ARGENTINE JOURNAL OF
CARDIOVASCULAR SURGERY
SCIENTIFIC JOURNAL OF THE ARGENTINE COLLEGE OF CARDIOVASCULAR SURGEONS

COVER ARTWORK
Horacio Hugo Tubio

"Mañana Examen"

He earned his degree as medical doctor from the University of Buenos Aires in 1964, specializing in general surgery and later in thoracic and cardiovascular surgery. He developed his professional career at Hospital Carillo, Hospital Mariano y Luciano de la Vega, Hospital Santojanni, and Hospital Militar Central. He obtained a scholarship from Hospital Fernández and finished his professional activities at Sanatorio Dr. Julio Mendez and Policlínico Bancario. He began his artistic career in 1994 with the sculptor Ángel Marzorati, receiving different mentions and awards. In 2000, he was granted the Special Award of Honor in Sculpture by the Medical Association of Artistic Culture. In 2014, he began his painting studies with Professor Ricardo Espósito, with solo exhibition of paintings at Colegiales showroom. He currently devotes to painting jointly with Masters Carlos Scanapieco and Ricardo Espósito at the atelier located at Jorge Newbery 3855, in the City of Buenos Aires.

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ISSN 1667-5738
Fourth-monthly Journal, Property of Argentine College of Cardiovascular Surgeons
Volume XIV - Number 3 - September - October - November - December 2016

Edition coordinator: María Laura Caruso
Translation into English: TP Victoria Vincent
Style corrector: Marcelo Colombini
Design & layout: PixelStudio
Editor: Argentine College of Cardiovascular Surgeons
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Argentine Journal of Cardiovascular Surgery - ISSN 1667-5738
Volume XIV - Number 3 - September - October - November - December 2016

The Argentine Journal of Cardiovascular Surgery is the publication of the Argentine College of Cardiovascular Surgeons. It was first published in 2003 to provide updated information on research conducted by worldwide specialists; the introduction of surgical techniques; articles on the figures and milestones of the national and international history of our specialty, on other topics related to cardiovascular surgery, endovascular surgery, cardiac surgery, circulatory support, phlebology and lymphology, and on new trends incorporating technological innovation such as treatments with stem cells. It is a basically surgical journal published on a four-monthly basis.

For online version (ISSN 1669-7723) and additional information: www.caccv.org.ar/raccv - E-mail: raccv@caccv.org.ar
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EDITORIAL

In fulfillment of the commitment made, we have succeeded in publishing the third number of the Argentine Journal of Cardiovascular Surgery for 2016, maintaining its quality and excellence. Also, we managed to realize a dream, many times delayed, by having the digital version fully translated into English. This third issue includes the paper that won the Bicentennial Award of the Argentine Congress of Cardiovascular Surgery on ***"Symptomatic Abdominal Aortic Aneurysms: The Experience of Three Centers in the Last Eight Years"*** whose authors, Dr. Elvio Demicheli, Dr. Marcelo Pataro, Dr. Mariano Ferreyra and Dr. Ricardo Lamura, showed the significance of this topic but particularly the importance of collecting information from various centers, a basic objective that the Argentine College of Cardiovascular Surgeons intends to promote for coming years.

Dr. Miguel Ángel Lucas contributed the biographical sketch of Pedro Bianchi Donayre, CACCV founding member, and Miguel Rubio submitted the biographical sketch of Denton Cooley, another great cardiovascular surgeon who also died this 2016.

For 2017, we need to continue this line of work, pursuing the publication of papers by College members from the whole country and the rest of Latin America, maintaining the scientific rigor conditions to achieve access to Index Medicus.

We have reached the end of a special year, with high expectations of constant improvement, looking for our own funding sources with the strong belief of the Committee Board that the RAACV continues to be the CACCV official publication that goes beyond the limits of our country, keeping the flame of our specialization alive.

Merry Christmas and a happy 2017!

Dr. Juan Esteban Paolini
Director

EDITORIAL

THE IMPORTANCE OF CREATING THE ARGENTINE CHAPTER OF THE SOCIETY FOR VASCULAR SURGERY

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Argentina is recognized worldwide for many things, including excellent soccer players, a queen and even the Pope. Argentina is perhaps the country responsible for the technological revolution in vascular surgery. That is one of the reasons for which we find it essential to create the Argentine Chapter of the Society for Vascular Surgery.

"We need to establish a learning community for the benefit of our patients," said Robert Crawford, chair of the SVS International Relations Committee. "And we are very pleased to welcome the vascular surgeons in Argentina; the creation of the Argentine Chapter will help to further strengthen our community."

The Society for Vascular Surgery (SVS) is a nonprofit organization with over 4,500 members seeking to make advances in the management of patients with vascular disease through education, research, innovation and public awareness. The SVS was founded in 1946 and has grown to become one of today's largest and most respected societies in the world. Education and knowledge acquisition are the pillars of the services that the international learning community seeks to build. One of the objectives is to strengthen the SVS while helping to strengthen vascular surgery societies in other countries as we are doing in Argentina.

