SCIENTIFIC LETTER

ABDOMINAL AORTIC SURGERY ASSOCIATED WITH SHAGGY AORTA: A CATASTROPHIC EVENT

Authors
Juan Marín[1] and Claudia Marín[2]

[1]*Vascular and Endovascular Surgeon, Surgery Service, Hospital de Urgencia de la Asistencia Pública, Santiago, Chile.*
[2]*Surgery Resident, Universidad Católica, Chile.*

Corresponding author:
Juan Marín
jmarin1953@gmail.com

ABSTRACT
Both open and endovascular surgery of abdominal aortic aneurysm associated with a "shaggy aorta" cause multiple atheromatous embolism phenomena usually associated with high mortality. We present a clinical case of abdominal aortic aneurysm associated with this entity that resulted in early death secondary to multiple atheromatous embolisms affecting the lower extremities, abdominal wall, and severe renal damage requiring emergency dialysis.

Keywords: *Abdominal aortic aneurysm, shaggy aorta.*

Received: 09/29/2024 ***Accepted: 11/02/2024*** ***https://doi.org/10.55200/raccv.v23.n1.0094***

INTRODUCTION

Atheroembolization in open or endovascular abdominal aortic surgery is a well-recognized entity. Spontaneous embolization to visceral and peripheral territories due to diffuse atheromatosis of the thoracic and abdominal aorta is also described. This condition is called shaggy aorta syndrome (hairy aorta). This diffuse chemoembolization is formed by microembolization of cholesterol released from these plaques. It usually reaches the smallest terminal vessels, with thrombosis of this microcirculation[1].

Although the name "shaggy aorta" refers to an irregularly shaped and spiculated aorta, as determined by visual features on computed tomography (CT) angiography, there is still no consensus definition.

We present here a clinical case of multiple atheromatous embolisms in a patient with abdominal aortic aneurysm and involvement of the iliac arteries who underwent open surgery and died early because of this serious complication[2].

CLINICAL CASE

A 64-year-old woman, hypertensive, smoking, and hypothyroid, with a history of claudication of the left leg, was consulted for severe left foot pain associated with toes' ischemia with preserved pulses associated with small purplish plaques on both soles of the foot compatible with atheromatous embolism. Angiotomography reveals the presence of an aortic aneurysm with involvement of the iliac arteries (*Figure 1*) associated with thoracic and abdominal aorta compatible with shaggy aorta (*Figures 2A* and *2B*).

In open surgery, an aortoiliac bypass is performed without complications. During the opening of the aneurysm, soft and friable atheromatous material compromises the proximal aorta and the aneurysmal sac. The area of the proximal anastomosis and the sac are cleaned, this friable material is removed, and the proximal aorta and iliac arteries are purged before closure.

In the immediate postoperative period, some plaques in both thighs were observed, which were compatible with atheromatous embolism. At 24 hours, severe embolic involvement was observed in both thighs and the lower abdominal wall (*Figures 3A* and *3B*). The picture is associated with creatinine levels of more than 3 mg/dl, hyperkalemia of 7 mEq/l, and severe metabolic acidosis. Transient catheter hemodialysis is started; however, she begins to require the use of vasoactive drugs to try to maintain hemodynamics associated with multiorgan failure. The patient died 36 hours later.

COMMENT

Although there are several definitions of shaggy aorta, there is consensus in defining it as a severe arterial degeneration of the aorta, whose surface is highly friable and susceptible to cause atheroembolism. Abdominal aortic aneurysm surgery, whether open or endovascular, associated with a shaggy aorta is a catastrophic event associated with high mortality[3].

