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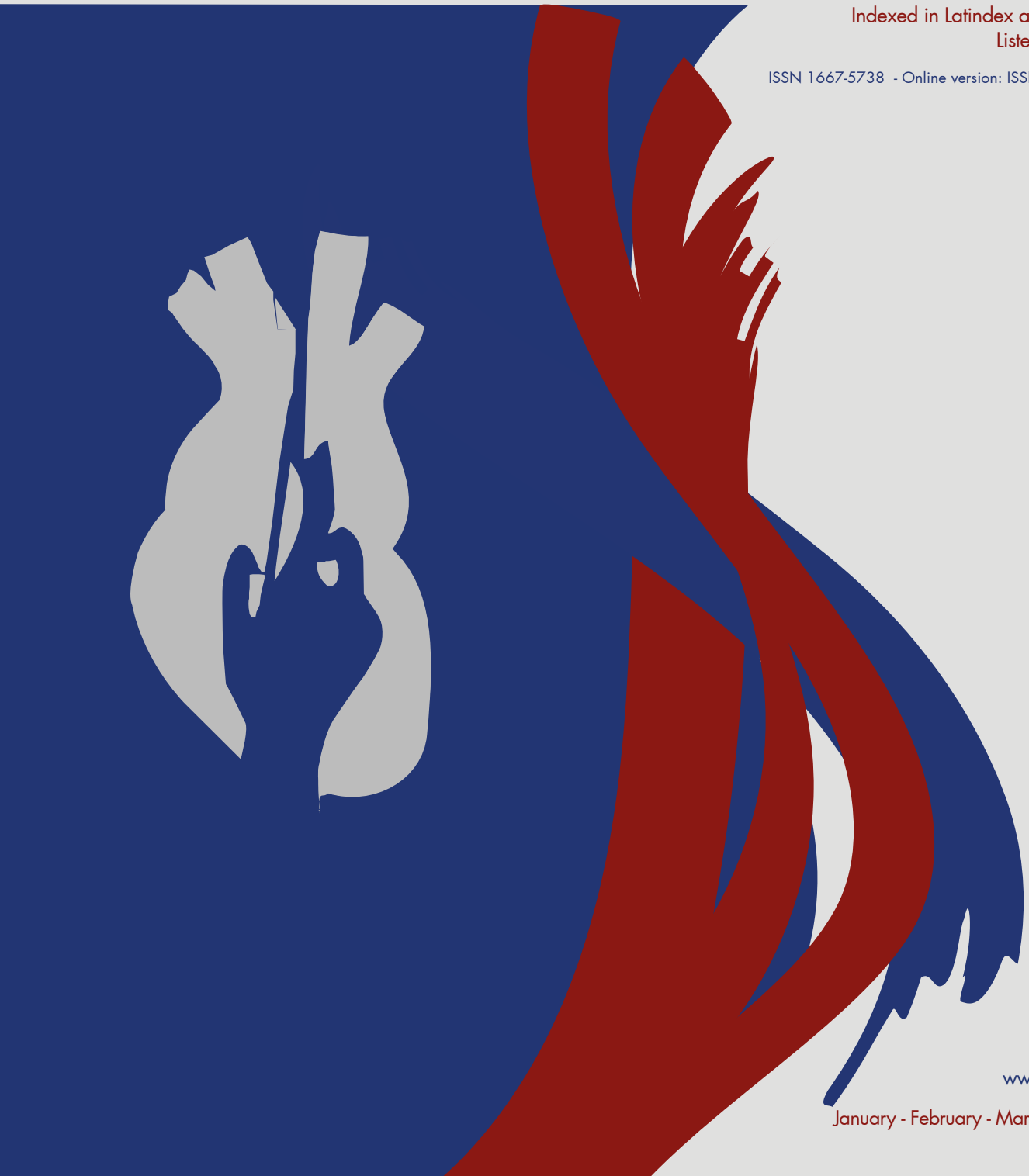

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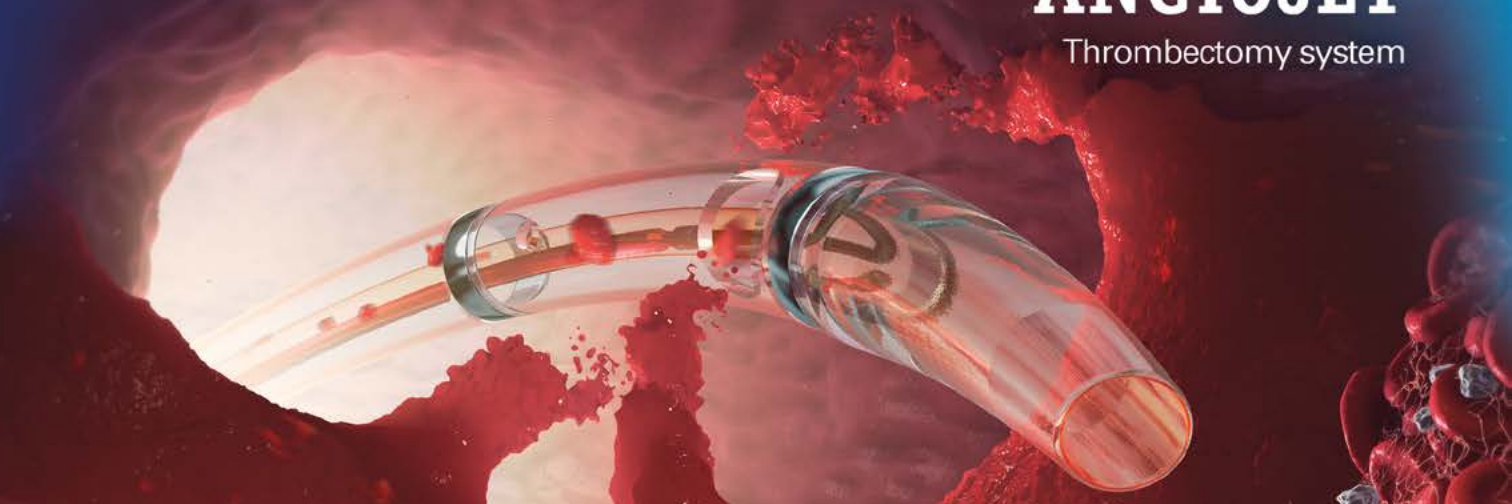

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ORIGINAL ARTICLE

OUTCOMES OF DIFFERENT TYPES OF STENT-GRAFT IN ENDOVASCULAR ABDOMINAL AORTIC ANEURYSM REPAIR: LONG-TERM EXPERIENCE OF A HIGH COMPLEXITY COLOMBIAN CENTER, THE FIRST LATIN AMERICAN EXAMPLE

ABSTRACT

Introduction: Endovascular abdominal aortic aneurysm repair (EVAR) devices are associated with a higher rate of complications at 5-year follow-up. At least 30% of patients with EVAR devices require some type of reintervention (whether endovascular or open) at 10-year follow-up. These complications include endoleak, abdominal aortic aneurysms rupture, graft migration, occlusion or infection. The objective of this paper was to determine the rates of failure for each type of EVAR stent-graft used in our local population. Also, this paper is the first step to create a Colombian and Latin American transnational EVAR device registry. **Material and method:** Single-center retrospective observational cohort study. Thirty-four patients with abdominal aortic aneurysms (AAA) treated with EVAR were included from 2011 through 2017. Data were collected from the patients' electronic medical records. **Results:** The stent-graft Endologicx Ba (Endologix, Irvine, CA, United States), Excluder (W.L. Gore, Newark, DE, United States), Zenith (Cook Medical, Bloomington, IN, United States), and Nellix endovascular aneurysm sealing system (EVAS) (Endologix, Santa Rosa, CA, United States) were not associated with any endoleaks or any type of complications after the EVAR procedure. The Aorfix (Lombard, Didcot, United Kingdom), and Endurant (Medtronic, Minneapolis, MN, United States) stent-grafts had rates of type II endoleak (in 1 and 2 patients) of 2.9% and 5.8%, respectively that closed spontaneously. No stent-graft developed type I, III or IV endoleaks or any endovascular or open reinterventions were needed. **Conclusions:** This study shows that the different types of stent-graft used for to treat AAA with EVAR can be used in a safe and feasible way with good postoperative clinical outcomes in the Latin American population.