To promote the formation of learning and networking communities, the SVS has embraced the creation of international chapters. The SVS currently has 10 international chapters, including Brazil, Colombia, Egypt, Germany, Hungary, India, Italy, Japan, Poland, Taiwan... and we look forward to seeing Argentina on this list very soon!

Approximately 15% of SVS members are international members representing 50 nations. Thanks to the work of the leaders of the

Society for Vascular Surgery, we have succeeded in obtaining a significant reduction in annual dues for Argentine members so as to encourage membership and thus transmit the benefits provided by the Society, including:

- Subscription to all SVS research journals:
  - o Journal of Vascular Surgery (JVS),
  - o Journal of Vascular Surgery: Venous and Lymphatic Disorders (JVS-VL),
  - o Journal of Vascular Surgery Cases (JVS-Cases);
- Access to clinical guidelines, recommendations and "best practices" documents;
- Discounted SVS Annual Meeting registration fees;
- Opportunity to make submissions and participate in the International Forum and other events of the SVS Annual Meeting;
- Eligibility to compete for SVS awards, grants and travel fellowships for international members, residents and students;
- Access to renowned VESAP3®, the online vascular education and self-assessment program developed by the SVS;
- Use of the SVS logo on your website to increase its prestige.

We would like to learn from you, listen to your paper submissions and publish your experience for all of us to improve day after day the management of our patients. In addition to its regular program, the Annual Meeting will include several sessions and events with an international focus that members from Argentina will not want to miss: the International Forum, international discussions and the international guest reception, an event specially designed for all our international members to spend a pleasant time together.

The Society for Vascular Surgery looks forward to your ideas, commitment and passion to strengthen the vascular surgery specialization and to improve public health.

It is a real honor for us to welcome the Argentine Chapter.

Elina and Roberto

ARTICLE

BIOGRAPHICAL SKETCH
FOR THE LAST NUMBER

You joined the team of Dr. Hugo René Mercado at Hospital Militar Central in 1955, two years after your graduation with honors. You came and contributed the knowledge that surrounded you when you were the beloved disciple of the great professor Alfonso Albanese, a great friend of Dr. Raúl Nicolás Velasco, Director of Hospital Militar Central, exalted thoracic surgeon, our surgical grandfather, and both devotees of the postulates of the Finocchietto School, from which they graduated.

You were of Mendoza origin, renowned winemaking lineage, the Escorihuelas. Your cousins gave you the family that you lost very young, when your parents died. Your family relationship changed over time and you became part of us, the group of young followers of the engine Hugo Mercado: Mercado, Bianchi, Lucas and Santín Hassan Iasín.

You were the first to follow Mercado to Hospital Ferroviario Central.

Together in that group, we were pioneering founders of new vascular surgery techniques conceived and shared by all. In 1963, we received the Honor Award for the book "Acquired Arterial Diseases, Arteriographic Diagnosis, Direct Surgical Treatment", edited by ED Bernades and perhaps the first book in Spanish on the treatment of chronic arterial diseases.

We created the use of the escape route through the deep femoral artery in the difficult issue of aortoiliac and femoral-popliteal occlusions. The scientific battle, of the highest academic level, in which you were engaged with Rubén Siano Quirós in the forum of the Argentine Academy of Surgery was unforgettable. At the time, I was the secretary of the President of the Argentine Society of Angiology. With Dr. Samuel Rascován, at his house on Av. Cruz in Parque de los Patricios, we promoted a meeting in which the actual authority was made clear. I had the punched card that we used before computers and proved that it was Mr. Luengo, from Río Colorado in the southern region of the country, (diagnosed with full bilateral superficial femoral and aortoiliac occlusion) on whom we together performed the previous bilateral femoral arteriotomy and then an aorto-bifemoral bypass, successfully deriving to the branches and

recovering the flow from the aorta to the distal sectors. There, the dispute came to an end. We even signed a "reconciliation certificate" (that is what we called it) and peace was reestablished with a handshake between the two opponents and bold pioneers of new techniques. Mercado had been the one who gave Rubén Siano the score in a meeting at a café on the corner of AMA, when Rubén confessed his uneasiness due to the very bad result of his case studies with complicated aortofemoral bypasses until then.

In 1975, you took up the presidency of the Argentine Society of Angiology and, together with Mercado, Albertal, Favaloro, Welsh and others, we founded the Argentine College of Cardiovascular Surgeons, an institution first essentially intended for guild purposes which then became an outstanding leader of cardiovascular, and today endovascular, surgery and all their surgical subspecializations. We had been civil surgeons at Hospital Militar Central since 1955 and in 1967, having received the gold medal for our work during ten consecutive years and created the Cardiovascular Surgery Service of Hospital Militar Central, we resigned and embarked on the adventure of Hospital Ferroviario Central. There, in 1964 we performed the first surgery on a ruptured abdominal aortic aneurysm, replacing it with a segment of a lyophilized aorta from a soldier injured in a tragedy at Puente Pacífico. I removed the abdominal aorta at the Pathology Service of Hospital Central, as Dubost did in Paris in 1961, put it in a tube with absolute alcohol, took it refrigerated to the Plasma and Blood Bank of the Argentine Army, producer of dried plasma for all Latin America, and had it lyophilized there.

