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COVER ARTWORK
Alejandro Fogazzi

"Paisaje de Córdoba, 2002"

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EDITORIAL

THE FUTURE OF CARDIAC SURGERY IN ARGENTINA

Although there are cardiac surgery databases in different countries, Argentina has no national records that may serve to know and plan this practice in the context of the healthcare activities of the country. The only data available dates back to 2007, when we estimate the overall number of cardiac surgeries at 374 per million adults per year, assuming some 224 coronary surgeries per million.[1] Unfortunately, we have no new information following this study. According to the records of *The Society for Cardiothoracic Surgery in Great Britain and Ireland*, en 2013, 760 hundred cardiac surgeries per million adult inhabitants were performed in the UK; this figure included 343 were coronary surgeries, 160 were aortic valve replacements, either alone or in combination, and 66 mitral valve surgery per million adults.[2] The comparison with Argentina reveals that the local rate of surgery use is less than half than that of the UK, and approximately two thirds in the case of coronary surgery. The same British record has observed that, between 2004 and 2013, the number of coronary surgeries fell 24%, while aortic valve surgery increased 37% and mitral valve surgery, 26%, with an overall increase of cardiac surgeries of only 3% for the same period, according to the change in total population (4 million inhabitants more). In the US, in turn, the number of coronary surgeries fell 31% between 1996 and 2006, while the number of mitral valve surgeries rose by 26% in the same decade.[3] In another US record, the trend for the number of coronary surgeries per year and million adults fell from 1,742 to 1,081 between 2001 and 2008, while the number of coronary angioplasties basically stood the same (from 3,827 to 3,667).[4]

In a press release of 2012, the *Argentine College of Interventional Cardioangiologists* (CACI) reported that the overall rate of use of coronary angioplasty in Argentina was of 942 angioplasties per million inhabitants, and that this proportion was fairly below that observed in developed countries. As a matter of fact, and with some local variations, the rate of use of angioplasty is reported per million

adults rather than inhabitants. Thus calculated, CACI's rate would be modified to 1,206 angioplasties per million adults, surpassing data from Canada, New Zealand and Portugal, and very close to that of Italy and Spain (about 1,300 procedures per million).[5] With these rates, CACI still urges to make a greater use of angioplasty in Argentina, despite the fact that the ratio between angioplasties and coronary surgeries is of about 6:1 versus 5.2:1 in the UK, and 3.4:1 in the US.[4-5] In any case, a greater use of angioplasty will entail a parallel increase in the number of coronary surgeries in order to maintain the current ratio between both procedures. In the worst case scenario, we could say that angioplasty has already reached a reasonable rate of use in Argentina, and that surgery has still ample headroom to grow in volume, with an orderly access of population to health resources. As compared with other countries, the over-proportional rate of use in angioplasty in Argentina (6 to 1) is due to several reasons. One of the main reasons is an incorrect use of repeated angioplasties in the same patient, and an inadequate indication of angioplasty in patients with multiple-vessel disease, left main disease, or diabetes.[6] In some hospital centers, the preference for angioplasty over surgery is justified on the basis of eventual poor surgical results, thus forcing an incorrect medical indication. Although Argentina has outstanding surgeons and surgical centers, the quality of others should be carefully analyzed. However, the overall rate of hospital mortality observed in the study CONAREC XVI for all types of cardiac surgery in 2,553 patients from 49 Argentine centers was of 7.7% versus 4.3% for coronary surgery.[7] In favor of these results independently audited by cardiologists, it should be noted that the mortality rate expected in patients operated in the UK in 2013 was of 7.5% and of 4.4% in the case of those undergoing coronary surgery[2].

Regardless of any strategy favoring one procedure or the other, the medical supply must provide actions not harmful, but rather beneficial for patients, and respecting their opinion. However,

it should be reminded that this opinion largely depends on the responsible information we ourselves provide to them, and on the background offered so that patients may analyze the usefulness of each procedure and assess their real risks and benefits. ■

R.A.B.

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ORIGINAL ARTICLE

INITIAL EXPERIENCE IN THE TREATMENT OF ACUTE AORTIC SYNDROME OF THE DESCENDING AORTA

ABSTRACT

Introduction: It is a process of the aortic wall which includes aortic dissection, intramural hematoma and penetrating ulcer. It should be noted that, while traumatic aortic transection is considered part of the syndrome, it is not included here since traumas are not addressed.

Objetive: To conduct a survey of demographic characteristics, diagnosis and treatment in our working group.

Materials and methods: Age, gender, comorbidities, clinical picture and laboratory tests upon admittance, imaging diagnosis methods, treatment, and length of hospital stay were evaluated.

Results: Seven patients presented type B aortic dissection; two patients had intramural hematomas: one with an aortic ulcer and another one with type B chronic dissection; and one presented symptomatic double thoracic aorta ulcer associated with abdominal aortic aneurysm. Eighty percent of patients were male with an average age of 64.7 years. The average length of hospital stay was 19.8 days. Pain was present in nine patients. Computed angiotomography was performed in all patients. All patients were treated by means of aortic endoprosthesis.

Conclusions: 1- Acute aortic syndrome is a high mortality disease whose diagnosis can be reached quickly through basic evaluation with imaging support. 2- We believe that CAT is the method that provides more precise details about morphological and diagnostic characteristics and for measurements for endovascular treatment. 3- Endovascular treatment is the most effective option that reduces mortality, hospital stay and complications.

Keywords: Aortic pathology, High complexity, Acute aortic syndrome.

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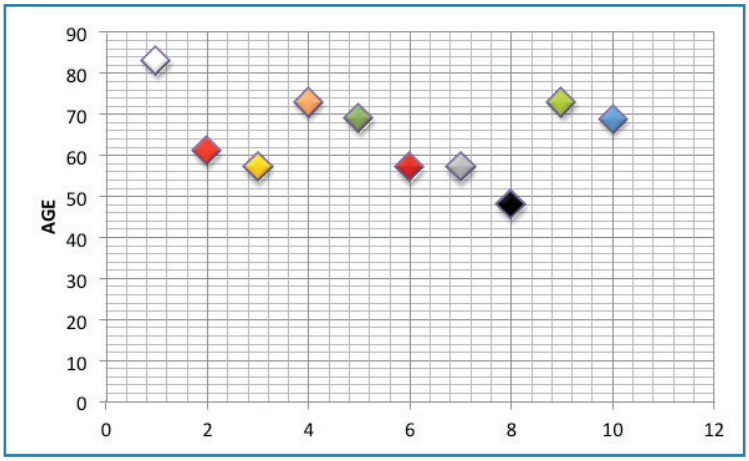

Figure 1. Age range of patients

INTRODUCTION

Acute aortic syndrome (AAS) is defined by an acute process of the aortic wall that develops with the weakening of the middle layer, involving a risk of aortic rupture and other complications. It consists of three entities: aortic dissection, intramural hematoma and penetrating ulcer. Its incidence is about 30 cases every one million inhabitants per year, out of which 80% are dissections, 15% intramural hematomas and 5% penetrating ulcers. It should be mentioned that traumatic aortic transection could be considered part of it but is not included in this paper since our center is not a trauma reference center. The ascending aorta is affected in 60% of cases (type A) and not affected in 40% (type B). It mainly affects men (70%) with an average age of 60 years. In the last decade, advances in imaging techniques have facilitated AAS diagnosis significantly and have provided fundamental information to learn about the evolution of this disease. On the other hand, the development of new surgical techniques and the appearance of endovascular treatment have changed the therapeutic strategy and, probably, the prognosis.