Keywords: *Abdominal Aortic Aneurysm, Endovascular Procedure, Stents.*

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INTRODUCTION

The endovascular repair (EVAR) of abdominal aortic aneurysm (AAA) has been on the rise since 1991[1] when the feasibility of EVAR was demonstrated by Parodi et al.[2] and Volodos et al.[3]. A total of 80% of the non-ruptured AAA are treated endovascularly in the United States. In Colombia the rate of AAA treated with EVAR has increased since 2007 but we still don't have a national registry with objective data[1-3].

The average cost of a stent-graft for EVAR is $7000 and new stent-grafts for EVAR are developed regularly. Often these new stent-grafts keep the same name for marketing purposes but have a different graft design and structure. These updates regarding EVAR stent-graft are not always available for scrutiny and have limited clinical evidence. In Latin America and more specifically Colombia, the regulatory requirements for the use of stent-grafts vary from one country to the next[1].

The EVAR devices have a higher rate of complications at 5-year follow-up. At least 30% of the patients with EVAR devices at 10-year follow-up require some type of reintervention (whether endovascular or open). These complications include endoleaks, AAA rupture, graft migration, occlusion or infection. Commercially available EVAR systems vary in important ways. The stent-graft material, design, and fixation mechanism vary among different brands, and each device has its own strengths and weaknesses. Back in 2013 and 2015 Duffy et al.[4,5] performed two systematic reviews published in Cochrane that revealed the lack of randomized trials comparing different stent-grafts in the world and Latin America[4,5]. Each stent-graft design could fail differently, but in Latin America and Colombia these results have never been pooled and compared. The objective of this paper was to determine the rates of failure for each type of EVAR stent-graft used in our local population. Also, this paper is the first step to create a Colombian and Latin American transnational EVAR device registry.

METHODS

Study design and setting

Single-center retrospective observational cohort study. The study was conducted in the Hospital Militar Central, Bogota, Colombia. Patients were selected from a database with planned EVAR to treat AAA from 2011 through 2017. Data were collected from the patients' electronic medical records. Hospital Militar Central and Universidad Militar Nueva Granada ethics committees approved the study.

Sample

Patients aged 61 years and over treated with elective EVAR with an average 3-year follow-up were eligible for inclusion. Patients treated with open AAA repair and emergency AAA repair were excluded. Subjects with non-degenerative AAA, thoracic, thoraco-abdominal or isolated iliac aneurysms, and complex aneurysms (fenestrated, extreme anatomy, eg, angled neck, short neck) were excluded too.

EVAR devices

The tent-grafts (and manufacturers) included were Zenith (Cook Medical, Bloomington, IN, United States); Zenith Low Profile (Cook Medical); Endurant (Medtronic, Minneapolis, MN, United States); Excluder (W.L. Gore, Newark, DE, United States); Endologix Ba AFX (Endologix, Irvine, CA, United States); Nellix endovascular aneurysm sealing system (EVAS) (Endologix, Santa Rosa, CA, United States); Anaconda (Vascutek, Inchinnan, Glasgow, United Kingdom); Aorfix (Lombard, Didcot, United Kingdom); Powerlink (LeMaitre, Burlington, MA, United States); Talent (Medtronic); AneuRx (Medtronic); and Incraft (Cordis, Milpitas, CA, United States).

Variables and measurements

Demographic variables

The following demographic data were collected: age and gender.

Clinical baseline variables

The preoperative baseline characteristics collected from the electronic medical records were comorbidities (arterial hypertension, type 2 diabetes mellitus, dyslipidemia, and hypothyroidism), location and size of the AAA.

Surgery-related variables

The following surgery-related variables were collected: type of stent-graft, and manufacturer.

Outcome variables

The primary endpoints of this study were the occurrence of Clavien-Dindo grade 2 and, above all, the postoperative complications.

The secondary endpoints were complications that occurred during or after surgery defined as endoleaks, AAAs rupture, graft migration, occlusion or infection, need for graft explantation and reintervention (endovascular or open).

Data analysis

Continuous variables were expressed as medians with interquartile ranges (IQR). Categorical variables were expressed as numbers and percentages. All analyses were performed using SPSS statistical

software, version 20.0 (SPSS Inc., Chicago, IL, United States). The Chi-square test was used to establish the presence of correlations between the type of aortic stent-graft used and the endoleak.

RESULTS

Fifteen patients were treated with open AAA repair and 70 patients with AAA EVAR from 2011 to 2017. Twenty-five patients had insufficient data in their clinical records. One patient died during the EVAR procedure due to general anesthesia complications. After the application of inclusion and exclusion criteria, 34 patients were included **(Figure 1)**. Their median age group was 71-80 years old (50%). A total of 82.35% of patients were males and 17.65% females. The identified comorbidities were arterial hypertension in 31 patients (91.17%), dyslipidemia in 11 patients (32.35%), type 2 diabetes mellitus in 5 (14.7%), and hypothyroidism in 8 patients (23.52%). A total of 70.5% of the patient had multiple comorbidities. The mean size of the AAA when the EVAR was performed was 60 mm (47.05%) **(Table 1)**.

FIGURE 1. Flowchart of the study recruitment

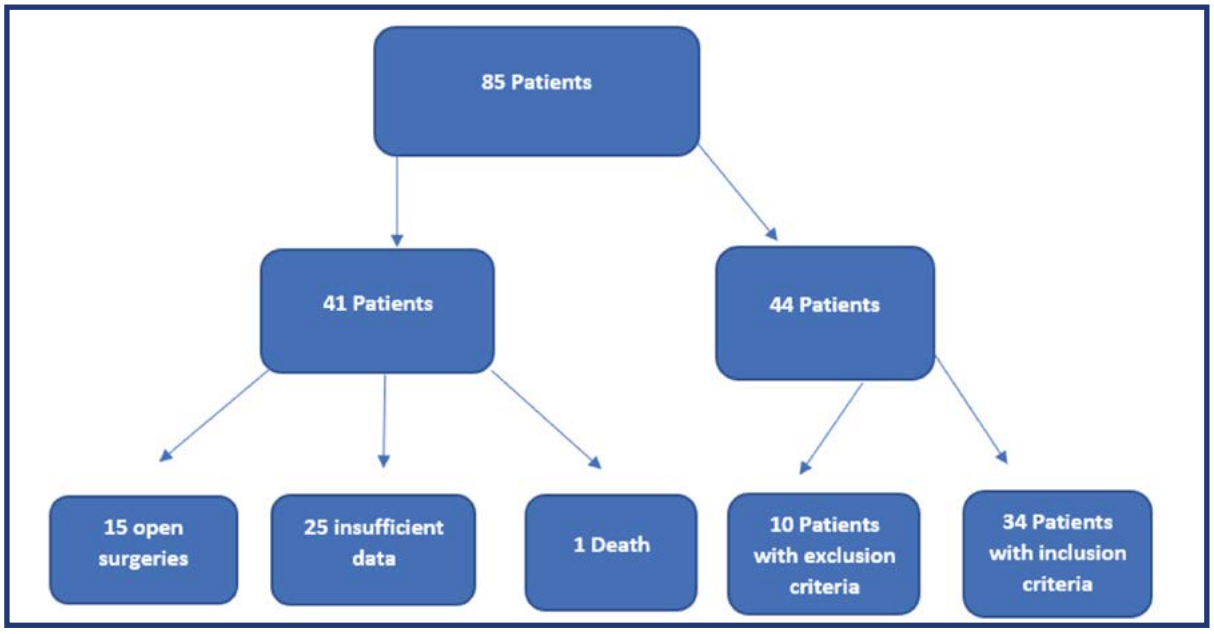

TABLE 1. Patient demographics and clinical characteristics

	N=34	%
Age (years)		
-61-70	7	20,59
-71-80	17	50
-> 80	10	29,41
Gender		
-Male	28	82,35
-Female	6	17,65
Comorbidities		
Arterial hypertension	31	91,17
Dyslipidemia	11	32,35
Type 2 diabetes mellitus	5	14,70
Hypothyroidism	8	23,52
Abdominal aortic aneurysm size (mm)		
45-50	7	20.58
51-55	3	8.82
56-60	8	23.52
> 60	16	47.05