In 1975, he took his native Mendoza to the Congress of the Argentine Society of Angiology and returned triumphant to his longed-for homeland.

Dear Pedro, today I can be honest with you and tell you about the great respect I feel for your surgical and human virtues. Hassan Santín left us very young when he died in a car accident in Brazil. You were the intellectual of the group, the respected one and capable of stopping Hugo Mercado when he got carried away and only listened to your wise advice.

Golf, your favorite sport, prevented you from getting to know what soccer was like, in a group of members of the Mercado School, fans of the soccer ball.

Your first marriage was a bad experience in your personal life, but several years later God rewarded you with a worthy woman, your partner for life, who gave you beloved children and grandchildren of the heart, and you were happy. When I last talked with you, you told me about her death and your depression, which undoubtedly undermined your last years.

I remember with a smile our trip to Moscow in 1970 together with Guillermo Masnata, the erudite tourist and great companion... Stockholm, Finland, Saint Petersburg, Moscow, Warsaw, Hungary and Greece... I travelled as official rapporteur to the International Congress of Cardiovascular Society in Moscow, and you two accompanied me out of friendship and curiosity. On that trip, we saw the impact of the 2nd World War and the excesses of victors and vanquished, in a life experience.

Do you remember when, in the Mozart square of Warsaw, we danced with Masnata under the rain, happy to be in the land of the great Polish creator?

You were full member of the Argentine Academy of Surgery, it was Velasco who made us join that worthy scientific society. Your contributions, discussions, arguments – particularly, those with Siano Quirós and his scientific presentations – were memorable.

A qualified and neat surgeon, almost exalted, you loved dissecting and hard-to-solve cases.

You were Chief of the Cardiovascular Surgery Service of Hospital Ferroviario and even held office as Director of that great hospital for a long time.

There is an infinite number of your virtues that I omit but your friends from the Mercado group could name fluently... Mauro Brangold, Adolfo Juorio, Mario Firpo, A. Sazzano, and the great Héctor Trabucco and Francisco De Pedro and the engineer Zeuli, creators of the Argentine artificial heart, the first one implanted by you at Hospital Ferroviario Central. They are part of the Argentine surgical history.

Pedro, you have left to the mystery of the beyond. I pray to the Infant Jesus of Prague, to whom your mother consecrated you as a child, that you are at peace in the dream celestial Kingdom, waiting to meet us someday so I can continue telling you how much I miss you since your death on 20 August this year... ■

ARTICLE

DR. DENTON COOLEY
1920-2016

Reconciliation between Denton Cooley and Michael Debakey in 2008 after 40 years of scientific rivalry. Photo from the Houston Chronicle web edition.

DR. MIGUEL RUBIO.

Hospital de Clínicas. UBA 2016

One of the most important cardiovascular surgery pioneers died on November 18, 2016. Denton Cooley, the inspiration behind the career of thousands of surgeons around the world and in our country, passed away leaving us a mark difficult to remove.

In the media, he will be remembered as the first to implant an artificial heart in the world, although not everyone knows that the Argentine surgeon Domingo S. Liotta was the researcher and developer of the device actively participating in such moment. He was the first in the USA to perform a heart transplant in a human being. He was a contemporary of Michael Debakey (1908-2008), who successfully disputed his position at Baylor College of Medicine and with whom there was the well-known rivalry that just enhanced the prestige of the specialization. The city of Houston became the world Mecca of cardiovascular surgery.

The Texas Heart Institute was the physical place created by him to develop his career, with thousands of publications, scientific advances, techniques and countless surgeons trained there.

Actually, what made Denton unique—because just naming him is enough worldwide—was his clear mind and extraordinary manual skill. He succeeded in simplifying the technique in an incredible manner and that earned him the recognition of his peers, who were simply amazed at his way of acting. Our generation was motivated by him along with other great surgeons such as Christiaan Barnard, Dudley W. Johnson and René G. Favaloro, because everyone wanted to be like these great men. For this reason, it is possible to observe that

our country has always had enormous prestige in the cardiovascular area, remaining at the forefront.

Perhaps new generations do not remember him with the intensity of ours, but they should know that he was one of the surgeons who allowed cardiac surgery to be almost a routine with successful and highly predictable results today. There is not much more to write about Cooley in an attempt to be original, because hundreds of thousands of words have already made him a part of history.

Denton was a highly ambitious and competitive man. He strived hard for all the great advances to be made at his Institute. When Christiaan Barnard performed the first heart transplant in the world, Cooley cabled him to congratulate him. The cable read: "Congratulations on your first transplant, Chris. I will be reporting my first hundred soon."

Some facts that describe him in his entirety and define his personality very well. For those of us who were lucky enough to see him in the operating room, it was not surprising when he completely solved a thoracic aneurysm in 50 minutes, from beginning to end, in a fellow countrywoman who nobody wanted to operate here. When he met her, Denton was 74 years old and had the spirit of a twenty-year-old young man. She expected to get the surgical appointment at least in a week. He entered the room, his great height increased his presence, and smiling kindly he asked her what she was planning to do the following day. Of course, the next afternoon he operated her after adding her to a long list of surgeries.