MATERIALS AND METHODS

Through the search and retrieval of information from the computer database of medical records of a high-complexity health center and the image digitilization system (DICOM), the medical records of 10 patients have been analyzed retrospectively in a period from October 2009 to June 2015. Data evaluated were age, gender, comorbidities, clinical picture and laboratory tests upon admittance, imaging diagnosis methods, treatment used, and length of hospital stay. They were entered and analyzed in an Excel table, including all those cases in which a diagnosis was reached based on clinical data collected from medical records or on the findings of imaging studies of aortic dissections, intramural hematomas and penetrating ulcers of the aortic wall. The Stanford (Svenson) classification was used considering that these entities may evolve into dissections, becoming real dissection subtypes. Qualitative variables were expressed as percentages and quantitative variables were stated as averages and medians.

RESULTS

Ten patients who may be included as AAS carriers were registered. Out of all the patients, seven (70%) presented Stanford type B aortic dissection associated or not with aneurysms of the same segment, two had intramural hematomas (one with an aortic ulcer and another one with type B chronic dissection), and one presented pure double thoracic aorta ulcer associated with abdominal aortic aneurysm.

Eighty percent of patients (n = 8) were male and two (2) were female, with an average age of 64.7 years (between 61 and 83 years old) and a median of 65 years (Figure 1). The average length of hospital stay was 19.8 days (between 5 and 60 days) and the median was 16.5 days. All patients had comorbidities, with hypertension present in 100% of patients (Table 1).

COMORBIDITIES	NUMBER OF PATIENTS	PERCENTAGE (%)
AHT	10	100
Sedentary behavior	9	90
Former smokers	9	90
Obesity	4	40
Coronary disease	2	20
RA	2	20
Hypothyroidism	1	10
Bronchial pathology / Spontaneous pneumothorax	1	10
Diabetes	1	10
BPH	1	10
Hiatal hernia	1	10

References: AHT = Arterial hypertension; RA = rheumatoid arthritis; BPH = benign prostatic hyperplasia

Table 1. Associated comorbidities

Pain was present in nine (9) patients (90%). It should be noted that one patient did not experience pain because acute aortic syndrome was found in a context of control of spontaneous pneumothorax. Fifty percent (n = 5) referred to highly intense, excruciating pain located in the precordial region, 30% (n = 3) located pain in the interscapular region and one (10%) located it in the abdomen. Table 2 shows the other symptoms and signs mentioned.

SIGNS AND SYMPTOMS	NUMBER OF PATIENTS	AVERAGE
Dyspnea	3	30%
Diarrhea	2	20%
Orthostatic hypotension	1	10%
Absent/Decreased pulse	2	20%

Table 2. Other signs and symptoms associated with acute aortic syndrome.

Two patients presented fever: one upon admittance and the other one during the postoperative period, whose picture got complicated due to a surgical wound abscess. A patient was admitted with a picture of hypotension, functional class II-III dyspnea and pulse asymmetry (absence of right dorsalis pedis pulse). In our series, two patients were admitted with hypertension and were referred to the coronary care unit for endovenous management of hypertension.

Computed tomography (CT) with intravenous contrast was performed in all patients as an imaging diagnosis method, and the second method most used was transesophageal echocardiography (TEE), which allowed to define the entry tears of dissections and the intramural hematoma. Two patients underwent angiographies – one of them to rule out postoperative complications, finding no evidence of them. An aortogram was performed in the context of a coronary cineangiography, in which access through the femoral artery failed and it was accessed via the right radial artery. One patient underwent transthoracic Doppler echocardiography to determine the cause of heart failure, finding pericardial effusion. The use of nuclear magnetic resonance (NMR) was registered for a patient due to diagnostic doubt. Two patients required soft-tissue ultrasound for

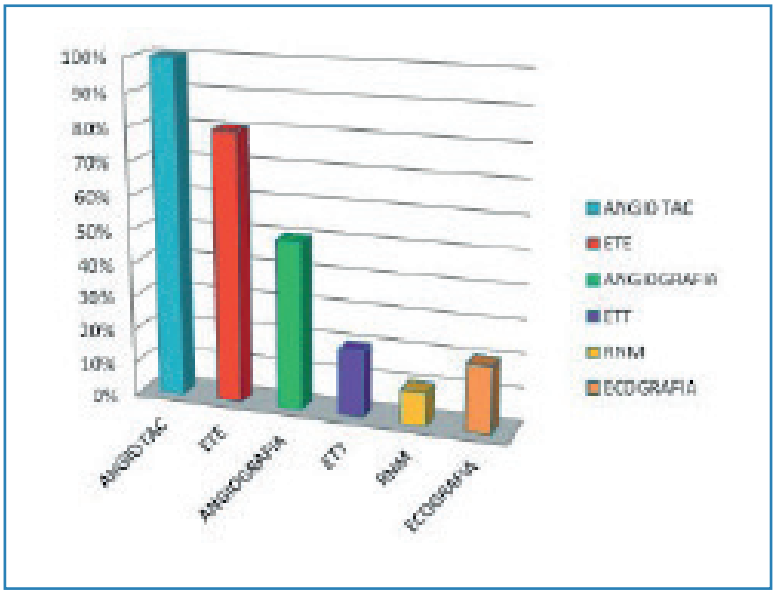

Figure 2. Percentage of studies conducted.

diagnosis of collection in surgical site and a patient needed cerebral NMR because of the development of a transient ischemic attack during hospital stay (Figure 2).

Ninety percent of patients were treated with aortic endoprostheses, either thoracic or abdominal, using endovascular techniques in a hybrid operating room. Debranching from the right carotid artery to the left carotid artery + left subclavian-carotid was performed in one patient due to the presence of pathology in zone 1-2, with subsequent retrograde thoracic aorta stenting. The intentional coverage of the left subclavian artery was performed in another patient, who lost strength in the left upper limb as a postoperative complication and recovered it with physiotherapy and the oral administration of cilostazol.

Mortality was 25% (n = 1). Death occurred early in the postoperative period due to a retrograde type A dissection with involvement of the right sinus of Valsalva. This patient was the only one who was admitted with a picture of hypotension/shock and pulse asymmetry. A wound abscess at the femoral artery dissection site was registered as a postoperative complication, and another complication not associated with the surgery occurred in a context of drug reaction to an antibiotic.

DISCUSSION

From the first descriptions of this disease made by Nicholls and Morgagni, through the first surgical intervention performed by Gurin in 1935 and the open repair of a type B dissection carried out by De Bakey and Cooley in 1953, to the advent of endovascular treatment and the use of this technique by Dake for the treatment of aortic dissection in 1999, this pathology has aroused the particular interest of the different research groups. However, it remains a disease with a high mortality rate, even with the implementation of new imaging diagnosis techniques.