In the 34 patients included in the present study the following types of stent-grafts and manufacturers were used: Zenith (Cook Medical, Bloomington, IN, United States); Endurant (Medtronic, Minneapolis, MN, United States); Excluder (W.L. Gore, Newark, DE, United States); Endologix Ba AFX (Endologix, Irvine, CA, United States); Nellix endovascular aneurysm sealing system (EVAS) (Endologix, Santa Rosa, CA, United States); and Aorfix (Lombard, Didcot, United Kingdom) **(Figure 2)**.

The Zenith Low Profile (Cook Medical); Anaconda (Vascutek, Inchinnan, Glasgow, United Kingdom); Powerlink (LeMaitre, Burlington, MA, United States); Talent (Medtronic); AneuRx (Medtronic) and Incraft (Cordis, Milpitas, CA, United States) stent-grafts and manufacturers were not used.

The stent-graft Endologicx Ba (Endologix, Irvine, CA, United States), Excluder (W.L. Gore, Newark, DE, United States), Zenith (Cook Medical, Bloomington, IN, United States) and Nellix endovascular aneurysm sealing system (EVAS) (Endologix, Santa Rosa, CA, United States) did not present endoleaks or any type of complications after the EVAR procedure. The Aorfix (Lombard, Didcot, United Kingdom) and the Endurant (Medtronic, Minneapolis, MN, United States) stent-graft had rates of type II endoleak (in 1 and 2 patients) of 2.9% and 5.8%, respectively that closed spontaneously and were not statistically significant (P = .712). No stent-graft developed type I, III or IV endoleaks, and endovascular or open reintervention was not required **(Table 2)**.

DISCUSSION

In this study no EVAR stent-graft developed graft-related failures (type, I, III, IV, and V endoleaks) in an median 5-year postoperative follow-up. Only 2 types of EVAR stent-grafts in our study had postoperative complications associated with the stent-graft. The only postoperative complication after AAA EVAR reported in our study was endoleak and the 3 cases were type II endoleaks with a cumulative incidence of 6.7% (Aorfix (Lombard, Didcot, United Kingdom). Also, the Endurant stent-graft (Medtronic, Minneapolis, MN, United States) had a cumulative incidence of 2.9% and 5.8% (in 1 and 2 patients, respectively). Type II endoleaks are the most frequent type found after the AAA EVAR, with rates of 10% to 45% in the medical literature available. A total of 35% to 79.9% of all type II endoleaks resolve spontaneously, which is consistent to our findings. Also, type II endoleaks are patient-related (due to retrograde flows from an arterial branch excluded by the stent-graft like the inferior mesenteric, lumbar, intercostal, and accessory renal arteries), and not stent-graft-related per se. Also, type II endoleaks are less clinically relevant compared to the other types, and more variably detected and operated on[1,6,7,8].

The Registry of Endovascular Treatment of Abdominal Aortic Aneurysm and the European Collaborators on Stent-graft Techniques for Abdominal Aortic Aneurysm Repair Registry confirmed the safety and efficacy profiles of endovascular repair with a reported 30-day

FIGURE 2. EVAR devices used

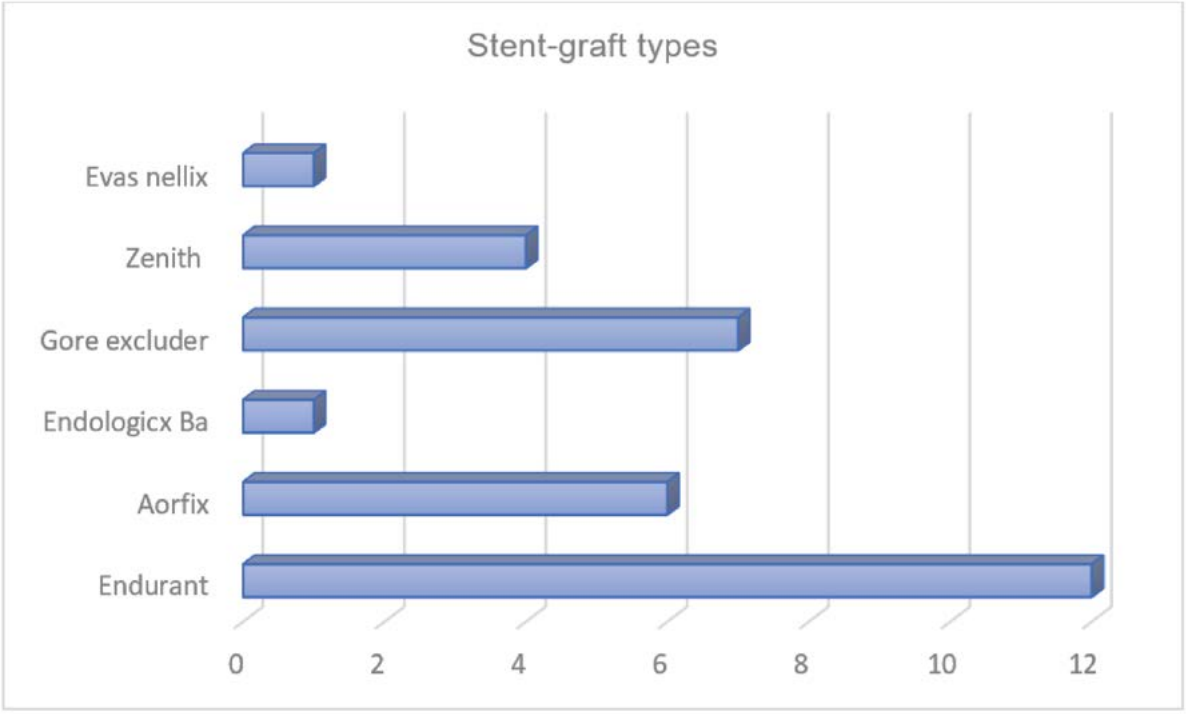

TABLE 2. Frequency of outcomes according to the different stent-grafts used

STENT-GRAFT TYPES	N = 34	ENDOLEAK TYPE	ENDOLEAK PERCENTAGE	REINTERVENTION	RUPTURE	P (CHI-SQUARE TEST)
Aorfix	6	II	(1) 2,9%	-	-	0,712
Endologicx Ba	1	-	-	-	-	-
Gore Excluder	9	-	-	-	-	-
Zenith	5	-	-	-	-	-
Endurant	12	II	(2) 5,8%	-	-	0,712
Evas Nellix	1	-	-	-	-	-
Total	**34**	**-**	**3**	**0**	**0**	**-**

procedural mortality rate of 2.9% and 3.1%, respectively. The 3 largest randomized clinical trials (RCT) that assessed the differences between EVAR and open surgery are the EVAR I, the DREAM, and the OVER. These RCT included patients with AAA > 5.5 cm that were eligible for open surgery, and also for EVAR that were randomly assigned to open repair or EVAR. The results of these studies concluded that EVAR is associated with a significantly lower 30-day mortality rate (EVAR I, 1.6% vs. 4.6%; DREAM, 1.2% vs. 4.6%; and OVER, 0.5% vs. 3.0%), and shorter intensive care unit (ICU) and hospital stays. Nevertheless, the survival advantage is lost at 2-year follow-up. This evidence is similar to the 30-day procedural mortality rate showed in our study of 1.42% (1 patient)[9-14].

