical fragmentation devices. On the contrary, the number of patients treated with Actilyse and mechanical aspiration requiring further aspiration (51 patients (79.7%)) was higher than those requiring a single aspiration (13 patients (20.3%)). Still, none of these patients required additional mechanical thrombolysis devices. ($p < 0.001$)

Antiplatelet and anticoagulation therapy

While all patients (33 patients) treated with mechanical aspiration and 50 treated with Actilyse and mechanical aspiration (78.1%) received anticoagulant therapy with warfarin derivatives (p 0.004). Only 12 patients treated with Actilyse plus mechanical aspiration (18.8%, p 0.008) received DAPT. The remaining five patients treated with

mechanical aspiration (15.2%) and 37 with Actilyse and mechanical aspiration (57.8%) received a combination of DAPT and anticoagulant therapy (p 0.001).

The partial lysis time was below 12 hours for four patients treated with mechanical aspiration (12.1%) and four patients treated with Actilysea and mechanical aspiration (6.3%). Yet, it was between 13 and 24 hours for 24 patients treated with mechanical aspiration (72.7%) and nine with Actilyse and mechanical aspiration (14.1%). The remaining patients (five treated with mechanical aspiration and 51 with Actilyse and mechanical aspiration) had no partial lysis ($p < 0.001$). The total lysis time was below 12 hours after the intervention for five (15.2%) and 54 (84.4%) and between 13 and 24 hours for 28 (84.9%) and 10 (15.6%) patients treated with mechanical aspiration and Actilyse and mechanical aspiration, respectively. ($p < 0.001$)

Complications

Three patients treated with mechanical aspiration (9.1%) and eight with Actilyse and mechanical aspiration (12.5%) presented minor complications (p 0.616), including mucosal bleeding, hematuria, and puncture site hematoma. Only two patients treated with Actilyse plus mechanical aspiration (3.1%) presented major complications (p 0.305). These complications comprised major bleeding from the puncture site requiring blood product transfusion without vasoactive agents. No patient suffered from cerebral bleeding in our patient cohort.

Ten patients treated with mechanical aspiration (30.3%) and four with Actilyse and mechanical aspiration (6.3%) required reintervention before 24 hours (p 0.001). On the other hand, three patients treated with mechanical aspiration (9.1%) and five with Actilyse and mechanical aspiration (7.8%) required reintervention within the first seven

days (p 0.828). These reinterventions were mainly associated with recurrent thrombosis. Also, seven patients treated with mechanical aspiration (21.1%) and 18 with Actilyse and mechanical aspiration (28.1%) presented post-thrombotic syndrome (p 0.461).

Follow-up

After one year, complete patency was achieved in most patients, i.e., 97.0% of patients treated with mechanical aspiration and 64.1% with Actilyse and mechanical aspiration (p 0.001). The DVT symptoms evolution time was below seven days for 24 patients treated with mechanical aspiration (72.7%) and 43 with Actilyse and mechanical aspiration (67.2%). However, It was between eight and 14 days for nine patients treated with mechanical aspiration (27.3%) and 21 with Actilyse and mechanical aspiration (32.8% p 0.57). Regarding the thrombosis location, most cases involved a femoral-popliteal-iliac vein thrombosis, with 21patients treated with mechanical aspiration (63.6%) and 50 with Actilyse and mechanical aspiration (63.6%) having a thrombosis in this location. Cases involving a femoral-popliteal vein thrombosis included 12 patients treated with mechanical aspiration (36.4%) and 14 with Actilyse and mechanical aspiration (21.9% p 0.127).

Discussion

This study compared two management alternatives for removing blood clogs from 97 patients who underwent endovascular treatment for May Thurner syndrome. The management alternatives included treatment with mechanical aspiration and catheter-directed thrombolysis with mechanical aspiration. Our study showed that both managements were equally safe for patients, but mechanical aspiration alone was more effective.