When comparing our records, it is observed that patients showed an older age average (64.7 years) as compared to others: 58 in RADAR, 60.9 in IRAD and 63.1 in RESA. The prevailing gender was male, and the most associated pathology was hypertension, with pain present as a cardinal symptom. In our records, the patient admitted with a picture of hypovolemic shock, 83 years of age and

pulse asymmetry was the one who died early in the postoperative period due to a retrograde type A dissection; these are precisely the variables listed as predictors of hospital mortality in the bibliography consulted. Computed tomography was the imaging diagnosis method used in 100% of cases to establish a diagnosis and also provided the means to make measurements for the selection of the type of endoprosthesis. Transesophageal echocardiography (TEE) and transthoracic echocardiography (TTE) allowed to determine the entry tears, intramural hematoma and pericardial effusion, which makes them important complements for decision making.

The initial treatment was medical. Most patients were admitted to the coronary care unit (CCU) for pain management, reduction/stabilization of blood pressure, maintaining an approximate mean of 80, and continuous cardiac monitoring. Pain was managed with NSAIDs and the use of opiates was not required. NTG with continuous infusion pump was used in the case of hypertension and inotropes were used for hypovolemic shock. Only one patient was not admitted to CCU, since he was admitted for the performance of CT for postoperative control of pleural drainage due to spontaneous pneumothorax, with no pain and hemodynamically stable, with daily interdisciplinary monitoring by the clinical medicine service and the peripheral vascular surgery service.

The total number of patients underwent surgery with 100% intraoperative success. In one patient, an arteriography was performed via the radial artery the day after surgery due to diagnostic doubt in the face of hematocrit decrease and abdominal pain, which could not be defined with abdominal CT. All patients were treated by means of endovascular techniques with aortic endoprosthesis. No patients required conversion or had renal function alteration early or late in the postoperative period.

CONCLUSIONS

- Considering that acute aortic syndrome is defined as a set of pathologies with high mortality, it is possible to reach the diagnosis quickly and accurately through basic evaluation with appropriate imaging support, allowing to establish a therapeutic option without delaying intervention.

- We believe that tomography is one of the imaging methods that provides more precise details about the morphological characteristics, allowing not only to reach a diagnosis but also to take decisions for a possible endovascular treatment.

- In our working group, we believe that endovascular treatment is an effective option that reduces mortality, hospital stay and complications within a group of clinically complex patients. ■

We believe that endovascular treatment is an effective option that reduces mortality, hospital stay and complications within a group of clinically complex patients.

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BRIEF COMMUNICATION

SUBCLAVIAN STEAL SYNDROME. ENDOVASCULAR AND OPEN MANAGEMENT. REPORT OF 2 CASES

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ABSTRACT
The Subclavian Steal Syndrome is caused by stenosis or occlusion of the subclavian artery, which generates reversal flow in the vertebral artery in order to perfuse the ischemic upper limb. Most of the patients are asymptomatic, others consult for vertigo, syncope, transitory ischemic attacks in the vertebrobasilar territory, or ischemic symptoms in the upper limb. At physical examination there is a significant difference in blood pressure between both arms, and pulse deficits in the affected limb. The diagnosis is confirmed by plethysmography and arterial duplex scan. Symptomatic patients should be treated either by surgical or endovascular approach. Percutaneous balloon angioplasty and stenting is the procedure of choice when there is suitable anatomy. Surgical treatment may be accomplished by carotid-subclavian bypass or carotid transposition in cases of large calcified lesions with risk of embolization. We present 2 cases of subclavian steal syndrome managed by endovascular and surgical approach.

Keywords: Subclavian steal syndrome, subclavian artery stenosis.

INTRODUCTION

The term "subclavian steal" refers to a phenomenon of reverse flow in the vertebral artery secondary to a hemodynamically significant stenosis or an occlusion of the ipsilateral subclavian artery.[1,2] In most cases, the occlusion of the subclavian artery is asymptomatic and does not require invasive studies or treatment. A prevalence between 0.6% - 6% of the population is estimated. The subclavian steal syndrome involves the presence of symptoms caused by arterial insufficiency in the brain (mainly, vertebrobasilar insufficiency), in the upper limb, which is irrigated by the subclavian artery,[1,2] or even in the heart if part of the coronary circulation is supplied by an internal mammary artery bypass.[1]

Below, the cases of two patients with upper limb and vertebrobasilar ischemic symptoms associated with stenosis and subclavian steal are

presented. Also, two different management strategies are shown revealing the treatment options for this syndrome with their specific indications.

Case 1: 77-year-old female patient, hypertensive, with coronary disease, clinical picture of 3-month right fronto-occipital headache radiating to the neck and shoulder on the same side associated with phosphenes, dizziness and gait instability, in addition to paresthesias and pain in the right upper limb. During physical examination, she presented right hemianopsia during the exercise and physical activity of the ipsilateral arm, suggesting subclavian steal. A duplex ultrasound and an angiotomography of the neck were conducted showing calcified and soft plaques with 70% significant stenosis of the right arterial brachiocephalic trunk. (Figure 1.) It was decided to perform a percutaneous endovascular procedure. An aortogram was conducted with insertion of a catheter into the right subclavian artery, revealing short stenosis of approximately 80%; continuing, a 10 mm x 30 mm stent was found in the brachiocephalic trunk, with proper recovery of distal flow at the obstruction. (Figure 2.) Her dizziness and visual and upper limb ischemic symptoms improved and she was released from hospital 2 days later with dual antiplatelet therapy and subsequent satisfactory evolution.

Case 2: 80-year-old male patient, diabetic, with coronary disease, who in the last 6 months presented syncope and several cerebral transient ischemic attacks associated with dizziness. At physical examination, an inter-arm blood pressure difference of 30 mm Hg was found, with no other remarkable findings. A duplex ultrasound of carotid vessels was conducted showing a large calcified atherosclerotic plaque at the origin of the right subclavian artery producing significant stenosis of more than 90%, which was confirmed by an angiotomography of the neck. (Figure 3.)

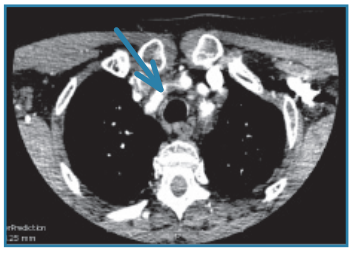

Figure 1. Angiotomografía cervical que muestra estenosis proximal del 70% del tronco braquiocefálico arterial.

Figure 2. Aortogram showing prosthesis in brachiocephalic trunk with proper subsequent distal flow.

It was considered that, given the anatomical characteristics, as it was a large calcified plaque, the best management strategy to treat this patient would be the surgical approach. A subclavian-carotid bypass with Dacron graft was performed without complications. (Figure 4.) With satisfactory clinical evolution, he was released from hospital 3 days later. Since then, his symptoms have improved.