Denton A. Cooley was the greatest beyond argument. This is what his peers, who have the tools to understand his huge and different capacity, think about him. Cardiovascular surgery was his accomplishment and his sphere. Filing for bankruptcy as a real estate developer, boosted his surgical capacity and he worked feverishly until a very advanced age. In his late nineties, with reduced mobility, he gave lectures encouraging surgeons to study techniques to solve the complications of new mini-invasive endovascular techniques.
The support provided by his wife Louise was so important to Denton that just few days after her death at age 94 he followed her in the road to eternity. They raised a large family with five daughters, of whom one died early. He is survived by 16 grandchildren and 17 great-grandchildren.

He was a living legend in his days and today became immortal. So much was told about him that it is not possible to distinguish myth from reality. It is said that one day, in a public hearing, a lawyer asked him if he believed that he was the best cardiovascular surgeon in the world. He answered yes. The lawyer said: "I think you are immodest." And he answered: "I remind you that I am under oath!" ■

ORIGINAL ARTICLE

SYMPTOMATIC ABDOMINAL AORTIC ANEURYSMS: THE EXPERIENCE OF THREE CENTERS IN THE LAST EIGHT YEARS

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ABSTRACT

Objectives: This study was intended: 1) to evaluate the results of the conventional and endovascular surgical treatment of symptomatic abdominal aortic aneurysms at three institutions, with equal diagnostic and therapeutic algorithm and the same surgical school, over the last 8 years; and 2) to communicate case studies which represent our daily practice and justify the need for a campaign for the early detection of this disease.

Materials and Methods: This is a retrospective study of the conventional and endovascular surgical treatment of symptomatic abdominal aortic aneurysms (SAAA) at three institutions, with demographic and risk factor data, within an 8-year period.

Results: Out of a total of 474 patients operated on between 2008 and 2015 due to abdominal aortic aneurysm (AAA), 71 patients were symptomatic. Mortality with endovascular treatment was 34.2% and with open surgery 80.0%. More than 70% of patients arrived in shock and the time of symptom onset was on average more than 8 hours. Hemodynamic instability (p = 0.013) and long-term assisted mechanical ventilation (p = 0.0001) were predictors of mortality.

Conclusión: The endovascular resolution of SAAA is the best therapeutic option because of low morbidity and mortality, with high short- and long-term efficiency. To achieve good results, we must have appropriate technology and materials and continuing medical and paramedical training. The prevention and early treatment of AAAs through massive detection campaigns is our ideal, ultimate objective.

INTRODUCTIÓN

In 1997, abdominal aortic aneurysms caused around 13,000 deaths in the United States. (1)

However, the aneurysmal disease was diagnosed two thousand years before Christ, and its treatment evolved from ligature through thrombosis, cellophane wrapping, etc. – all with very poor results. It was only in 1951 that Charles Dubost proposed as a surgical technique the replacement of the abdominal aortic aneurysm using a cadaver graft. At that time, this technique revolutionized the entire therapeutic proposal for such pathology.[1]

The concept did not undergo any substantial changes until the advent of the endovascular therapeutics. This conceptual change modified the treatment of aneurysms in such a way that today more than 95% of the infrarenal arterial dilatations are performed with this technique.

It is from the 60s and 70s, when the first endoluminal tools (catheters, introducers, wire guides, angioplasty balloons, stents, etc.) were created, that this therapeutic revolution began. In 1990, the concept of "endovascular treatment" materialized combining the existing materials with a bold and innovative idea.[2]

Since then, new techniques and tools have made it possible to treat this pathology in more challenging anatomies, inexorably displacing the "conventional management".[3] Today, discussion does not center on the benefits of this new current but on its technical aspects.

Vascular surgeons drove this change by getting trained, devising new proposals and establishing hybrid operating rooms as a new workplace.

This study was intended: 1) to evaluate the results of the conventional and endovascular surgical treatment of symptomatic abdominal aortic aneurysms at three institutions, with equal diagnostic and therapeutic algorithm and the same surgical school, over the last 8 years; and 2) to communicate case studies which represent our daily practice and justify the need for a national campaign for the early detection of this life-threatening disease.

MATERIALS AND METHODS

Out of the 474 patients with an infrarenal abdominal aortic aneurysm (AAA) who underwent endovascular or conventional surgery at the three centers mentioned above over the last 8 years, a selection was made of those symptomatic patients (SAAA) that presented the pathology at the time of the doctor's appointment. All patients or their representatives signed a consent form.

If the hemodynamic state allowed so, the necessary materials and devices were available and the anatomy was appropriate, endovascular treatment (EVSAR) was attempted first. In those patients who did not meet the above conditions, the conventional open management of symptomatic abdominal aortic aneurysms (COMSAAA) was performed.

