

# ENDOVASCULAR THERAPY IN FLOATING THROMBUS OF THORACIC AORTA

## ABSTRACT

**Introduction:** The presence of a floating thrombus in the aorta is rare. Diagnosis is often achieved through angio-TC in patients with embolic ischemia. It is a serious condition that can end the life of the patient due to complications associated with emboli in different territories such as cerebrovascular, extremities, intestine, kidneys, and spleen. Currently, the treatment is long-term anticoagulation plus the surgical treatment of embolized territories. **Objective:** To present the case report of a patient who presented with abdominal pain and whose angio-CT revealed a massive splenic infarction, and an aortic thrombus located in its descending distal portion close to the celiac trunk. Condition was treated by placing an aortic endoprosthesis to suppress the embolic source. **Discussion:** The case and the different treatment alternatives are analyzed in relation to the presence of this embolic source of aortic location.

**Keywords:** Embolism, Aortic Thrombus, Aortic Endoprosthesis

## Authors:

Juan Marín Peralta<sup>1</sup>,   
Claudia Marín Heise<sup>2</sup>,   
Gian Zamboni Torres<sup>3</sup>, 

<sup>1</sup> Cirujano vascular y endovascular

<sup>2</sup> Interna de Medicina Pontificia  
Universidad Católica de Chile

<sup>3</sup> Radiólogo intervencionista  
Hospital de Urgencia de la  
Asistencia Pública  
Santiago, Chile

## Correspondence:

Dr. Juan Marín P.  
La Araucana 728,  
La Reina (7860247)  
[jmarin1953@gmail.com](mailto:jmarin1953@gmail.com)

## INTRODUCTION

The presence of a floating thrombus in the aorta is a significant source of arterial thromboembolism.<sup>(1,2)</sup> This is a potentially serious clinical complication because some patients often present with ischemia in certain parts of their bodies due to the release of embolic material from this thrombus developing strokes, upper or lower limb ischemia, and ischemic compromise of kidney, superior mesenteric flow, and spleen. Although it is necessary to treat these embolized territories, the problem is also the embolic source due to this aortic thrombus. Anticoagulation has been the gold standard therapy of this entity.<sup>(3)</sup> However, surgery has also played a key role in territories like the aortic arch against potentially embolic clinical manifestations with significant embolic risk in the cardiovascular territory, a surgery that can be very complex.<sup>(4)</sup> Currently, there is a new treatment alternative—*aortic endoprosthesis implantation*—to suppress this embolic source, the so-called TEVAR (*thoracic endovascular aneurysm repair*) technique.<sup>(5)</sup> In our medical specialty we still have not had the chance to use this option, only in a few isolated cases. Therefore, our objective is to present the case of a floating aortic thrombus treated with this technique.

## CASE REPORT

This is the case of a 60-year-old woman with a past medical history of non-insulin-dependent diabetes mellitus, leukemia of 10-year evolution, iron deficiency anemia and uterine bleeding treated with estrogen therapy for 10 years. She is admitted to the emergency room with moderate abdominal pain of 24-hour evolution. An abdominal computer tomography is performed that reveals the presence of

a splenic infarction (70%) plus a 4 cm floating mural thrombus occupying 30% of the distal thoracic aortic lumen and reaching up to 1 cm above the celiac trunk emergency (*Figures 1a, 1b*). The lab test results only show the presence of anemia with a complete blood count of 26%, and leukocyte count of 21 000.