This entity represents a severe degeneration of the aortic surface, extremely friable, and likely to cause peripheral and visceral embolization spontaneously or during catheterization, aortic manipulation, surgery, or minimally invasive procedures. It is a microembolization characterized by small particles formed by cholesterol crystals that cause a severe

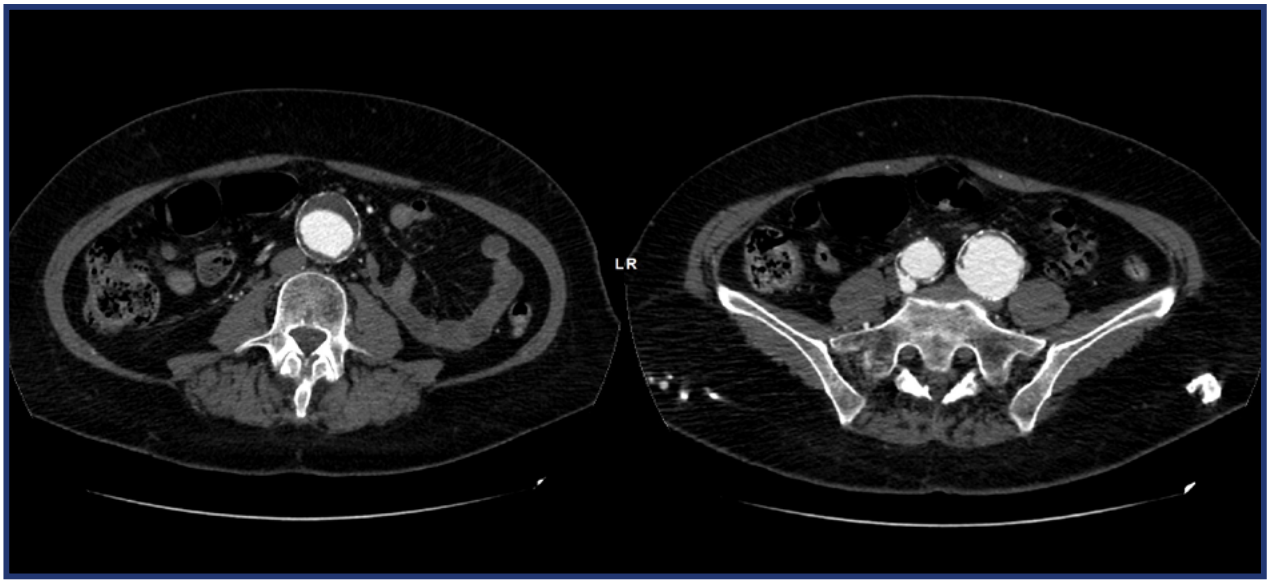

FIGURE 1. Tomographic image showing an abdominal aortic aneurysm involving the iliac arteries.