DISCUSSION AND CONCLUSIONS

Atherosclerosis is the most common cause of the subclavian steal syndrome, which is more frequent on the left side possibly due to a more acute angle at the origin of the left subclavian artery, leading to atherosclerosis by an increased turbulent flow,[2] in addition to the known cardiovascular risk factors, including hypertension, diabetes, hypercholesterolemia, smoking.[3]

Other less common causes of subclavian artery stenosis are: Takayasu arteritis, compression of the artery at the thoracic outlet, post-radiotherapy fibrosis,[4] after the surgical correction of aortic coarctation,

tetralogy of Fallot (with Blalock-Taussig-type anastomosis),[1] and congenital anomalies such as the right aortic arch with isolation of the left subclavian artery.[1,2]

The syndrome occurs when a significant subclavian artery stenosis compromises the perfusion of the target organs mentioned above. As the degree of obstruction increases, the distal pressure to the stenosis site will fall at some point below the pressure transmitted by the contralateral vertebral artery (not compromised) via the basilar artery or the carotid artery through the circle of Willis.[1] The result of this pressure gradient favors a reverse blood flow in the ipsilateral vertebral artery in distal direction to the subclavian stenosis. A coronary-subclavian steal phenomenon has also been described in patients that previously underwent myocardial revascularization surgery, using the internal mammary artery (IMA).[1,2]

In about 80% of patients, the occlusive disease of the subclavian artery is asymptomatic and incidentally found when a discrepancy between the blood pressure of both arms is observed or when a duplex ultrasound is conducted in patients being tested for a coronary or carotid disease.[2] Symptomatic patients may present ipsilateral limb ischemia: claudication, fatigue, coldness, paresthesias, pain at rest.4 This occurs in one third of patients, whereas ischemic and trophic changes are rare.[2,3] The reverse flow of the vertebral artery is usually asymptomatic and, when not, causes in most cases vertebrobasilar ischemic transient attacks, which may manifest themselves as: dizziness, vertigo, ataxia, loss of balance, falls, diploplia, nystagmus, blurred vision, syncope, tinnitus, hearing loss, dysarthria.[2-4] In patients who underwent myocardial revascularization surgery with IMA graft, as the demand in another vascular bed such as the ipsilateral upper limb increases, angina and infarction may occur due to coronary-subclavian steal.[1,4,5]

In most cases, patients present significant systolic blood pressure difference between both arms (> 15 mm Hg).[2,4] In 1966, Toole stressed the importance of the bilateral arm sphygmomanometry, stating that, when the subclavian artery is stenotic or occluded, there should be a systolic blood pressure difference of more than 20 mm Hg or a diastolic blood pressure difference of more than 10 mm Hg for a reverse flow of the vertebral artery to occur.[2,4] Taking this into account, any person that know how to measure blood pressure may infer the diagnosis.6 It may also manifest itself with absent or severely diminished pulse (axillary, brachial, radial or ulnar) as compared to the contralateral arm; supraclavicular or cervical bruit.[4] Other physical examination findings are: ischemic changes such as finger ulcers, gangrenous skin lesions, blue fingers and subungual hemorrhages, secondary to atheromatous embolisms due to atherosclerotic lesions of the subclavian artery.[2-4]

Color duplex ultrasound is the non-invasive diagnostic option of choice to detect backflow.[4,7,8] Subclavian artery stenosis should be inferred in any patient with neurological symptoms of the vertebrobasilar territory, claudication of the arm or coronary ischemia,

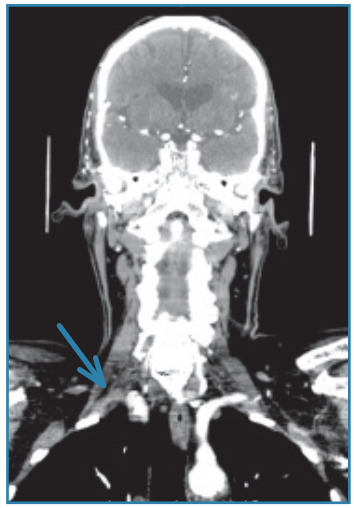

Figure 3. Cervical angiotomography showing a 90% stenotic area in the first section of the right subclavian artery.

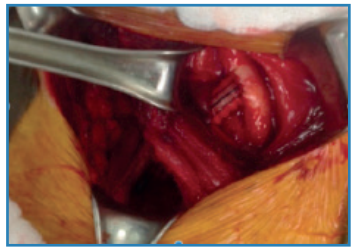

Figure 4. Subclavian-carotid bypassing with Dacron prosthesis. The right common carotid artery anastomosis is at the top right. Sternocleidomastoid muscle retracted to the left.

when the IMA has been used for myocardial revascularization.[1] Continuous Doppler and duplex ultrasound scans are easily accessible, low-cost and accurate if performed by a skilled operator. Findings suggesting significant obstruction include wave damping or monophasic changes; also, mosaics are observed in the color suggesting turbulent flow and increased flow rates on the site where there is suspected stenosis.[4,7] When there is severe stenosis (70% - 99%) of the proximal subclavian artery, 65% of patients will have permanent reverse flow in the ipsilateral vertebral artery and 30% will have intermittent reverse flow.[9] Other diagnostic tools include magnetic resonance angiography and computed angiotomography; however, they are most commonly used to quantify the degree of subclavian artery stenosis, the etiology of the obstruction or stenosis, and also when planning the therapeutic approach.[1,2]

Subclavian artery stenosis is a cardiovascular risk marker and identifies a population that will benefit from aggressive secondary prevention. Medical management includes lifestyle changes, glycemic control in diabetics (Hb1Ac < 7%), quitting smoking, anti-ischemic management; aspirin or clopidogrel, beta-blockers, angiotensin-converting enzyme inhibitors, and statins, which reduces long-term mortality.[1-4]

Usually, definitive management is not necessary in asymptomatic patients with subclavian artery obstruction or stenosis.[2] With the establishment of symptoms, surgical or endovascular management is needed. Management indications include disabling ischemia of the upper limb (claudication, pain in rest and digital embolization; vertebrobasilar insufficiency due to the steal phenomenon; anginal symptoms due to coronary steal by an IMA graft; lower limb claudication in axillofemoral bypass cases; to increase the flow in the affected upper limb before a myocardial revascularization surgery with an IMA graft) or when an arteriovenous fistula will be performed in the arm of the compromised subclavian artery.[4] The selection of the revascularization technique depends on the patient and the characteristics of the lesion.4

Surgical revascularization consists of performing a carotid-subclavian bypass, carotid transposition or an axillo-axillary bypass.[1,10] The first surgical reconstruction of a stenosis of the supra-aortic trunks (brachiocephalic trunk, subclavian artery and common carotid artery) was reported in 1951 by Shimizu and Sano; later, Diethrich et al and Crawford et al published results in which they observed a mortality decrease from 22% to 5.6% when an extra-anatomic cervical bypass was performed instead of using a transthoracic approach.[4] Surgical revascularization becomes necessary when endovascular treatment is not possible or when the anatomic conditions are not optimal and it is a more technically difficult procedure.[10] Carotid-subclavian bypassing surgery has favorable results proven by multiple studies showing low rates of mortality (0.8%) and postoperative complications (stroke: 0.5% - 5%) as well as favorable rates of medium- and long-term permeability (92% and 83% after 5 and 10 years, respectively).[4] Different materials may be used: a Dacron, PTFE or autologous vein

graft.[10-12] Although endoluminal therapy is considered safe and effective, open surgery continues to be an important option in low-risk patients due to greater durability and long-term permeability.[11,12] Symptomatic patients with failed endovascular management or with subsequent loss of permeability due to stent occlusion should be considered for surgical revascularization,[10,11] as well as patients with long, distal or very calcified lesions.[1]