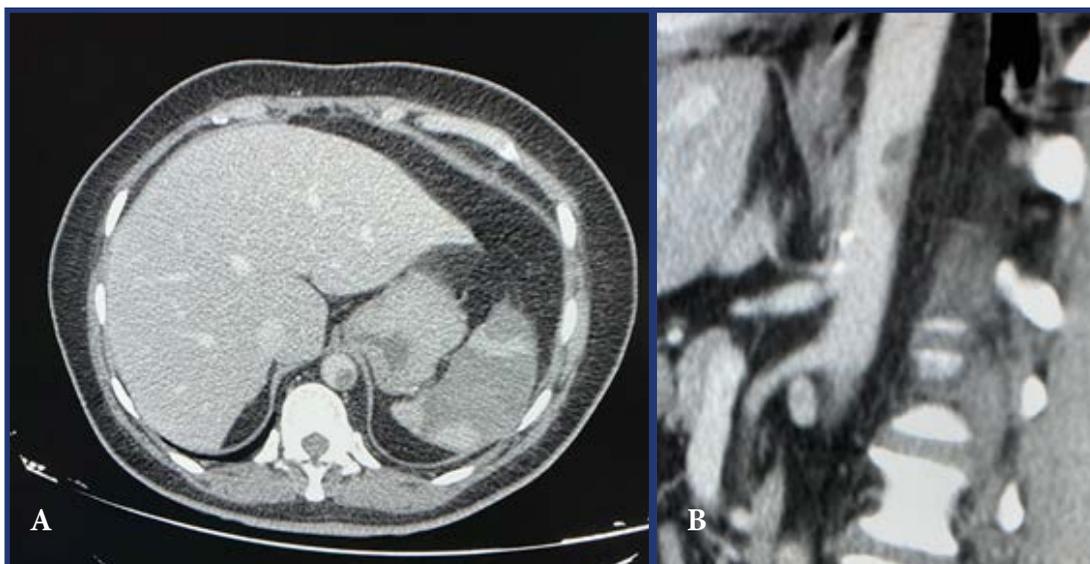
On day 2 it was decided to perform an endovascular procedure in a hybrid room under general anesthesia to cover the floating thrombus with a 26 mm x 100 mm CTAG thoracic endoprosthesis (Gore). The prosthesis was ascended via open right femoral access to land 1 cm above the celiac trunk emergency (*Figure 2a and Figure 2b*). On day 24/10 the control angio-CT performed confirms the resolution of the floating thrombus (*Figure 3a and Figure 3b*).

Outcomes: No complications. The patient is discharged from the hospital on day 5. The follow-up conducted at 90 days and 1 year revealed no signs of new aortic thrombi (*Figure 4*).

## DISCUSSION

Most arterial thromboembolisms are due to cardiac causes and, in some cases, they are due to aortic atherosclerosis and aneurysms.<sup>(5,6,7)</sup> In a not uncommon number of cases, the presence of a floating thrombus in the aorta like the embolic source is a common finding.<sup>(1,2)</sup> There are numerous causes of this clinical presentation that are not necessarily associated with atherosclerotic aortic disease, but with hypercoagulable states, smoking, use of steroids, trauma, drug abuse, heparin-induced thrombocytopenia, rheumatologic diseases, and vasculitis.<sup>(8,9)</sup> For decades, extended anticoagulant therapy has been the alternative to treat these floating thrombi with relatively good results.<sup>(10)</sup> Also, in very complex cases of failed therapy in regions

**FIGURE 1.** Floating thrombus in the aorta. **A.** Splenic infarction associated with a thrombus located in the abdominal aorta. **B.** Aortic thrombus close to the celiac trunk.



like the left anterior descending coronary artery or the aortic arch, open surgery of high complexity has been performed to remove these thrombi that can cause serious emboli in both the cerebrovascular territory and the upper limbs. The TEVAR alternative has been around for quite some time for the management of this clinical condition with satisfactory outcomes.<sup>(12,13)</sup> There is a wide review regarding the use of TEVAR in this clinical scenario to the detriment of other therapies available.<sup>(14)</sup>

In this case, TEVAR was decided because the patient had suffered a massive splenic infarction. It was thought that its anticoagulation could turn into a hemorrhagic infarction, thus triggering a potentially surgical abdominal complication. Also, because it was impossible to predict whether this large thrombus

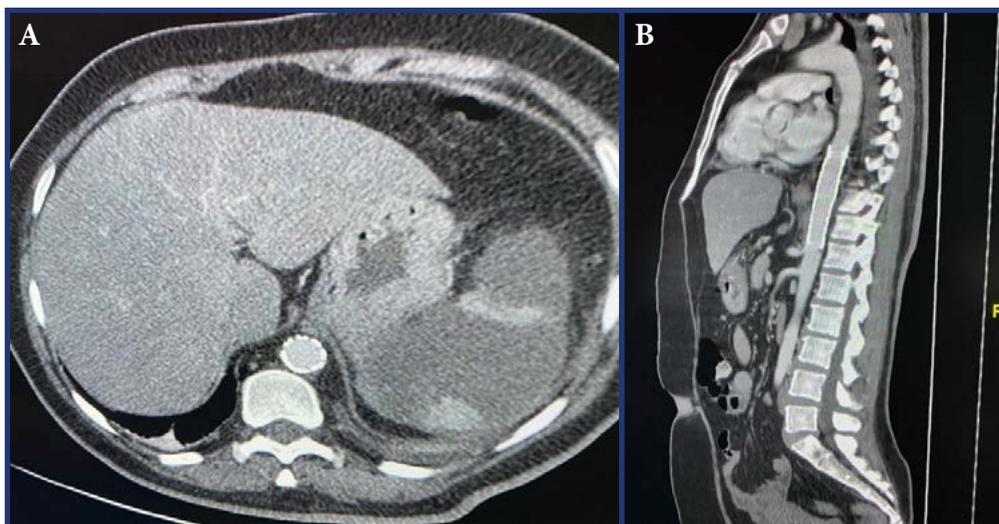
would not keep causing visceral emboli or to the extremities. Regarding its etiology, the only thing we found as the cause was significant thrombocytosis.