Upon a suspected SAAA, hemodynamically stable patients (conscious, with systolic pressure > 80 mmHg) were transferred to the tomography room for a computed angiotomography (CAT), whereas hemodynamically unstable patients were taken immediately to the operating room. All of them were managed with a resuscitation protocol called "hemostatic resuscitation or permissive hypotension", which is based on the restriction of resuscitation with fluids in an aggressive way, as long as the patient remains conscious and systolic blood pressure is above 80 mmHg.

In the case of stable patients, if the CAT confirmed that the anatomical characteristics of the aneurysm were appropriate for endovascular treatment, the patient was considered eligible for this procedure (EVSAR). If patients were unstable, without previous CAT, at the operating room they underwent an intraoperative angiography, which served to determine the adequate anatomical characteristics for EVSAR. In some other cases, due to the extreme instability of the patient or to the lack of appropriate resources or means, it was decided to perform CMSAAA.

The morphological characteristics considered appropriate in patients with SAAAs were modified in relation to the "instructions for use" of the different available endoprostheses. Local anesthesia was the first option for those patients.

The hemodynamic variables were recorded upon admission, establishing the severity of the clinical picture and other hospital parameters. Other outcomes included 30-day mortality and postoperative complications.

STATISTICAL ANALYSIS

Data were entered in a database (Microsoft Excel 97) and then analyzed using the statistical package (SPSS 19 and Medcalc 16.4). For all variables, their distribution of frequencies and/or percentages was established in relation to the total number of cases. For ordinal or higher-scale measurements, the following statistics were computed: number of cases, minimum value found, maximum value found, median, mean, standard deviation.

For the group-by-group analysis and the estimation of survival time (100-event probability), the Kaplan-Meier survival analysis technique was used, whereas the Log-Rank test was used as the significance test, considering an alpha value below 0.05 as the significance level.

For the multivariate analysis, the Cox regression technique was used considering alpha = 0.05 as the input alpha level for independent variables and alpha = 0.10 as the output level. For the final model, the collinearity and goodness-of-fit assumptions of the model were compared.

For the determination of the cut-off point in variables measured on a proportional scale (quantitative) that are associated with the

event, the logistic regression technique and the analysis of predicted probability values (Study 3) were used. Then, the curve that allows to determine the value of the inflection point of the plotted curve (cut-off point) was plotted.

RESULTS

Between May 2008 and December 2015, 71 patients with symptomatic abdominal aortic aneurysm (SAAA) underwent surgery. Average age: 72.3 years, male/female ratio: 7:1. In all cases, the diagnosis was confirmed by ultrasound or tomography; 45 patients had more than 6 hours of symptom onset, and 57 were conscious at the time of admission.

24% had a history of AMI, 29.5% of COPD, 9.8% of chronic renal failure. 91% had a history of smoking and 87.3% of arterial hypertension.

30-day global mortality was 34.2% in the group of endovascular treatment (EVSAR) and 80% in the group of conventional management (CMSAAA) (OR 7.7, 95% confidence interval 2.55 to 23.24, $p = 0.000$). If the various populations are analyzed separately, it is observed that there were situations which could be called "ideal": patients with less than 6 hours of rupture, hemodynamically stable upon admission and who received endovascular treatment. This subgroup had no 30-day mortality. Instead, those hemodynamically unstable patients that, given the urgency, received general anesthesia and underwent CMSAAA had a mortality rate of more than 80%.

In the EVSAR group, death occurred within the first 30 days. Two patients died within 72 hours because of severe hypovolemic shock, one died due to the compartment syndrome, and one as a result of a type I endoleak not treated due to the high risk of the patient.

On the contrary, in the CMSAAA group, 10 patients were admitted hemodynamically stable but their mortality also was 80% (Figure 1). AMI, renal failure, ischemic colitis and the compartment syndrome were the causes of mortality. The 3-year cumulative survival rate was 44%.

A univariate analysis explored the mortality-related risk factors in patients with symptomatic aortic aneurysm. For this purpose, it established correlations with age, sex, hemodynamic stability, rupture time above 6 hours, need for preoperative intubation, prior coronary angioplasty or myocardial revascularization surgery, prior AMI, cerebrovascular disease, peripheral vascular disease, heart failure, COPD, renal failure, obesity, type of anesthesia, need for aortic occlusion balloon, possibility

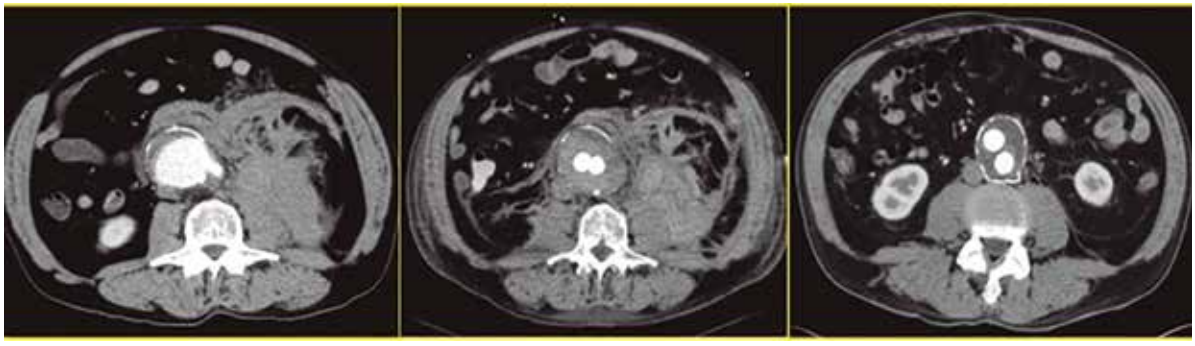

Figure 1. Tomography prior to surgery, during the immediate postoperative period and on the follow-up of a patient with ruptured aortic aneurysm treated endovascularly. Sack decrease and hematoma resorption are observed.