The first cases of percutaneous angioplasty of aortic arch vessels were described in the 80's. Although balloon dilatation of these stenoses was effective and safe, reintervention was the main problem as long-term permeability was much lower than with surgery,4 which improved significantly with the use of stents.[12-13] In general, first an endovascular approach with angioplasty and stenting should be considered before open surgery, since it is a less invasive procedure with lower morbidity, shorter hospital stay and quicker recovery.[3,10,12-14] Several reports of angioplasty with stenting have described permeability rates over 90% after 5 years.[1,2,5] Balloon angioplasty with stenting may be performed in a safe way when there is little probability that the stent compromises vertebral artery circulation and when the patient has appropriate anatomic characteristics, as in the cases of stenoses or short occlusions at the origin of the subclavian artery.[1,2]

In conclusion, the subclavian steal syndrome is an entity that is primarily based on clinical suspicion and is not rare. In patients with upper limb and transient vertebrobasilar ischemic symptoms, the presence of this pathology should always be considered and blood pressure should be measured in both upper limbs; a blood pressure difference over 20 mm Hg means high probability of subclavian artery stenosis. It is important to take into account the overall context of the patient and to analyze carefully the anatomical alterations of the lesion in order to choose the best management strategy (endovascular or surgical) for the achievement of the best short- and long-term results with the lowest possible morbidity. ■

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SCIENTIFIC LETTER

AGENESIS OF INFERIOR VENA CAVA

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The topography of the inferior vena cava (IVC) is divided into 3 segments: prerenal, renal and postrenal. In the embryo, there are 3 pairs of venous vessels combining fusion and resorption. Given the complexity of the process, different anomalies may occur, some of them with great predisposition to thrombosis. This anomaly was first explained in 1973 by Abernethy, who described the azygos continuation of the IVC associated with a mesocaval shunt and dextrocardia in a 10-month-old child. These alterations are rare and occur between the sixth and eighth weeks. The frequency of congenital anomalies of the inferior vena cava is 0.3%-0.5% in the healthy population and 2% in patients with cardiovascular disease. Known anomalies are retroaortic left renal vein, circumaortic left renal vein, double infrarenal IVC, azygos or hemiazygos continuation of the IVC, and absent IVC. Although IVC congenital anomalies have low prevalence, multislice tomography has increased their frequency of appearance. In particular, multislice computed axial tomography (CAT) images have the benefit of establishing the diagnosis of this rare pathology and, if the surgical approach to the retroperitoneum is needed, allow to plan access and avoid damaging abnormal vessels.

This paper refers to the case of IVC agenesis in a 28-year-old male patient with no previous venous thrombosis who sought care for edema of the lower limbs. In the physical examination, he presented soft and painless edema extended bilaterally from the foot to the knee, with 2/4 intensity and no skin color change. No pedal arterial pulses were palpated. He did not show genital edema or collateral venous circulation. The first study was a *venous Doppler scan*, which revealed the presence of thrombi from the popliteal veins to the iliac veins. It was complemented with multislice CAT, confirming the presence of thrombosis in the said venous axis and the absence of the infrarenal IVC (Figure 1). Oral anticoagulant treatment with dicoumarol was decided, succeeding in resolving the edema in a horizontal position.

Figure 1. Occlusion of the inferior cava vena (on the right) with collateral circulation from the illiac veins to the vena cava at the level of the renal veins.

In subsequent controls with elastic support, he presented edema with induration and increased intensity with daily activity. He did not accept the alternative treatment with fibrinolytics or the anatomical reconstruction of the IVC.

Anomalies of abdominal veins are described according to the embryological sector involved: subcardinal, supracardinal or poscardinal[1] (Table 1). Each of the above vascular structures corresponds to a pair of veins, in reference to the absence of the IVC. In vein formation s, the iliac veins and the vena cava are conditioned by processes of atrophy or develop from them. For this reason, it is observed that the vena cava and the iliac vein resulting from this anomaly are very rare, with their etiopathogenesis being established in the absence of supracardinal development. The other hypothesis is thrombosis followed by fibrosis. The venous bridging in the pelvic area has at the lower end the external and internal iliac veins, which connect with the lumbar veins, which in turn connect with the azygos and hemiazygos system. As a result of venous hypertension and slow venous flow, venous insufficiency and thrombosis occur. This is what the said patient presented when he appeared. The clinical presentation is often asymptomatic, and azygos drainage may be associated with cardiovascular or renal malformations. In young people with thrombosis in both femoral-iliac axes, this determines a strong inclination to infer the presence of the IVC agenesis variant of venous malformations[2-4].

Anomalies of the postcardinal veins	Retrocaval/circumcaval uréter
Anomalies of the subcardinal veins	Interruption of the inferior vena cava with azygous/hemiazygous continuation
Anomalies of the supracardinal veins	Persistence of the left supracardinal vein - Left inferior vena cava
	Double inferior vena cava - Persistence of both left and right supracardinal veins
Anomalies of the renal segment	Circumaortic venous ring
	Retroaortic renal vein
	Multiple renal veins

Tabla 1. Classification of anomalies of the inferior vena cava[1].

Doppler scanning is an extremely valuable tool to establish this situation and is complemented with the study of retroperitoneal vessels. Multislice CAT, which reveals with accuracy the malformation present, completes the imaging study[5]. The patient under consideration was young and had both deep venous axes compromised. The first imaging study was a Doppler scan, which showed the occlusion of the femoral-iliac veins. This causes a rise in the base pressure, already increased by the absence of the inferior vena cava.

Renal alterations are important in the surgical treatment of aortic or kidney pathology. Not knowing about this pathology may cause traumatic lesions of venous vessels with hemorrhages. In the course of surgery of ruptured aneurysm of the abdominal aorta, we have found 2 patients with retroaortic left renal vein and one with circumaortic. In the first case, the hematoma of the retroperitoneum made it difficult to visualize the structures and they were damaged causing large hemorrhages difficult to control. The transperitoneal approach is highly likely to lead to this situation, while the retroperitoneal approach averts such possibility due to the displacement of the left retroperitoneum. The detection of this rare anomaly prevents an incorrect diagnosis of retroperitoneal adenopathies or masses and is useful for the surgeon to plan the surgical approach. This situation does not occur in the case of a ruptured aneurysm because multislice CAT scanning is not always possible and due to the presence of blood in the retroperitoneum[4].