In conclusion, we believe that TEVAR is one additional therapeutic alternative for this catastrophic presentation. Also, it is a minimally invasive technique like current endovascular therapy. As a matter of fact, in the vascular surgical field it has been proposed as the first-line therapy for the management of vascular diseases. Finally, we believe that this technique changes the therapeutic paradigm on the management of floating aortic thrombi because of the availability of this therapeutic resource and as long as the patients' conditions are favorable who should already have presented with symptoms associated with an embolic phenomenon in the first place.

**FIGURE 2.** A. Angiography showing a floating thrombus in the aorta. B. Endoprosthesis implantation into the aorta followed by floating thrombus exclusion.



**FIGURE 3.** A and B. Control angio-CT showing the lack of floating thrombus in the aorta.





**FIGURE 4.** Endoprosthesis control follow-up at 1 year without presence of floating thrombus.

#### Conflicts of interest

The authors declared no conflicts of interest; this study obtained no funding from the private or public sectors.

## REFERENCES

1. Reber PU, Patel AG, Stauffer E, Müller MF, Do DD, Kniemeyer HW. Mural aortic thrombi: An important cause of peripheral embolization. *J Vasc Surg.* 1999;30:1084-9.
2. Hahn TL, Dalsing MC, Sawchuk AP, Cikrit DL, Lalka SG. Primary aortic mural thrombus: Presentation and treatment. *Ann Vasc Surg.* 1999;13:52-9.
3. Gentile Lorente D, Escrib Monfort C. Trombosis en arco aórtico derecho aparentemente no ateroscleroso. *Rev Med Chile* 2013; 141: 540-542.
4. Edwards, Jeffrey B.; Jones, R. Wesley; Armstrong, Paul A.; Makdisi, George; Hooker, Robert L.: Management of Floating Ascending Aortic Thrombus for the Vascular Surgeon. *Ann Vasc Surg*, 2019-11-01, Volume 61, Pages 10-11.
5. Reber PU, Patel AG, Stauffer E, Müller MF, Do DD, Kniemeyer HW. Mural aortic thrombi: An important cause of peripheral embolization. *J Vasc Surg.* 1999;30:1084-9.
6. Brewster DC, Chin AK, Hermann GD, Fogarty TJ. Arterial thromboembolism. In: Rutherford RB, editor. *Vascular surgery*. Philadelphia: WB Saunders; 1995. p. 647-69.
7. Tunick PA, Kronzon I. Protruding atherosclerotic plaque in the aortic arch of patients with systemic embolization: a new finding seen by transesophageal echocardiography. *Am Heart J.* 1990 Sep;120(3):658-60.
8. Trindade VD, Bettio J, Albuquerque LC. Endovascular treatment of a mobile thrombus of the thoracic aorta in association with ulcerative colitis. *Tex Heart Inst J* 2012;39:592-593.
9. Hazirolan T, Perler BA, Bluemke DA. Floating thoracic aortic thrombus in "protein S" deficient patient. *J Vasc Surg.* 2004 Aug;40(2):381.
10. Francois Caron , Sonia S Anand . Antithrombotic therapy in aortic diseases: A narrative review. *Antithrombotic therapy in aortic diseases: A narrative review. Vasc Med* 2017 Feb;22(1):57-65.
11. Weiss S, Bühlmann R, von Allmen RS, Makaloski V, Carrel TP, Schmidli J, Wyss TR. Management of floating thrombus in the aortic arch. *J Thorac Cardiovasc Surg* 2016 Sep;152(3):810-7.
12. Criado E, Wall P, Lucas P, Gasparis A, Proffitt T, Ricotta J. Transesophageal echo-guided endovascular exclusion of thoracic aortic mobile thrombi. *J Vasc Surg* 2004;39:238-42.
13. Verma H, Meda N, Vora S, George RK, Tripathi RK. Contemporary management of symptomatic primary aortic mural thrombus. *J Vasc Surg* 2014;60:1524-34.
14. Meyermann K, Trani J, Caputo FJ, Lombardi JV. Descending thoracic aortic mural thrombus presentation and treatment strategies. *J Vasc Surg.* 2017 Sep;66(3):931-936.