A total of 10% of patients can require reintervention due to type I endoleaks seen on the 30-day imaging monitorization. Type I endoleaks occur at either the proximal (Ia) or distal (Ib) attachment sites and can be seen during the insertion of the initial stent-graft. Type III endoleaks are often due to 3 mechanisms: a defect within the graft material, a structural failure causing the separation or the components or due to inadequate overlapping. Type I and type III endoleaks indicate direct communication with the systemic blood flow, the aneurysmal sac and require immediate repair. The initial approach to repair type I endoleaks involves angioplasty of the damaged attachment site. The second-line option includes a bare-metal stent (large stent sizes with strong radial force) that can be placed over the attachment site. The third treatment strategy consists of inserting an overlapping stent-graft in the nonadherent portion of the stent-graft. The last endovascular treatment option is the deployment of a new stent-graft component across the defect or junctional separation followed by further angioplasty to remold the structural components of the stent-graft. However, type I endoleaks that occur at the proximal docking site can be more technically challenging because they originate distally to the takeoff of the renal arteries, and open repair can be required. Type IV endoleaks are due to the patients full anticoagulation with heparin perioperatively and are self-limited resolving as the patient's coagulation returns to normality. Type V endoleaks are classified as an enlarging aneurysmal sac without a visible endoleak generating endotension in the aneurysmal sac that can require EVAR reintervention or conversion to open repair. In this study no stent-graft developed type I, III, IV or V endoleaks or endovascular or open reintervention were needed[14,15].

Back in 2018, Kent et al.[1] conducted a systematic review and meta-regression to evaluate the safety of device registries for AAA EVAR. A total of 147 moderate quality papers involving 27 058 patients were included. Multiple outcomes were pooled. The estimated rate of overall endoleak (excluding type II) at 2 years was 5.7% +/- 0.6% compared to our series (0%). The pooled rate of reintervention was 11.1% +/- 0.7% at 2 years compared to our 0% rate of reintervention[1]. In our study there were no differences in pooled endoleak rates (excluding type II endoleaks) among different stent-grafts. In this study, expert consensus defined non-inferiority as better performance compared the worst performing stent-grafts (25%). The main outcome in the expert consensus was the cumulative rate of endoleaks (excluding type II) to evaluate the stent-graft safety profile. An ideal device registry should recruit, at least, 525 patients to demonstrate non-inferiority in the rate of endoleaks reported (excluding type II) while 492 patients are required to demonstrate non-inferiority in the stent-graft reintervention rate. Only 2 out of the 147 studies included in this systematic review achieved this minimum standard[1]. In our study, we found that 491 patients didn't show acceptable non-inferiority at 2 years for new or altered EVAR stent-graft. Almost all previous publications have captured lower patient numbers. With performance varying among the different devices, and with new devices being introduced regularly, there is an urgent need to capture higher quality long-term data on EVAR stent-grafts. In our study there was no

correlations between the aortic stent-graft type and the endoleaks ($P = .712$).

In the studies reviewed by Kent et al.[1] attrition rates were particularly high with a 29% pooled attrition rate at 1 year. In our study, the attrition rate was 35.7% (25 patients). The EVAR arms of RCTs, and even the EVAR 2 trial only had a maximum of 21% attrition rate at 1 year. The best way to avoid attrition is to improve poor follow-up in future registries. The other problem is that attrition will mask higher stent-graft failure rates compared to those found at 1 year[1]. The follow-up protocols in patients treated with AAA EVAR are vital to reduce complications. Also, it allows early detection and endovascular or open treatment of late postoperative complications. The better understanding of the clinical characteristics, stent-graft types, and the long-term progression of patients after AAA EVAR will facilitate that we can choose the best approach for this highly complex condition with unique features to reach the best possible outcomes[15].

Adherence to the manufacturer indications for use (IFU) produces better clinical results. In this study all stent-grafts were used according to the IFU. However, in the real clinical scenario's only 30% to 70% of all stent-grafts are actually inserted following the IFU anatomy. This gives more objectivity to our results[1,4,11,15].

Stent-grafts evolve continuously over the time to reduce their complications and improve their outcomes. However, length of follow-up remains a critical issue. Kent et al.[1] shows only a median follow-up from their 147 included studies of 24-month duration[1]. The creation and development of national and global registries is urgently required for EVAR stent-grafts including anatomical considerations to determine which is the ideal stent-graft design, configuration, and material for AAA EVAR procedures[16]. This study could be the beginning of this in our country and Latin America.

Study limitations

The findings of this study should be interpreted within the context of its design. It's a single center non-randomized study with a small sample. Results should, therefore, be viewed as hypothesis-generating to be able to conduct future studies. All data were retrospectively collected from the patients' electronic medical records and outcomes are based on what was registered. It was no possible to subdivide stent-graft by updates under these because the generation of updated stent-graft had very few data available. The strengths of this study are the detailed short and long-term clinical outcomes of AAA EVAR devices, the patients' follow up, and the adherence to the manufacturer IFU regarding the use of stent-grafts.

CONCLUSIONS

This study shows that the different stent-graft types used for AAA EVAR can be used in a safe and feasible way with good postoperative clinical outcomes in our population. Nevertheless, we must develop a national and Latin American Device Safety Registry for AAA EVAR to reach the minimum of patients required for a registry to show acceptable non-inferiority at 2 years for new or altered EVAR stent-grafts reported in the medica literature available. This is the first step for the creation of the Colombian/Latin American Device Safety Registry for AAA EVAR that will allow us to obtain statistical significative data to choose the best stent-graft options from the surgical market.

Conflicts of interest

The authors have no disclosures to declare.

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SCIENTIFIC LETTER

CARDIAC SYNOVIAL SARCOMA

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ABSTRACT

Cardiac tumors are divided into metastatic and primary origin. Primary cardiac tumors have a very low incidence (0.001-0.03%), of which only 25% are malignant and very aggressive. We present a clinical case of a 60-year-old female patient with dyspnea, palpitations and dizziness. Transthoracic echocardiogram showed a heterogeneous mass in the left atrium, so it was decided to resect it. The patient had a torpid postoperative course and dies 48 hours later.

Keywords: *Primary cardiac tumor, Cardiac malignancies, Synovial sarcoma*

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INTRODUCTION

Cardiac tumors are divided into metastatic and primary origin. Primary cardiac tumors have a very low incidence (0.001% to 0.03%), of which only 25 % are malignant and very aggressive.[1] Synovial sarcoma is more common in the soft tissue of limbs, but it is extremely rare to find it in the cardiac location.[2] Prognosis is poor, and survival sits at around 6 months, even with surgery.[3]

CASE REPORT

This is the case of a 60-year-old woman admitted to the coronary unit with progressive dyspnea FC III of 3-week evolution. Admission EKG sinus rhythm 85 L/m preserved P and PR. Narrow QRS, normal ST-segment, and isolated ventricular extrasystoles. Ultrasensitive troponin 22.8. Transthoracic echocardiogram: LV normal EF 60%-65%. Left atrium with severe dilatation, heterogeneous mass with areas of hypoechogenicity, mobile, with implantation base in the interatrial septum and occluded mitral valve 4.8 x 3 and 5.6 x 3.8 cm TEVI **(Figure 1)**. Moderate mitral stenosis. Normal RA and RV. Coronary angiography: normal coronary arteries. Given the patient's symptoms and the ECG characteristic of the mass added to frequency, diagnosis of suspected left atrium myxoma is achieved. At that moment it was not considered to perform NMR given how certain the diagnosis is, on one hand, and because she is a surgical patient either way according to the heart team.