In conclusion, the presence of venous thrombosis in young patients, particularly men, should lead to infer the presence of vascular malformations. The thrombotic occlusion of the femoropopliteal vein is associated with this. The absence of IVC should be inferred in the case of young patients with bilateral thrombosis and extension in the femoral-popliteal-iliac axis. ■

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SCIENTIFIC LETTER

GENETIC AND VENOUS INSUFFICIENCY IN NORRIE DISEASE

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Norrie disease is an X-link genetic disorder caused by the mutation of a gene called "Norrie disease pseudoglioma".[1] It is a recessive hereditary disease affecting men and characterized by congenital blindness. One third of patients, mostly as from the second decade of life, develop hearing loss, intellectual disability and behavioral disorders. In addition, they have an increased risk of developing peripheral vascular diseases such as venous insufficiency of the lower limbs and sexual impotence.[2-4] This paper describes the experience in the management of the of case brothers aged 26 and 29 with established diagnosis of Norrie disease, and both with congenital blindness. None presented auditory manifestations or cognitive disorders in the last doctor's appointment. Both showed peripheral vascular manifestations represented by chronic venous insufficiency of the lower limbs – one of them C4 and the other C6 under the CEAP classification. (Figures 1 and 2). Only one of them had erectile dysfunction, with little success after pharmacological treatment. The reason for the medical consultation was the possibility of a surgical solution to the venous insufficiency of the lower limbs, which, as revealed by venous Doppler ultrasound, was affecting the trunk of the great saphenous vein in both cases. The surgical management of venous insufficiency in these two young men posed a dilemma, since they had proven genetic predisposition to the development of venous vascular manifestations in the lower limbs, which might affect their mid- and long-term evolution.[3] The medical treatment decided consisted of phlebotonics and vasodilators, together with graduated elastic compression and scheduled exercises to strengthen the propellent-suction pumps.

The ophthalmologic manifestations of Norrie disease are usually bilateral and symmetrical. The iris, the anterior chamber and the cornea may be normal at birth, but high yellowish-gray masses or "pseudogliomas" are frequently observed behind the lens, along with retinal vascular dysgenesis and leukocoria. During the first

weeks or months of life, the retina detaches fully or partially. In childhood, patients may develop cataracts, nystagmus, anterior/posterior synechiae, band keratopathy and shallow anterior chamber with increased intraocular pressure. In its evolution, phthisis bulbi (atrophy of the eyeball) is observed together with cloudy corneas and hollow orbits. The most affected men develop progressive asymmetric sensorineural hearing loss beginning in childhood (the initial average age is 12 years old). Hearing loss may be intense and bilateral in mid-adulthood. Between 20% and 30% of patients present developmental delay and intellectual disability. Some have cognitive and psychosocial disorders, including psychosis. Peripheral vascular extraocular manifestations were described long after the first signs of this disease were reported, with venous insufficiency of the lower limbs possibly present in various degrees, even C5-C6 CEAP classes. Erectile dysfunction is also described.[1,2] The diagnosis of Norrie disease is based on clinical findings. Genetic testing may confirm the diagnosis and may help assess the risk that family members transmit a genetic mutation to their children. ■

Figure 1. Trophic sequels in both foot insteps.

Figure 2. Trophic sequels in the inner side of the foot.

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SCIENTIFIC LETTER

AXILLARY ARTERY PSEUDOANEURYSM AFTER HUMERAL ARTHROPLASTY

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Pseudoaneurysms recognize the same etiological agents as vascular trauma, being evident more frequently at remote stages. The frequency of each etiologic agent such as a knife, a projectile or secondary to osteoarticular lesions varies.[3] A partial disruption of the artery with extravasation of blood into the surrounding tissues is the mechanism responsible for the development of a pseudoaneurysm. It often follows blunt or penetrating trauma, with the consequent formation of a fibrous capsule lacking intima. This localized hematoma has persistent communication with the native artery that provides it with pulsatility.[2] The incidence of pseudoaneurysms of the subclavian-axillary union is very rare. They are usually associated with trauma due to clavicular fractures and dislocation of the glenohumeral joint; other less common causes are iatrogenic, puncture, infectious and resulting from radiotherapy.[4] Clinical confirmation is obtained with imaging studies. Arteriography is the current gold standard; however, its use is limited in cases where lesions can be managed using an endovascular approach. With the advance of technology, new non-invasive techniques such as Doppler ultrasonography, computed angiotomography and magnetic resonance angiography have taken on a fundamental role in the diagnosis and planning of the surgical tactic of this entity.[5,6] This paper is intended to present the case of an axillary artery pseudoaneurysm after an arthroplasty of the humeral head.

The case refers to a 64-year-old man admitted to hospital with a history of alcoholism and arthroplasty with resection of right humeral head six months before, which evolved with an intensely painful pulsating tumor with 10 cm x 10 cm skin ulceration and active bleeding (Figure 1). Initially, it was managed with observation, compression bandaging and pain treatment. A laboratory test showed hematocrit (HCT) decrease to 18%. During his hospital stay, he underwent selective angiography of the right subclavian and axillary arteries, revealing a contrast leak

Figure 1. Ulcerated pulsating tumor in right shoulder.

and the formation of a right axillary pseudoaneurysm (Figure 2). In the absence of supplies for endovascular treatment, covered stent and coils, treatment was deferred until such elements were available. On the sixth day, he was referred to the emergency room of this hospital in a very bad general condition, with 12% HTC, 4.5-gr hemoglobin, intense pain, extreme pallor, an ulcerated pulsating tumor, active bleeding and a sense of impending doom. Being not possible to stabilize the patient, an emergency surgery was decided. He entered the operating room for vascular scanning. A proximal control of the axillary artery was performed with a longitudinal incision two centimeters below the clavicle, where it was possible to clamp the axillary artery in its proximal segment. Then, a medial longitudinal incision was performed in the right arm for the vascular control of the distal segment of the said artery. The proximal incision was extended in oblique deltopectoral form, joining both approaches. Thus, the pseudoaneurysm was exposed, the large hematoma was evacuated and the major and minor pectoral muscles were desinserted to expose the axillary artery. The hemodynamics of the patient was normalized after bleeding control. Finally, a 6-cm interposition procedure of the left reversed saphenous vein was performed (Figure 3). The patient left the operating room with 9-gr hemoglobin, hemodynamically stable, extubated and with preserved radial and ulnar pulses. He was referred to the coronary care unit. During the immediate postoperative period, he evolved with lucidity and without the sharp pain described before surgery. His hospital discharge was 6 days later.

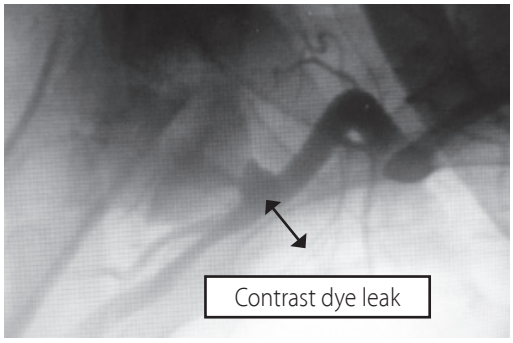

Figure 2. Angiography showing right axillary pseudoaneurysm with contrast leak.