The proportion of patients with a history of arterial hypertension differed between the patients' groups (i.e., treatment with mechanical aspiration and catheter-directed thrombolysis with mechanical aspiration), with a greater proportion of patients treated with Actilyse and mechanical aspiration having a history of this condition (32.8% vs. 12.1%, p 0.027). More patients treated with mechanical aspiration needed a vena cava filter and anticoagulation (54.6% vs. 23.4%, p 0.002 and 100% vs. 78.1%, p 0.004, respectively). On the other hand, more patients treated with Actilyse and mechanical aspiration underwent DAPT or a combination of DAPT and anticoagulant therapy (12.8% vs. 0%, p 0.008 and 57.8% vs. 15.2%, $p < 0.001$, respectively). These features of the analyzed population may influence the patient outcome. However, they are still independent variables.

One-year permeability

Our finding showed that patients treated with mechanical aspiration had higher one-year patency rates than those treated with Actilyse and mechanical aspiration (97.0% vs. 64.1 %, p 0.001). These findings align with the Zhu et al. study that analyzed 26 patients undergoing mechanical thrombectomy for acute common femoral or iliac DVT (6). This study reported a one-year patency rate of 96% for these patients. However, these evaluations did not compare the outcomes of mechanical thrombectomy with other methods. An earlier study by Pouncey et al. using catheter-directed thrombolysis and mechanical aspiration reported a one-year patency rate of 85.4% (7), comparable to that of patients treated with Actilyse and mechanical aspiration in our evaluations. However, we ignore whether Pouncey et al. used Actilyse or another thrombolytic drug since this information was not specified.

Reintervention

A single aspiration was sufficient in a greater proportion of the patients treated with mechanical aspiration (63.6% vs. 20.3%, p <0.001). However, only patients under this endovascular treatment required mechanical fragmentation devices to achieve optimal thromboaspiration (21.2% vs. 0%, p <0.001). On the other hand, more patients treated with Actilyse and mechanical aspiration required a second surgical intervention before 24 hours (30.3% vs. 6.3%, p 0.001). Considering that these reinterventions were associated with recurrent thrombosis, the increased reintervention rate in these patients might come from the reduced use of DAPT and DAPT with anticoagulants (0 vs. 18.8%, p 0.008, and 15.2% vs. 57.8%, p < 0.001, respectively).

Total and partial lysis time

Treatment with Actilyse and mechanical aspiration favored the thrombi lysis since more patients under this regimen showed total lysis before 12 hours (84.4% vs. 15.2%, p < 0.001). On the other hand, most patients treated only with mechanical aspiration required between 13 and 24 hours (84.9% vs. 15.6%, p < 0.001). Regarding the partial lysis time, we found no differences between the management alternatives during the first 12 hours. However, more patients treated only with mechanical aspiration required between 13 and 24 hours to achieve partial lysis (72.7% vs. 14.1%, p < 0.001). Considering that Actilyse was subminister during the 12 hours following the intervention, the differences in the total and partial lysis time observed in our treatment groups might have come from the action of Actilyse during this period.

Complications

The management alternatives for removing thrombi were not particularly associated with any of the minor complications considered in this study since the rate for these complications was similar for both management alternatives (9.1% vs. 12.5%, p 0.616). Few patients treated with Actilyse and mechanical aspiration suffered from major complications. However, the rate for these complications (3.1%) is below that reported by Sigua-Arce et al. for patients treated with catheter-directed thrombolysis plus mechanical aspiration. In Sigua-Arce et al. evaluations, 6.7% of patients presented major bleeding requiring transfusion, and 39.3% had stent-related complications, including thrombosis, stenosis, and stent migration (8). This rate of stent-related complications is particularly high, considering that we found no such complications in our cohort, even though 94.9% of the patients had stents.

The management alternatives were also not particularly associated with post-thrombotic syndrome. This affectation was present in 25.8% of our patients, but its rate did not differ between the management groups (21.2% vs. 28.1%, p 0.461). The literature reports higher rates for this syndrome. For example, a study by Sigua-Arce et al. showed that 46.6% of patients suffered from post-thrombotic syndrome despite 96.5% receiving antiplatelet or anticoagulation therapy (i.e., single antiplatelet therapy, DAPT, anticoagulation, triple therapy) (8). Also, a study by Vedantham et al. reported that 47% of the patients undergoing pharmacomechanical thrombolysis (336 patients) presented post-thrombotic syndrome within the 6 and 24 months following the event. These patients also received anticoagulant and antiaggregant therapy and used compressive stockings at least three times per week (9). In this evaluation, 48% of the patients in the control group, which included patients treated only with anticoagulant therapy (355 patients), also presented post-thrombotic syndrome (9).