The indication for surgery was more than clear, because left atrium tumors are considered emergencies, that is, the patient should be operated right after diagnosis is achieved.

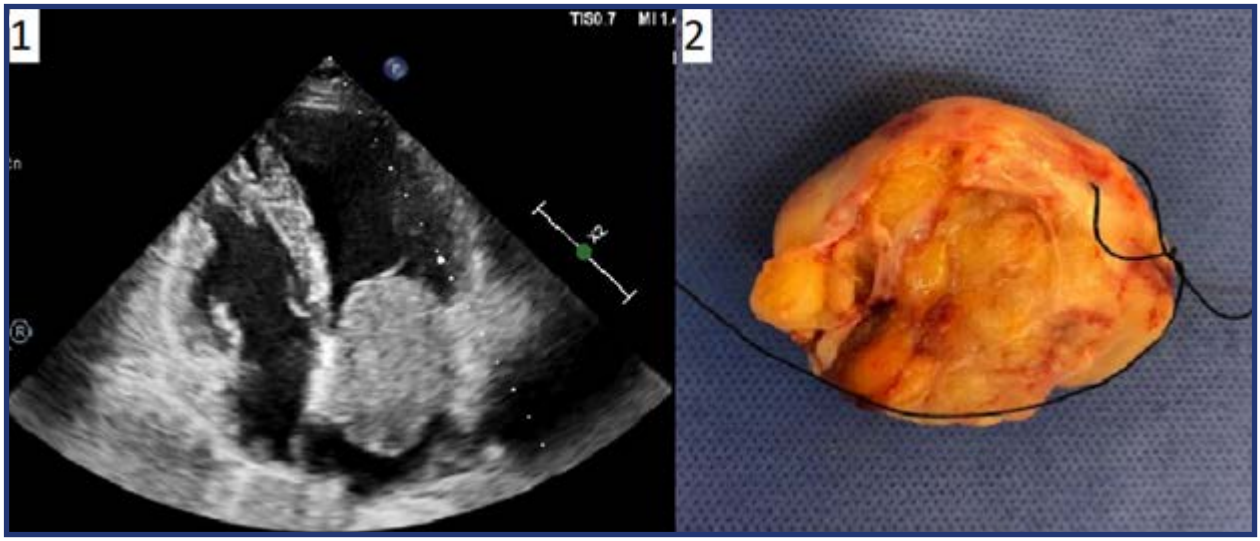
Surgery was performed through median sternotomy, cannulation of both cavas with Pacific cannulas and ascending aorta with a 22-Fr aortic cannula. After entering ECC, the RA is opened and both the right atrium and ventricle are examined and turn out to be tumor-free. Afterwards, the aorta is clamped and cardioplegia is infused (Bretschneider's solution).

The Guiraudon approach is attempted where it is confirmed, before opening the fossa ovalis, that there is not a less renitent area for the opening given the mass was pressing 100% of the fossa ovalis and the septum. It is decided to make an incision on the left atrial roof, distal to the arteria anastomotica auricularis magna 2 cm away from the left atrial appendage orifice with a 11 blade scalpel, going proximal, that is, towards the interatrial septum.

A large, whitish mass attached to the septum is revealed, which clearly did not have the appearance of a myxoma, but of a tumor that was infiltrating the fossa ovalis, the interatrial septum, the posterior mitral valve in P3, the medial commissure, 3 cm of the left atrial posterior wall and part of the left ventricular posterior wall. The tumor is resected, part of the left atrial posterior wall, the entire interatrial septum, and the mitral valve. Part of the LV wall and the mitral annulus were left with remains of the tumor since the myocardium was clearly infiltrated by the mass. This was followed by complete resection of the mass that obviously lacked oncologic validity, but did multiply OR mortality. Repairs of the resected area are made with a pericardial patch and mitral replacement using mechanical prosthesis No. 25 **(Figure 2)**. With clamp times of 61 minutes and 85 min of extracorporeal ECC is exited.

The patient evolves with severe SIRS characterized by massive clinical bleeding, and high requirement of vasopressors. Patient is re-examined due

FIGURE 1. 1. Echocardiographic image on TTE. Mass observed in the left atrium with invasion of mitral apparatus (Image from the Hospital Fernández Echocardiography Department, courtesy of Dr. Silvia Makhoul). **2.** a 5.3 x 4.3 x 2.5 cm nodular, solid mass, of lobulated external surface, yellowish brown in color can be seen here.



to clinical bleeding without any findings of surgical bleeding; she dies 48 hours after surgery. Anatomical pathology: malignant mesenchymal tumor that due to histopathological signs plus the immunohistochemical pattern reveal, in the first, place, synovial sarcoma. (Vimentin positive, BCL-2 positive, TLE1 positive, K167 > 30%).

CONCLUSION

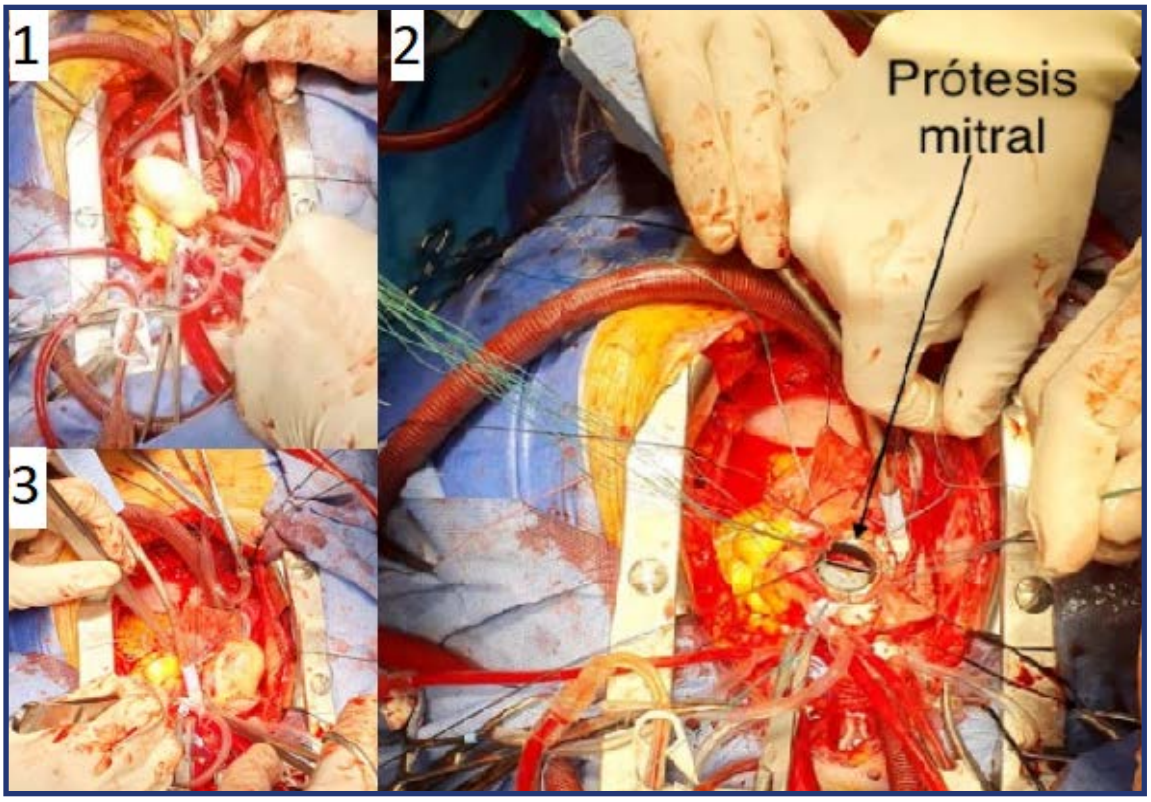
Although when a malignant cardiac tumor is suspected an MRI is suggested, in this case it was not performed, which was not an error per se given that the surgical indication would not have changed. Still, it would have helped estimate the postoperative outcome with greater probability.