of endovascular treatment, need for hypogastric artery embolization, deliberate hypogastric artery occlusion, additional proximal cuff, need to perform the chimney technique, presence of a major complication, conversion to open surgery, and postoperative complications such as AMI, ARF with hemodialysis, long-term assisted mechanical ventilation (AMV), ischemic colitis, compartment syndrome, multi-organ failure, paraplegia and stroke.

The analysis suggested mortality risk factors such as hemodynamic instability, consciousness upon admission, previous endotracheal intubation, obesity, the use of general anesthesia, the use of aortic occlusion balloon, open surgery, the type of endoprosthesis used, the presence of major postoperative complications such as long-term AMV, compartment syndrome and multi-organ failure (Table 1). However, when these factors are grouped by collinearity, one realizes that instability hemodynamics, the state of consciousness upon admission, preoperative endotracheal intubation, general anesthesia and the use of occlusion balloon are variables directly related to the preoperative hemodynamic state. Major complications such as long-term AMV, compartment syndrome and multi-organ failure relate to a postoperative period with a high mortality rate. For this reason, a multivariate analysis with a collinearity test was conducted then.

Collinearity was found between independent variables (linear correlation coefficient r ≥0.6 significant). Therefore, only the variables between which there was no collinearity and which were most statistically and clinically relevant for the prediction of the event were included in the initial model. The multivariate analysis in Table 2 describes the initial model.

Table 1. Multivariate analysis before collinearity tests.

RISK FACTORS	B	SE	Sig.	OR	95% CI for OR	
					Lower	Upper
Hemodynamic stability	-2.155	0.549	.000			
Conscious upon admission	-1.968	0.809	**0.015**			
Preop intubation	2.313	0.802	**0.004**	10.109	2.101	48.633
Obesity	-1.109	0.517	**0.32**	3.032	1.101	8.348
Local anesthesia	-3.321	0.809	**0.000**			
Aortic balloon	2.015	0.888	**0.025**	7.500	1.290	43.608
No EVSAR	-2.043	0.563	**0.000**	7.7142	2.559	23.2484
No Zenith endoprosthesis	-1.123	0.552	**0.043**	3.072	1.0358	9.0909
No Endurant endoprosthesis	-2.364	0.861	**0.006**	10.6363	1.9693	57.446
Major complication	2.482	0.572	**0.000**	11.968	3.903	36.704
Long-term AMV	3.397	0,659	**0,000**	29,867	8.216	108.570
Compartment syndrome	1.419	0.831	**0.088**	4.133	0.811	21.070
Multi-organ failure	1.405	0.703	**0.046**	4.074	1.027	16.168

RISK FACTORS	B	SE	Sig.	OR	95% CI for OR	
					Lower	Upper
Instability	-1.8777	0.916	0.40	6.55	1.086	39.302
Obesity	-0.244	0.829	**0.768**	0.783	0.154	3.975
Surgery with local anesthesia	-1.757	1.347	0.192	0.173	0.12	2.421
No Zenith endoprosthesis	-0.495	1.164	**0.671**			
No Endurant endoprosthesis	1.880	1.970	0.340	6.553	0.138	311.368
AMV	3.120	1.001	**0.002**	22.648	3.181	161.231
Multi-organ failure	0.140	1.352	**0.918**	1.150	0.081	16.288

Table 2. Initial model for the multivariate analysis.

According to these results, in the presence of the other variables, the risk factors of obesity, anesthesia, type of endoprosthesis and multi-organ failure lose statistical significance in relation to the event. Table 3 describes the final model.

RISK FACTORS	B	SE	Sig.	OR	95% CI for OR	
					Lower	Upper
Hemodynamic instability	-1.735	0.702	0.013	5.667	1.431	22.4368
Long-term AMV	3.139	0.698	**0.000**	23.077	5.875	90.644

Table 3. Results of the final multivariate model.

In conclusion, the perioperative mortality of patients with symptomatic aortic aneurysm is directly influenced by their hemodynamic state upon admission to the institution. Undoubtedly, in the case of a patient in shock that undergoes aneurysm repair surgery, any major complication parameter in the postoperative period will mark a torpid evolution that in most cases ends with the death of the patient.