Accompanying semiology, diagnostic confirmation with imaging methods is essential for the elective treatment of these cases. To date, Doppler ultrasonography has been promoted to confirm the diagnosis; however, its usefulness for surgical planning is limited. Angiotomography and resonance angiography are

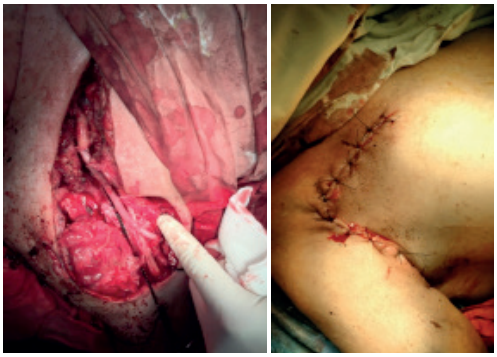

Figure 3. Axillary-humeral bypass with internal saphenous vein.

considered fundamental for a proper surgical tactic, since they provide information about the organs and tissues surrounding the lesion.[7] The angiographic study remains important in the diagnosis and non-invasive treatment of these lesions, so long as it can be performed. This was not possible in the case presented since endovascular treatment could not be provided due to the lack of materials.

Lesions of subclavian and axillary vessels are very rare, and most surgeons have limited related experience. In addition, the surgical exposure of these vessels, particularly with active bleeding, usually is very difficult and challenges capacities, even of experienced surgeons. Endovascular management has proven to be an adequate therapeutic option. It eliminates the need for a surgical dissection, especially in high-risk patients, and should be performed in stable patients with well-defined and focal lesions. Mortality varies between 5% and 10%.[8] The conventional surgical management of complex lesions in the subclavian-axillary union includes the distal and proximal vascular control of the vessel, as well as the resection of the affected part with consequent vascular reconstruction, either with native vessels or synthetic graft. These decisions will be taken in relation to the general condition of the patient. This type of approach has been associated with a mortality rate of up to 20%.[9] In this patient, venous autograft was used, considering the area contaminated with the ulcerated tumor. Subclavian-axillary vascular lesions are usually catastrophic; for this reason, if referred to the operating room, the patient is often hemodynamically unstable. The speed with which the surgical treatment of a ruptured pseudoaneurysm is decided is vital for limb salvage and improved quality of life.[10] In conclusion, an early diagnosis of these vascular lesions, which are not frequent, is important since timely surgical treatment prevents serious complications and, if surgery is deferred, the functionality of the affected limb and the life of the patient may be compromised. ■

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IMAGES IN CARDIOVASCULAR SURGERY

RADIAL ARTERY PSEUDOANEURYSM: WHEN ENDOVASCULAR TREATMENT IS FORCED AND OVERPRESCRIBED

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ABSTRACT

Pseudoaneurysms are the result of arterial injury, whether iatrogenic or due to trauma. They are a late complication of trauma. The incidence of pseudoaneurysms in upper extremities is less than in lower extremities. Delayed treatment leads to hemorrhage, edema and nerve compression. In turn, the potential complication of pseudoaneurysm in the upper limbs is the loss of fingers. A case of pseudoaneurysm diagnosis and treatment until resolution is presented. Surgery with resection of the pseudoaneurysm and arteriography for injury was the best treatment for this particular case, after attempting to seal the neck of the false aneurysm with endovascular treatment and double-balloon and extrinsic compression.

INTRODUCTION

Pseudoaneurysms of the upper limbs are rare lesions, though of great importance due to their potential complications, such as thromboembolism and rupture.[1] The puncture of the radial artery is frequently performed for invasive hemodynamic monitoring, vascular access for diagnosis and/or treatments, etc. Complications of this procedure have been described in small series of cases, but their surgical treatment has not been fully explained. Understanding the signs and symptoms of these complications is imperative to offer optimal treatment.[2] Delayed treatment of pseudoaneurysms leads to hemorrhage, venous edema and regional nerve compression as a result of their increased size.[3]

Their etiology, either traumatic or iatrogenic, due to puncture for monitoring or catheterization, is varied with an incidence < 0.1%. Their treatment must be administered quickly in order to preserve the hand and fingers.[4]

Below there is a description of the case of a radial artery pseudoaneurysm in a young female patient, who due to delayed optimal treatment developed the complications of this pathology, including active bleeding, a tumor with compressive neuropathy and skin ulceration. Many of these are avoidable if the appropriate early treatment for this case is chosen.

CLINICAL CASE

A 32-year-old female patient was admitted to the intensive care unit with respiratory insufficiency, requiring orotracheal intubation in assisted mechanical ventilation, and hemodynamically unstable, with inotropic requirement for hemodynamic support. After invasive monitoring of median blood pressure, she developed a painful pulsatile tumor at the site of the right radial artery puncture. A pseudoaneurysm was diagnosed and one-week compression bandaging was prescribed. Subsequently, skin ulceration and active bleeding were observed with no hemodynamic compromise of the patient. The case was referred to the Hemodynamics Service, where the endovascular treatment of the pseudoaneurysm was prescribed (Figure 1). A double-compression technique – extrinsic with ultrasound transducer and intrinsic with balloon – was used at the site of the contrast leak (Figure 2). After three hours of endovascular treatment, it was possible to slow down the extravasated flow but this technique failed to exclude the pseudoaneurysm with thrombosis of its neck (Figure 3).

After 12 hours of endovascular treatment, the painful ulcerated pulsatile tumor with active bleeding continued, with no therapeutic benefits being obtained with this method.

On the following day, the case was referred to the Vascular Surgery Service, where immediate surgical treatment to exclude the pseudoaneurysm was prescribed with its resection, bleeding control and cutaneous plastic repair of the ulcerative lesion.

In forty minutes of surgery, all the therapeutic benefits needed to solve this pathology were achieved.

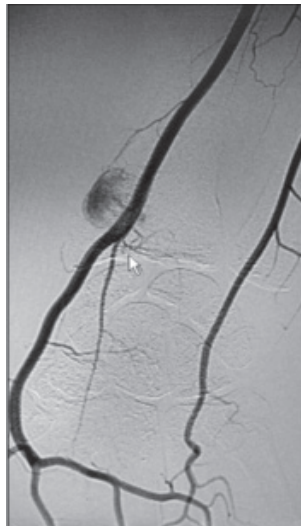

Figure 1. Angiography, contrast leak in radial artery.

Figure 2. Endovascular compression with balloon.

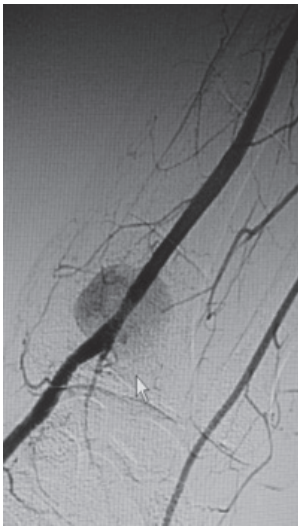

Figure 3. Control after endovascular treatment.

Figure 4. Proximal and distal control of the lesion.