What's more, cardiac sarcomas can be treated with preoperative neoadjuvant chemotherapy, although prognosis is still poor. They are highly aggressive and survival of < 1 year even with surgical treatment.[4]

In this case, in a patient with dyspnea at rest, indication of neoadjuvant chemotherapy would have been an illusion based on the clinical signs and not on reality.

Although the incidence rate is low, malignant cardiac tumors should be taken into account when an intracardiac mass is seen in the images, especially if no pedicle can be seen or if the tumor appears to be attached to the mitral valve. Its proper study improves the decision-making process.

FIGURE 2. Intraoperative images. **1** and **2**. Mass resection. **3.** Replacement of mechanical mitral valve.



Conflicts of interest
The authors have no disclosures to declare.

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SCIENTIFIC LETTER

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*

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INTRODUCTION

The presence of a floating thrombus in the aorta is a significant source of arterial thromboembolism.[1,2] 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.[3] 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.[4] Currently, there is a new treatment alternative—aortic endoprosthesis implantation—to suppress this embolic source, the so-called TEVAR (thoracic endovascular aneurysm repair) technique.[5] 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.

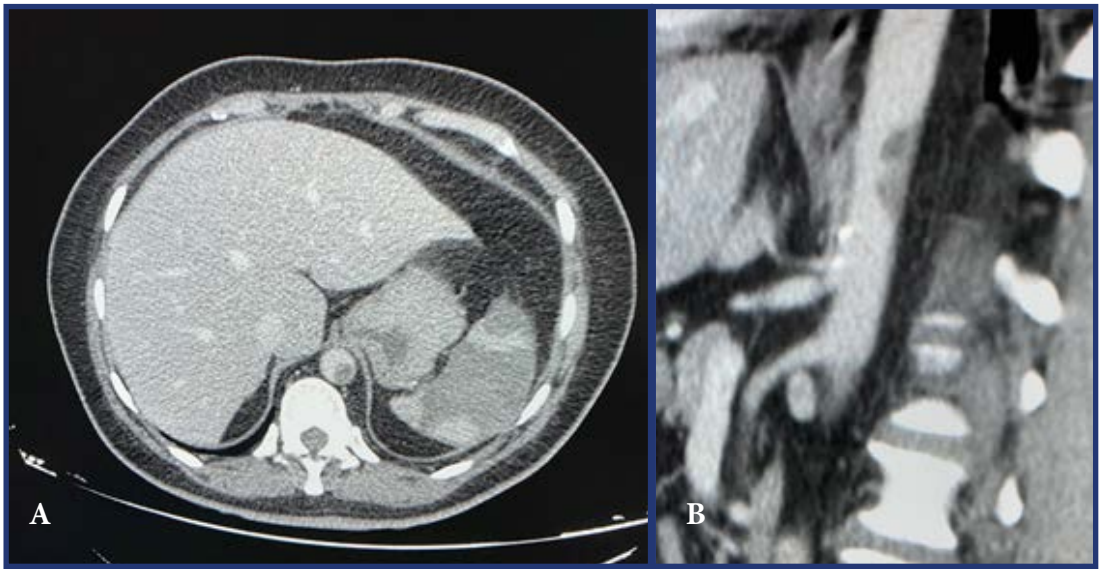
On day 2 it was decided to perform an endovascular procedure in a hybrid room under general anesthesia to cover the floating thrombus with a 26 mm x 100 mm CTAG thoracic endoprosthesis (Gore). The prosthesis was ascended via open right femoral access to land 1 cm above the celiac trunk emergency *(Figure 2a and Figure 2b)*. On day 24/10 the control angio-CT performed confirms the resolution of the floating trunk *(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.[5,6,7] In a not uncommon number of cases, the presence of a floating thrombus in the aorta like the embolic source is a common finding.[1,2] 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.[8,9] For decades, extended anticoagulant therapy has been the alternative to treat these floating thrombi with relatively good results.[10] Also, in very complex cases of failed therapy in regions

FIGURE 1. Floating thrombus in the aorta. **A.** Splenic infaction 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.[12,13] There is a wide review regarding the use of TEVAR in this clinical scenario to the detriment of other therapies available.[14]

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.

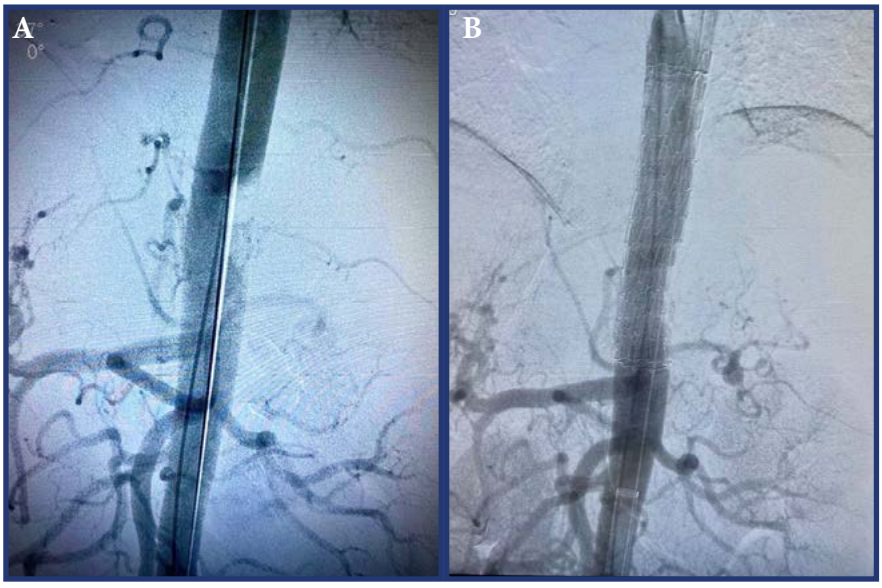
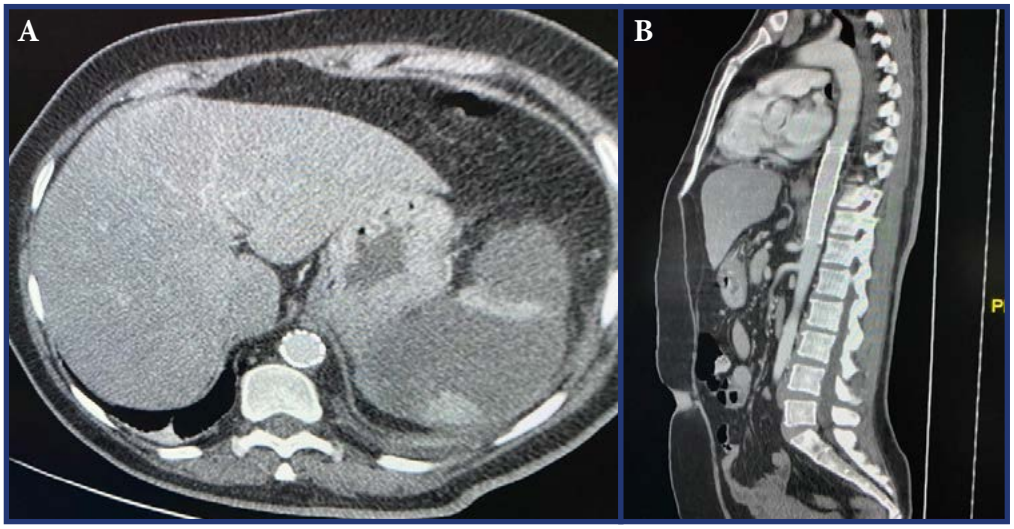


FIGURE 3. A and **B.** Control angio-CT showing the lack of floating thrombus in the aorta.