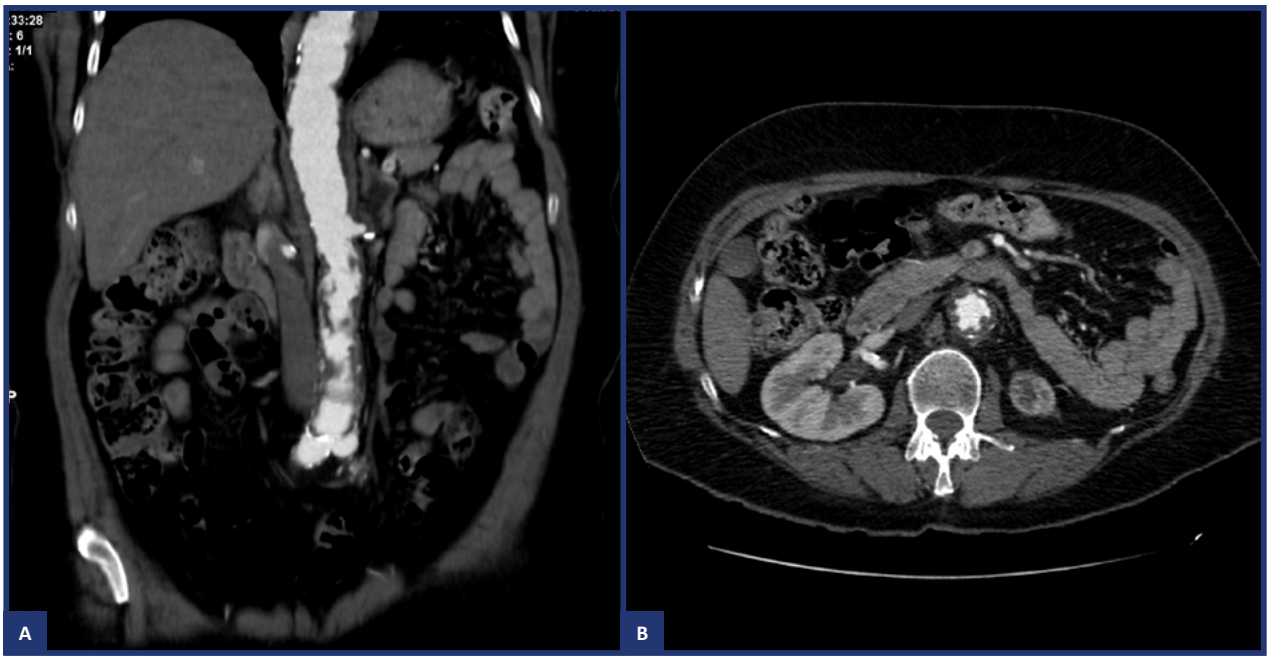

FIGURE 2. A and B. Tomographic image showing a shaggy aorta.

FIGURE 3. A. Preoperative atheromatous embolism. **B.** Severe atheromatous embolism 24 hours after surgery.

alteration of the microcirculation, affecting all territories and, in the case of the abdominal aorta, involves the intestine and kidneys and causes spinal ischemia and lower extremities[4]. In the case of abdominal aortic surgery in any of its modalities, the shaggy artery also presents atheroembolism phenomena[5]. In our case, the patient had already presented atheromatous embolism of both feet in the preoperative period of the aortic aneurysm. Although during surgery, atheromatous material was removed from the proximal aorta before repair and the prosthesis was purged before anastomosis of the iliac arteries, immediately after leaving the operating room, she presented significant atheromatous embolism of both thighs and, 24 hours later, severe deterioration of renal function with severe hyperkalemia, although early dialysis had been started. The patient died 36 hours after surgery. Although medical treatments such as high-dose atorvastatin, anticoagulation, and corticosteroids

are available, their effectiveness has not been proven. The use of a supra celiac intra-aortic filter has also been proposed with some effectiveness[6], as well as early ligation of both iliac arteries associated with an axilla-bifemoral bypass, which helps to reduce damage to the extremities; however, it does not prevent embolization of the visceral territory. Perhaps an alternative to diminishing this massive visceral atheroembolism is a suprarenal clamping associated with clamping of the renal and superior mesenteric arteries to clean before repairing with a prosthesis, as emerged after the analysis and study of this patient.

In this case, measures to reduce this serious complication were ineffective, although this complication was foreseen before surgery.

Declarations

The authors declare no conflict of interest.

REFERENCES

1. Serra R, et al. The Shaggy Aorta Syndrome: an updated review. Annals of Vascular Surgery. 2020;70:528-541. https://doi.org/10.1016/j.avsg.2020.08.009.

2. Hollier LH, Kazmier FJ, Ochsner J, Bowen JC, Procter CD. "Shaggy" Aorta Syndrome with Atheromatous Embolization to Visceral Vessels. Annals of Vascular Surgery. 1991;5(5), 439-444. https://doi.org/10.1007/bf02133048.

3. Zempo N, et al. Fatal Diffuse Atheromatous Embolization Following Endovascular Grafting for an Abdominal Aortic Aneurysm: Report of a Case. Surgery Today. 2001;31(3):269-273. https://doi.org/10.1007/s005950170185.

4. Toya N, Baba T, Kanaoka Y, Ohki T. Embolic complications after endovascular repair of abdominal aortic aneurysms. Surgery Today. 2013; 44(10):1893-1899. https://doi.org/10.1007/s00595-013-0795-y.

5. Kwon HY, Noh M, Gyo Gwon J, Cho Y-P, Kwon T-W. Impact of shaggy aorta with abdominal aortic aneurysm following open or endovascular aneurysm repair. Eur J Vasc Endovasc Surg. 2016;52(5):613-619. https://doi.org/10.1016/j.ejvs.2016.08.010.

6. Sanada J, Matsui O, Ohtake H, Kimura K, Kusanagi M, Terayama N. Distal Embolus Protection With an Intra-Aortic Filter During Stent-Graft Repair of a Severely Atherosclerotic Thoracic Aortic Aneurysm. Journal of Endovascular Therapy. 2005;12(6):642-646. https://doi.org/10.1583/05-1673r.1.