A longitudinal incision was performed on the projection of the right radial artery, with proximal and distal control of the lesion. By repairing the artery with loops, with no need for clamping, bleeding was controlled (Figure 4). Then, the incision was extended to unify the approach, proceeding to the resection of the pseudoaneurysm by direct visualization of the 1-mm-long neck of its sack (Figure 5). The arteriorraphy of the arterial lesion was performed with 7-0 Prolene suture, achieving a satisfactory bleeding control result and also keeping the radial artery unharmed (Figure 6).

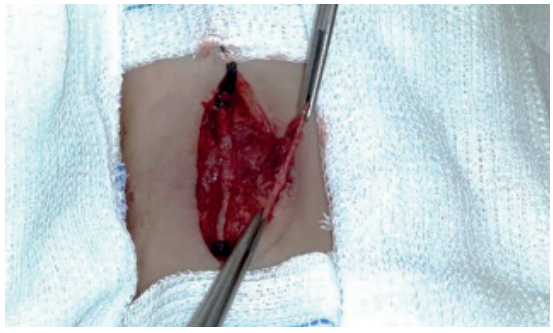

Figure 5. 1-mm-long neck of the pseudoaneurysm.

CONCLUSION

Whatever the form of endovascular treatment chosen, it always is invasive, costly and time-consuming and uses nephrotoxic contrast. In this case, surgery was the proper treatment because it allowed the resection of the pseudoaneurysm together with the skin ulceration and, with a 2.5-cm-long incision, it was possible to work on the repair of the arterial lesion in a comfortable way (Figure 7).

Figure 6. Resection of the pseudoaneurysm with neck ligation.

The endovascular treatment in this case delayed surgery, which did have therapeutic success in solving the problem not only by excluding the pseudoaneurysm but also by removing the thrombus causing compressive neuropathy due to the relation to the median nerve and the hyperalgesia described (Figure 8).

Risk factors leading to iatrogenic pseudoaneurysms are anticoagulation or antiplatelet therapy before arterial catheterization, age over 60 years, female sex, catheters above 7 French units, obesity, and inappropriate compression of the arterial puncture site.[5]

The patient concerned is a 32-year-old obese woman. In her case, while no catheters over 7 French units were used in monitoring the median blood pressure, her sex and obesity were factors leading to this kind of lesion. In this type of patients, it is fundamental to perform effective and careful compression to avoid this kind of complications in invasive treatments for arterial monitoring and/or diagnosis.

It is known that a high percentage of these patients solve these lesions with appropriate compressive bandaging, and it is in these cases where it is essential to take initial measures to avoid later skin ulceration in young patients.

In this case, where ballooning was used continuously in a platelet-free artery, a reactive spasm was observed, as shown in Figure 3, and this can damage the arterial endothelium in a healthy artery.

Doctors must be aware of the different treatment options for a certain pathology; this therapeutic diversity opens up a range of specialties that can solve the case. However, professionals must know about the limitations of the various methods they use so as to focus on the best treatment for a given case in each particular patient, forgetting about the personal benefit. ■

Figure 7. Surgical wound 2.5 cm long in immediate postoperative period.

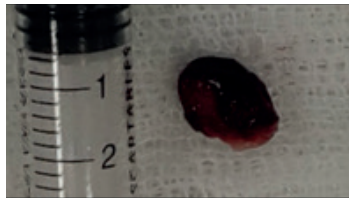

Figure 8. Thrombus extracted.

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CONGRESOS ERAN LOS DE ANTES...

Algunas Sociedades Cardiológicas Europeas han reaccionado ante la publicación del nuevo código ético de la alianza Eucomed que se impondrá a partir de enero de 2018. Eucomed está conformada por una alianza empresaria de aproximadamente 25000 compañías que abarcan el desarrollo, producción y distribución de más de 500.000 productos médicos.

Entre los puntos controvertidos podemos mencionar que:

- se establecen guías con los criterios que debe cumplir un congreso médico para ser aceptable para patrocinio por la industria,
- desmarca el patrocinio de la industria de cualquier cosa relacionada con ocio o programa social,
- establece que a partir del 1 de enero de 2018 las compañías (adheridas a Eucomed) no proporcionarán soporte económico directo a los denominados "asistentes pasivos", sólo a los ponentes y a las personas con un papel específico en el programa,
- define que las compañías podrán seguir financiando costos relacionados con congresos pero de forma diferente, a través de "Becas de educación". Estas becas no se darán directamente a los profesionales, sino a través de organizaciones o entidades.

Dr. Patrick Serruys, editor jefe de la revista EuroIntervention órgano oficial de la Asociación Europea de Intervencionismo Cardiovascular *(EAPCI)* junto al Chairman del PCR (2015) William Wijns y al presidente de *(EAPCI)* publican una editorial donde fijan la siguiente posición:

- la primera crítica es que este nuevo código es una iniciativa unilateral ya que está hecho "por la industria y para la industria" sin ningún tipo de consulta o contacto con los médicos,
- la desaparición del soporte económico a los médicos tendrá consecuencias inmediatas calculando una perdida de hasta un 50% de los asistentes,
- la imposibilidad para asistir a los congresos se traducirá en una reducción de oportunidades de mantener la formación médica continua, cosa que puede tener un impacto directo en el manejo de los pacientes,
- el sistema abre la puerta a que las compañías puedan ser mucho más selectivas con respecto a las organizaciones y congresos que deciden patrocinar dejando de lado los objetivos de las distintas sociedades médicas.

Haciendo otra lectura, el código tiende a favorecer a los profesionales "preferidos" de una empresa o de varias (popes) en detrimento de aquellos que son independientes, siendo los más jóvenes los que poseen menos posibilidades. Asimismo, consideran que la formación continua quedará en las manos de la buena voluntad y de la iniciativa de cada médico en particular. Otro punto también cierto es que muchas sociedades médicas consideran a los congresos como fuente de financiación.

Hoy cumplimos con nuestro XXV Congreso, que en realidad en un comienzo se denominó Encuentro, creciendo en todos los aspectos de la especialidad, tanto en número de colegiados, así como en los objetivos para con nuestra principal cita académica. Hemos sopesado los distintos avatares económicos, acostumbrados a los desafíos diarios de nuestra profesión y, a diferencias de otras sociedades, el compromiso de los miembros del colegio es el principal sostén de nuestro evento. Es verdad que gracias a las empresas solventamos muchos de los gastos, pero tuvimos bien en claro de la necesidad de mantener nuestra independencia y, por sobretodo, nuestra transparencia. Nos reunimos una vez más buscando la excelencia, incluyendo a los distintos centros que ejercen la especialidad con el mejor nivel en búsqueda de la "verdad sospechosa", como la definió Karl Popper, propia de la ciencia más pura y dejando de lado dogmas e imposiciones.

Congresos "como los de antes" en donde los distintos centros exponían sus experiencias, sumada a la experiencia de extranjeros, es la principal propuesta de este Veinticincoavo evento y he aquí la gran diferencia con aquellas sociedades que desvirtuaron sus objetivos.

Dr. Juan Esteban Paolini

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