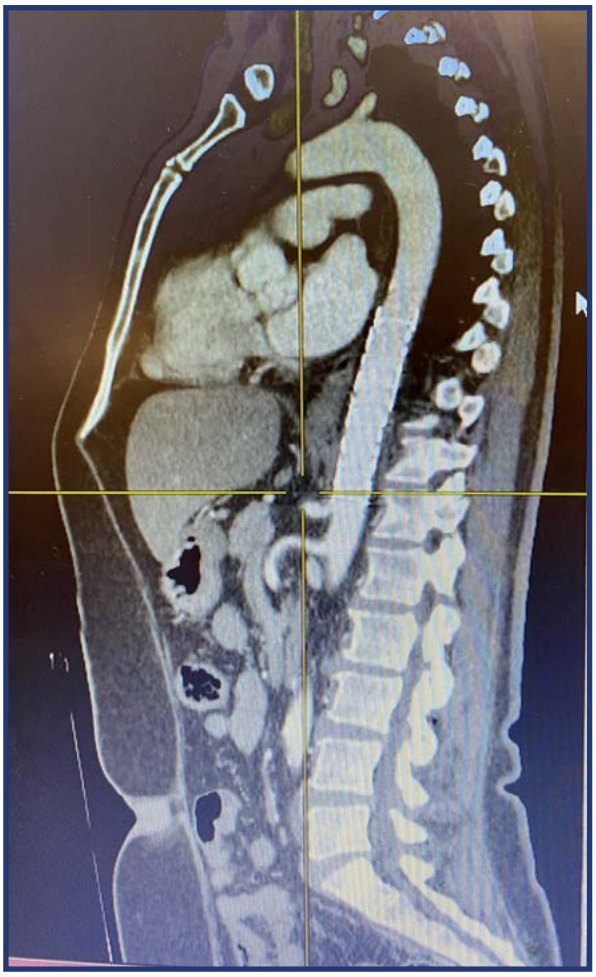


FIGURE 4. Endoprosthesis control follow-up at 1 year without presence of floating thrombus.

Conflicts of interest

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

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SELECTED ARTICLES

We hereby present comments on a selection of articles recently published in internationally acclaimed medical journals. We believe these papers deserve special attention due to the quality and importance of the conclusions reached by the studies. Our objective is to keep an open look on new aspects of scientific research or review articles that may, in turn, update aspects of our own medical specialty.

Also, the Editorial Committee will consider suggestions on recent articles that the readers think deserve to be commented in this section (revista@caccv.org.ar).

LEFT MAIN CORONARY ARTERY DISEASE: SURGERY VS PERCUTANEOUS TREATMENT

HUCKABY LV, SULTAN I, FERDINAD FD ET AL. MATCHED ANALYSIS OF SURGICAL VERSUS PERCUTANEOUS REVASCULARIZATION FOR LEFT MAIN CORONARY DISEASE

The Annals of Thoracic Surgery (April 26, 2021),
https://doi.org/10.1016/j.athoracsur.2021.04.043

Traditionally, the presence of significant left main coronary artery disease (LMCAD) (> 50%) is considered an indication for surgical revascularization. However, recent studies suggest that percutaneous treatment —percutaneous coronary intervention, PCI— can offer similar results both in the short- and long-term. Registries indicate that in recent years a growing number of patients with this disease are treated with PCI instead of CABG (coronary artery bypass grafting). However, compared to the cohorts of patients from the NOBLE and EXCEL studies, real-world patients treated with PCI are significantly older and have more comorbidities compared to those treated with CABG. Huckaby LV et al., from the Unit of Cardiac Surgery at Pittsburgh University School of Medicine, Pittsburg, PA United States compared the results from their center in patients treated from 2010 through 2018 by applying a matching algorithm —a greedy propensity-matching technique— to create balanced groups and then compare the real-world results and study the 5-year mortality rate and the rate of cardiac and cerebrovascular events.

All adult patients with LMCAD treated throughout this period with either one of the 2 techniques available were included in the study. A total of 1091 patients were identified (CABG, 898; PCI, 193); the application of the algorithm generated 2 separate groups with similar characteristics (CABG, 215; PCI, 134). The result analysis suggested that the overall mortality rate at 30 days, and 1 and 5 years was higher in the PCI group (at 1 year: 77.61% vs 88.37%; at 5 years: 48.77% vs 75.62%). The rate of cardiac and cerebrovascular at 5 years was also higher in the PCI group (64.93% vs 32.56%, $P < .001$). The authors proved that in the PCI group the rate of myocardial infarction was higher (19.40% vs 7.44%, $P = .001$), as well as the need for reintervention (26.12% vs 7.91%, $P < .001$) at 5 years. The statistical adjustments confirmed these results at 5 years (a lower mortality rate with CABG, risk ratio, 0.40, $P < .001$, and a lower rate of cardiac and cerebrovascular events, 0.37, $P < .001$). Authors want to make clear that no statistically significant differences were seen in the rates of strokes reported in either one of the 2 cohorts, which is why this last difference corresponds to cardiac events only (infarctions and need for revascularization).

The inter-group study results are similar to those of patients from this center, which means that there are substantial advantages in both survival and event occurrence in patients with LMCAD treated with CABG. Nonetheless, results should be double checked in the corresponding prospective studies.

ANALYSIS OF THE EVOLUTION OF PERSISTENT TYPE 2 ENDOLEAKS

SEIKE Y, MATSUDA H, SHIMIZU S ET AL. NATIONWIDE ANALYSIS OF PERSISTENT TYPE II ENDOLEAK AND LATE OUTCOMES OF ENDOVASCULAR ABDOMINAL AORTIC ANEURYSM REPAIR IN JAPAN: A PROPENSITY-MATCHED ANALYSIS

Circulation. 2022;145:1056-1066.
https://doi.org/10.1161/CIRCULATIONAHA.121.056581

Technology to perform endovascular aneurysm repairs (EVAR) procedures is well established. It has lower procedural mortality and mortality rates compared to open surgery. However, the authors claim that these results don't hold up any longer than 2 years due to the need for reinterventions due to endoleaks. There is consensus that type I and type III endoleaks are surgery eligible. However, there is not consensus on the clinical significance of persistent type II endoleaks (pT2EL), which are the most common complication associated with EVAR (incidence rate between 3.8% and 45%). In addition, in most cases, they are considered benign complications. The Japanese Committee for Stent-graft Management was established back in 2006 to prevent the inadequate use of stent-grafts. Since 2006 all EVARs performed in Japan to this date have been registered. Seike et al.—members of this committee—analyzed the results from this registry to assess the importance of pT2EL and the risk of adverse events in these patients. The authors reviewed the past medical histories of 17 099 patients under 75 years treated with EVAR due to abdominal aortic aneurysm from 2006 through 2015. Patients were divided into 2 groups based on the presence or absence of pT2EL. Out of the overall number of patients, 4957 (29.0%) had pT2EL. Also, in this group, age was significantly older, and there were fewer males. Similarly, these patients were found to be more prone to hypertension and chronic kidney disease, but less susceptible to respiratory disorders.