We could not identify the reason behind our lower post-thrombotic syndrome rates, considering that both studies used antiplatelet and antiplatelet therapies similar to ours (8, 9). In our patient cohort, the percentage of patients receiving antiplatelet or anticoagulation therapy was 85.6% for anticoagulation, 12.4% for DAPT, 43.3% for DAPT and anticoagulation, and 34.0% for vena cava filter. Somehow, these therapies were more effective in reducing post-thrombotic syndrome in our cohort. It is important to mention that, unlike Vedantham et al., we did not consider the severity of the post-thrombotic syndrome since this information was unavailable (9).

Limitations

Our conclusions are limited since they come from a retrospective monocentric study that used an anonymized database. Further multicenter evaluations, including a larger population, must validate our conclusions. These evaluations must include a control group treated only with anticoagulant therapy and would benefit from having a prospective clinical trial to ensure proper diversification and control over the variables. Also, the database had no information about the symptoms before and after the procedure and the post-thrombotic syndrome severity. Therefore, we could not evaluate the management alternatives' effect on the symptoms' development or the post-thrombotic syndrome severity.

Conclusion

Our study demonstrated that both management alternatives for removing thrombi, i.e., treatment with mechanical aspiration and catheter-directed thrombolysis with mechanical aspiration, are equally safe and associated with low rates of minor and major complications. However, the mechanical aspiration treatment was more effective

and resulted in a higher one-year patency rate than the Actilyse and mechanical aspiration treatment.

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Tables:

Table 1. Clinical and surgical features of patients with May Thurner syndrome

	Only Mechanics Aspiration	Actilyse + Mechanics	P Value
Male	6 (18.18%)	16 (25%)	0.447
Female	27 (81.82%)	48 (75%)	
Antecedents			
HTA	4 (12.12%)	21 (32.81%)	0.027
Diabetes	22 (66.67%)	31 (48.44%)	0.088
Hypothyroidism	2 (6.06%)	3 (4.69%)	0.772
Thrombophilia	8 (24.24%)	18 (28.13%)	0.683
Antecedent >1	1 (3.03%)	2 (3.13%)	0.980
Risk Factor			
OC	4 (12.12%)	8 (12.50%)	
No	25 (75.76%)	50 (78.13%)	0.962
Trauma	3 (9.09%)	5 (7.81%)	
Other	1 (3.03%)	1 (1.56%)	
Time of Evolution			0.576

<7 Days	24 (72.73%)	43 (67.19%)	
8-14 Days	9 (27.27%)	21 (32.81%)	
Location			
Femoro-Popliteal	12 (36.36%)	14 (21.88%)	0.127
Femoro-Popliteal-Iliac	21 (63.64&)	50 (78.13%)	
Left Laterality	33 (34.02%)	64 (65.98%)	N/A
Anatomical Variation	0	3 (4.69%)	0.206
Stent Use	33 (100%)	59 (92.19%)	0.099
Angioplasty	1 (3.03%)	3 (4.69%)	0.697
Vein Cava Filter	18 (54.55%)	15 (23.44%)	0.002
Therapy			
Dual Antiplatelet Therapy	0	12 (18.75%)	0.008
Anticoagulation	33 (100%)	50 (78.13%)	0.004
Dual Antiplatelet and Anticoagulant	5 (15.15%)	37 (57.81%)	< 0.001

Unique or Additional aspiration mechanic			
Unique aspiration	21 (63.64%)	13 (20.31%)	< 0.001
Additional aspiration	5 (15.15%)	51 (79.69%)	
Use of devices	7 (21.21%)	0	
Total Lysis Time			
<12 Hours	5 (15.15%)	54 (84.38%)	< 0.001
13-24 Hours	28 (84.85%)	10 (15.63%)	
Partial Lysis Time			
No	5 (15.15%)	51 (78.69%)	
<12 Hours	4 (12.12%)	4 (6.25%)	< 0.001
13-24 Hours	24 (72.73%)	9 (14.06%)	

Table 2. Primary outcomes of patients with a diagnosis of May Thurner syndrome treated with mechanical aspiration or mechanical aspiration plus thrombolysis.