DISCUSSION

Despite great advances in the knowledge of pre, intra and postoperative management and new anesthetic techniques, the conventional open management of symptomatic abdominal aortic aneurysms (CMSAAA) has maintained a mortality rate of more than 40%. These figures could not be modified in the last 20 years.[4] On the contrary, various series have shown results of mortality associated with the endovascular treatment of symptomatic aneurysms (EVSAR) with values lower than 25%.[5-6] It is already known that the endovascular management of this mortal pathology involves lower morbidity, lower hemodynamic compromise as long-term aortic clamping (essential in high-risk patients) is avoided, lower anesthesiology impact, and more rapid recovery – all resulting in lower mortality.

Our figures coincide with a meta-analysis recently published with US Medicare data, on a population treated for symptomatic abdominal aortic aneurysms (SAAAs) in the 2001-2009 period, in which 30-day mortality of the EVSAR group was 33.8% as compared to 47.7% of the CMSAAA group.[8]

More recently, three studies comparing EVSAR and COAAAR have been published. The first one to be published was the Dutch study

Amsterdam Acute Aneurysm Trial (AJAX),[5] followed by the presentation of the French study ECAR[6] and the English study *Immediate Management of the Patient with Rupture: Open versus Endovascular Repair (IMPROVE)*.[7]

In the AJAX study, in-hospital mortality was 21% for patients in the endovascular group and 25% for those treated with open surgery, showing no significant difference. The results were better than expected due to an improvement in patient logistics, the use of tomography imaging and, above all, the centralization of patients in only 3 institutions of high academic level.

In the IMPROVE study recently presented, 54% were treated endovascularly with an associated mortality rate of 25%. However, when both groups were compared, no significant difference could be established. Preoperative blood pressure under 70 mmHg (hemodynamically unstable) and the type of anesthesia used were predictors of mortality.

In our study, as regards mortality, hemodynamic instability was associated to an HR of 5 and assisted mechanical ventilation to an HR of 23.

The abdominal compartment syndrome is a known complication of endovascular treatment.[9] It normally occurs in hemodynamically unstable patients with a large retroperitoneal hematoma. The result is intra-abdominal hypertension and multiple organ system dysfunction.[10 and 11] Early recognition, or even suspicion, through the measurement of bladder pressure and surgical decompression are needed to improve survival. The use of an aortic occlusion balloon, coagulopathy, massive transfusion and conversion to an aorto-uni-iliac device are predictors of the syndrome. In our experience, it was a cause of mortality and was present in 3 of our 71 patients.

CONCLUSION

In our country, anatomical constraints and, especially, logistics (banks of endoprostheses) make the endovascular technique difficult to apply for the treatment of patients with symptomatic aneurysms. However, our approach is to attempt endovascular treatment as the "first treatment option" for patients with symptomatic aneurysms.

The authors of this paper are involved in this approach since its inception, totally convinced that it is the best therapeutic option for patients suffering from this disease.

The vast difference between the two approaches – EVSAR and CMSAAA –, shown in this humble communication and supported by international literature, dispels any doubts as to which the best therapeutic option is.(9) In this presentation, we have documented the early technical success and good long- and short-term results obtained with the endovascular treatment of SAAAs.

After the period of endovascular training at the same surgical school, our job was to attempt to create and coordinate "aorta treatment centers" that include a multidisciplinary group of specialists (cardiology, cardiac surgery, vascular medicine, vascular surgery, cardiovascular anesthesia, imaging, nurses and technicians) expert in the diagnosis and treatment of the aneurysmal disease.

The creation of these centers, with the appropriate provision of

materials and infrastructure, would help to provide EVSAR to most patients with SAAA.

However, we know that finding the most intelligent solution to this problem, beyond the technique to be used in emergency cases, does not imply high costs, sacrifices or unattainable procedures but just the determined and tenacious search for such pathology. This could be achieved through national massive detection campaigns.

With this paper, our ultimate objective is to contribute to their implementation. Detecting an abdominal aortic aneurysm early only requires an abdominal ultrasound scan.

It is a matter of raising awareness, informing the community and getting the attention of the health authorities.

The treatment of a patient with symptomatic abdominal aorta aneurysm is a frustrating, challenging emergency situation which stretches the surgical team to the limit. The difference between the endovascular and conventional approaches is significant, but even more significant is the difference between treating symptomatic and asymptomatic aneurysms.

For this reason, today our daily actions are focused on the prevention and early detection of aneurysms and on the search for excellence in the endoluminal technique.

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SCIENTIFIC LETTER

NATURAL EVOLUTION OF TYPE A AORTIC DISSECTION IN FOUR PATIENTS WITHOUT SURGICAL TREATMENT

ABSTRACT

Introduction and objectives: To describe the characteristics, form of presentation, clinics, treatment and evolution of four patients with type A aortic dissection on whom no surgical treatment was performed.

Methods: A descriptive study of 4 patients with type A aortic dissection is conducted.

Results:

Case 1 – 37-year-old male patient referred from another hospital with a clinical picture of 4-day aortic dissection. A tomography was performed and type A aortic dissection was diagnosed. He remained asymptomatic. Surgical treatment was proposed and the patient refused it. After 10 days, the patient was released with antihypertensive therapy. He has been on follow-up for a year, showing resorption of hematoma of ascending aorta and permeable dissection of descending aorta.