Afterwards, 2 matched groups were created to adjust for the corresponding differences and compare disease progression and the occurrence of adverse events. This analysis confirmed the higher mortality rate of the pT2EL group due to deaths associated with the aneurysm (pT2EL, 1.0% vs 0.2% in patients without type II endoleaks); the rupture was confirmed in 0.8% of the cases with pT2EL compared to 01% of the patients from the control group. Also, significant differences were found in the enlargement of the aneurysm sac > 5 mm (27.4% in the pT2EL group vs 2.7%), and in the need for reintervention (14.9% vs 0.7%, respectively).

The enlargement of the aneurysm sac was associated with age, the diameter of the proximal neck, and chronic kidney disease as independent positive predictors. Also, with masculine sex as a negative predictor.

Results would be indicative that persistent type II endoleaks are not benign. As a matter of fact, in certain patients, procedures of visceral branch embolization would be beneficial. However, the capacity of this type of procedures to reduce reinterventions or the rate of rupture should be confirmed in large scale prospective studies or in randomized clinical trials. In conclusion, they believe that in the case of female elderly patients with a proximal neck of a large diameter and chronic kidney disease, all of them non-modifiable factors associated with a higher risk of long-term survival, open surgery would be advised.

CACCV PRESIDENT´S LETTER

FAREWELL

Dear friends colleagues,

At the end of my term as president of the Argentine College of Cardiovascular Surgeons, I would like to thank all our national and international colleagues who have joined us and given us their support to keep our medical training going.

The last two years have been difficult for all scientific meetings giving us little or no opportunity for personal interaction. We had to re-evaluate new educational and training alternatives. There is no doubt that virtual meetings changed our perspective and way of life. However, it was your support through congresses, symposia, masterclasses or webinars that allowed us to keep on learning and sharing our experiences.

I believe this is the way to keep working together and reach consensus on clinical guidelines and decision-making processes on our routine daily clinical practice. I invite you to follow this path and support our CACCV.

Looking forward to seeing you soon!

Sincerely,

Javier Ferrari Ayarragaray, MD
CACCV President

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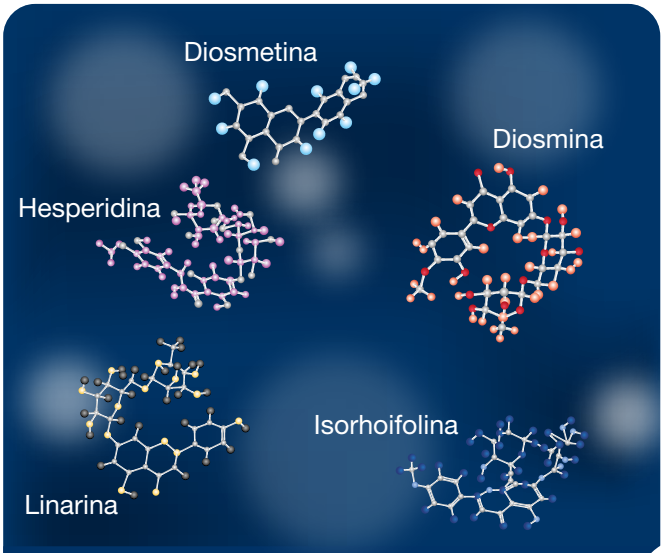

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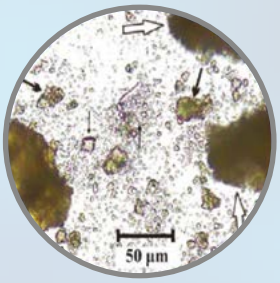

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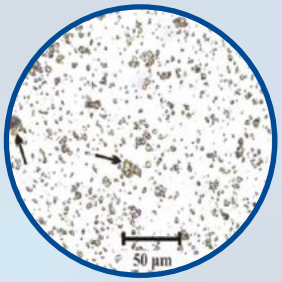

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*Estudio realizado por el Dpto. de Farmacología Clínica y Farmacia Clínica, Universidad Nacional de Farmacia, Jarkov, Ucrania comparando dos productos similares a Daflon en dicho país.

DAFLON 1000 mg comprimidos recubiertos y DAFLON 1000 mg Suspensión Oral
Composición Daflon 1000 mg comprimidos recubiertos: Cada comprimido recubierto de Daflon 1000 mg contiene: Fracción flavonoide purificada y micronizada: 1000 mg (Correspondiendo a: Diosmina 90 %: 900 mg y Flavonoides expresados en hesperidina 10%: 100 mg). **Excipientes**: Carboximetilalmidón sódico, celulosa microcristalina, gelatina, estearato de magnesio, talco. **Recubrimiento:** dióxido de titanio (E 171), glicerol, laurilsulfato de sodio, macrogol 6000, hipromelosa, óxido de hierro amarillo (E 172), óxido de hierro rojo (E 172), estearato de magnesio. **Composición DAFLON 1000 mg Suspensión Oral:** Cada sachet de 10 ml de Daflon 1000 mg contiene: Fracción flavonoide purificada micronizada: 1000 mg (Correspondiendo a: Diosmina 90%: 900 mg y Flavonoides expresados en Hesperidina 10%: 100 mg). **Excipientes:** Malitol en polvo, goma xantan, benzoato de sodio, aromatizante de naranja, ácido cítrico, agua purificada. **Acción terapéutica:** Vasculoprotector. **Indicaciones:** Tratamiento de las manifestaciones de la insuficiencia venosa crónica de los miembros inferiores, funcional y orgánica. Sensación de pesadez, dolor, calambres nocturnos. Tratamiento de los signos funcionales relacionados con la crisis hemorroidal. Contraindicaciones: Hipersensibilidad a las sustancias activas o a alguno de los excipientes. **Advertencias y precauciones de empleo:** La administración de este producto no imposibilita el tratamiento específico de otras enfermedades anales. Si los síntomas no disminuyen rápidamente, debe practicarse un examen proctológico y el tratamiento debe ser revisado. Embarazo: No hay datos o estos son limitados relativos al uso de fracción flavonoide purificada micronizada en mujeres embarazadas. Los estudios realizados en animales no han mostrado toxicidad para la reproducción. Como medida de precaución, es preferible evitar el uso de Daflon durante el embarazo. Lactancia: Se desconoce si el principio activo/los metabolitos se excretan en la leche materna. No se puede excluir el riesgo en recién nacidos/niños. Se debe decidir si es necesario interrumpir la lactancia o interrumpir el tratamiento tras consideran el beneficio de la lactancia para el niño y el beneficio del tratamiento para la madre. **Reacciones adversas:** Trastornos del sistema nervioso: Raras: mareos, dolor de cabeza, malestar. Trastornos gastrointestinales: Frecuentes: diarrea, dispepsia, náuseas, vómitos. Poco frecuentes: colitis. Frecuencia no conocida: dolor abdominal. Trastornos de la piel y del tejido subcutáneos: Raras: erupción cutánea, prurito, urticaria. Frecuencia no conocida: edema aislado de la cara, labios y párpados. Excepcionalmente, edema de Quincke. P**osología y forma de administración:** Posología usual: un comprimido recubierto/ sachet por día preferiblemente por la mañana. Crisis hemorroidal: 3 comprimidos recubiertos/ sachets al día durante los primeros cuatro días y después 2 comprimidos recubiertos/sachets al día durante tres días. La ranura sirve únicamente para fraccionar y facilitar la deglución pero no para dividir en dosis iguales. MAMS Cert Nº 40.987. Daflon 1000 comprimidos: Elaborado en Les Laboratoires Servier Industrie, Gidy, Francia. Daflon 100 mg suspensión oral: Elaborado en 1-3 allée de la Neste - COLOMIERS Francia. Importado por: SERVIER ARGENTINA S.A. Av. Castañares 3222 (C1406IHS) C.A.B.A. - Tel.: 0800-777-SERVIER (7378437) Directora Técnica: Nayla D. Sabbatella - Farmacéutica. Versión: Enero/2020

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