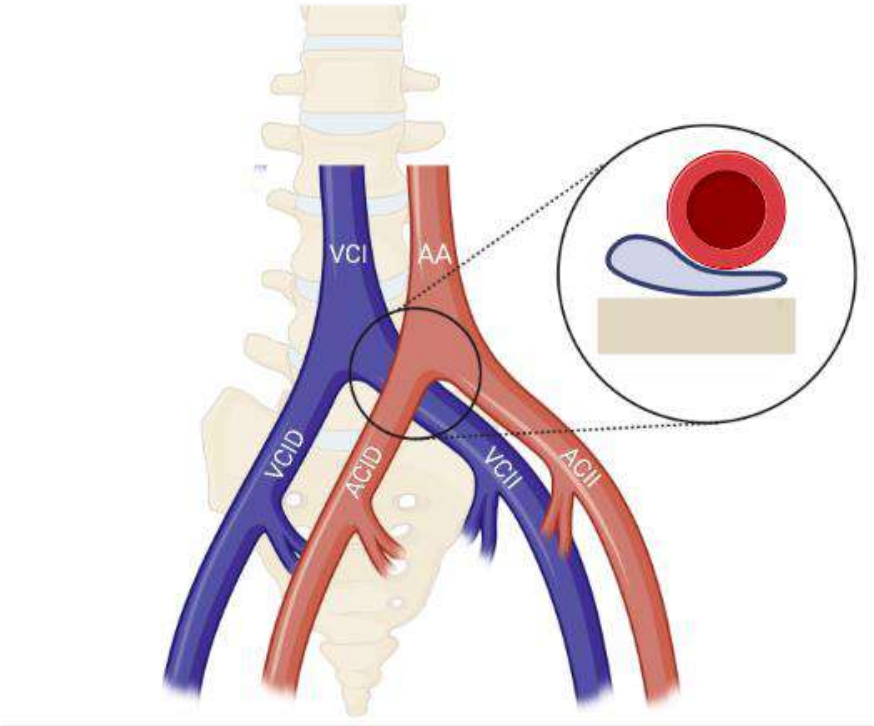
Outcomes	Only Mechanics Aspiration	Actilyse + Mechanics	P Value
Minor Complications	3 (9.09%)	8 (12.5%)	0.616
Major Complications	0	2 (3.13%)	0.305
Reintervention <24 Hours	10 (30.30%)	4 (6.25%)	0.001
Reintervention 1-7 Days	3 (9.09%)	5 (7.81%)	0.828
Post-Thrombotic Syndrome	7 (21.21%)	18 (28.13%)	0.461
Permeability			
1 Year	32 (96.97%)	41 (64.06%)	0.001

Figure Legends:

Figure 1: Illustrative image of the compressive phenomenon of the right common iliac artery on the left common iliac vein. AA: Abdominal aorta, LCA: Left common iliac artery, LCA: Right common iliac artery, IVC: Inferior vena cava, RVC: Right common iliac vein, LVC: Left common iliac vein. Created with BioRender.com by XXXX-XXXX.

Figures:

Figure 1



Figure

Click here to access/download;Figure;May Thurner Sindrome.tiff

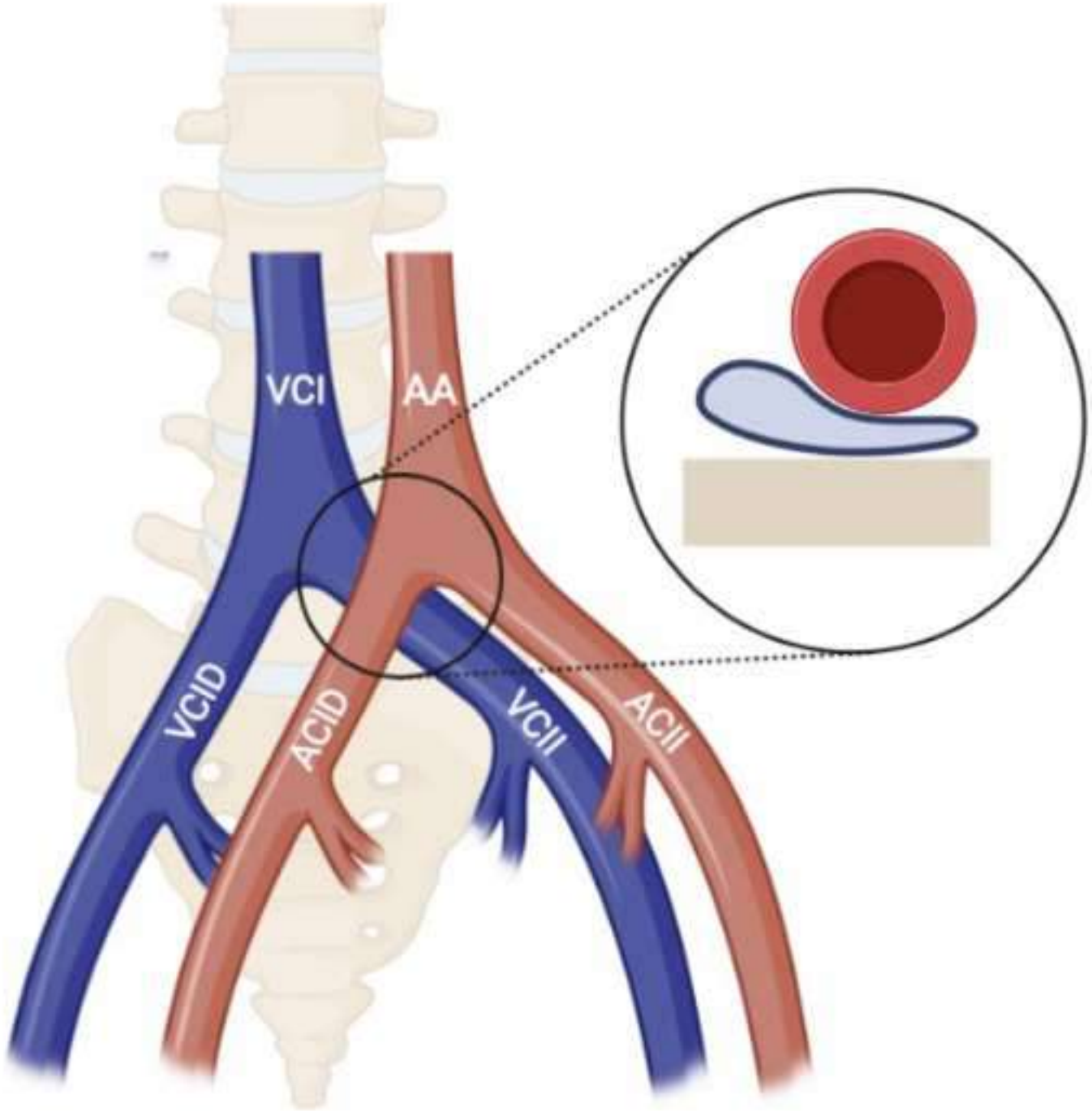


Table 1. Clinical and surgical features of patients with May Thurner syndrome

	Only Mechanics Aspiration	Actilyse + Mechanics	P Value
Male	6 (18.18%)	16 (25%)	0.447
Female	27 (81.82%)	48 (75%)	
Antecedents			
HTA	4 (12.12%)	21 (32.81%)	0.027
Diabetes	22 (66.67%)	31 (48.44%)	0.088
Hypothyroidism	2 (6.06%)	3 (4.69%)	0.772
Thrombophilia	8 (24.24%)	18 (28.13%)	0.683
Antecedent >1	1 (3.03%)	2 (3.13%)	0.980
Risk Factor			
OC	4 (12.12%)	8 (12.50%)	
No	25 (75.76%)	50 (78.13%)	0.962
Trauma	3 (9.09%)	5 (7.81%)	
Other	1 (3.03%)	1 (1.56%)	

Time of Evolution			
<7 Days	24 (72.73%)	43 (67.19%)	0.576
8-14 Days	9 (27.27%)	21 (32.81%)	
Location			
Femoro-Popliteal	12 (36.36%)	14 (21.88%)	0.127
Femoro-Popliteal-Iliac	21 (63.64&)	50 (78.13%)	
Left Laterality	33 (34.02%)	64 (65.98%)	N/A
Anatomical Variation	0	3 (4.69%)	0.206
Stent Use	33 (100%)	59 (92.19%)	0.099
Angioplasty	1 (3.03%)	3 (4.69%)	0.697
Vein Cava Filter	18 (54.55%)	15 (23.44%)	0.002
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			0.001
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