Case 2 – 49-year-old male patient referred from another hospital with a picture of 10-day type A aortic dissection. Upon admission, the patient was asymptomatic and refused surgical treatment, he had dissection and aneurysm of ascending aorta, arch and descending aorta. He was released after 7 days. He has been on follow-up for 22 months with no change of aortic diameters observed. He continues asymptomatic.

Case 3 – 75-year-old male patient with a history of two cardiac surgeries (MRS 12 years ago and AVR 7 years ago). He had had precordial pain radiated to the back 20 days ago. A CAT was performed showing type A aortic dissection. The patient was asymptomatic and refused surgical treatment given the risks. He has been on follow-up for 34 months.

Case 4 – 53-year-old male patient with a clinical picture of 36-hour type A aortic dissection. Upon admission, the patient was asymptomatic. Surgical treatment was proposed and the patient refused it. He was released after 10 days. He has been on follow-up, asymptomatic and with dilation of ascending and descending aorta.

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Conclusion: Type A aortic dissection is a high-mortality disease in its acute form. We presented 4 patients who refused surgery. Today, they remain asymptomatic after an average follow-up of 2 years, with aortic diameters similar to those presented in the acute phase.

Keywords: Aortic dissection. Treatment. Evolution.

INTRODUCTION

Etiology and classification of aortic dissections

The aortic dissection is characterized by the creation of a false lumen in the middle layer of the aortic wall. The types of dissections are classified according to the presence and location of early tears, as well as to the retrograde or antegrade extension of the dissection. The Stanford Group refers to types A and B, depending on whether the ascending aorta is affected by the dissection or not. DeBakey differentiates among type I, when the ascending and descending aortas are affected; type II, when only the ascending aorta is affected; and type III, when only the descending aorta is affected.

A typical aortic dissection (AD) begins with the formation of a tear in the aortic intima, exposing the sick underlying middle layer to pulsatile blood flow. This blood flow penetrates the middle layer, dissecting it and extending distally in variable length, creating a false lumen; occasionally, it extends proximally.

Shear forces may cause the tearing of the inner part of the dissected aortic wall (intimal flap), producing additional entry or exit sites. The distension of the false lumen may stenose and distort the true aortic lumen.

The most frequent location of the primary intimal tear is the ascending aorta between 1 and 5 cm above the right sinus of Valsalva in 65% of cases, the proximal descending aorta below the left subclavian vein in 20% of cases, the transverse aortic arch in 10% of cases, and the distal thoracoabdominal aorta in 5% of cases.

There are predisposing factors for aortic dissection such as age, systemic arterial hypertension (AHT), congenital abnormalities of the aortic valve, inherited disorders of the connective system, traumatic and other factors. AD affects patients between the fifth and seventh decades of life, with more frequency in males (3:1). For people under 40 years old, the frequency is similar in both sexes given the greater frequency of AD in women during the third trimester of pregnancy.

ATH is found in 80% of cases and is the second predisposing factor in terms of importance. Cystic medial degeneration is an intrinsic sign of various inherited disorders of the connective tissue, most notably the Marfan syndrome and the Ehlers-Danlos syndrome, in which there is collagen and medial elastin deterioration, which would be the main predisposing factor for most non-traumatic ADs. Patients with Marfan syndrome,

in addition to their propensity to the development of thoracic aortic aneurysms, have high risk of AD at a relatively young age. Annuloaortic ectasia with idiopathic dilatation of the ascending aorta and aortic insufficiency originates from cystic medial degeneration and also predisposes to AD.

Clinical presentation

The most common symptom is sudden-onset severe pain of a tearing, pulsating nature migrating in the direction of the dissection, located in the front of the chest, neck and jaw when the aortic dissection (AD) is in the proximal aorta or in the interscapular area and the abdomen if the AD is distal, with the incidence of shock and preserved or high arterial tension.

Less common symptoms upon presentation of the AD, with or without associated chest pain, would be:

-Cardiac arrest due to severe aortic insufficiency in proximal ADs;
-Syncope without focal neurological signs due to rupture of proximal AD in the pericardial cavity with tamponade or, less frequently, due to rupture of descending aortic dissection in the left pleural space;
-Stroke, peripheral neuropathies or paraplegia;
-Cardiac arrest or sudden death.

Physical examination

AHT appears in 80%-90% of distal ADs while is less common in proximal ADs. True arterial hypotension is more frequent in proximal ADs due to cardiac tamponade, although distal ADs also cause arterial hypotension due to intrapleural or intraperitoneal rupture. When the dissection occludes brachiocephalic vessels, it is possible to register arterial hypotension (pseudohypotension) inaccurately.

Typical physical signs associated with AD are more characteristic when the proximal aorta is affected. These would be:

-Pulse deficit (50% at proximal AD and 15% at distal AD) due to vascular lumen occlusion by the flap or due to the extension of the very dissection in the artery and compromise of the true lumen by the false channel. Sometimes, pulse deficits are transient due to distal reentry or movements of the intimal flap.
-Aortic insufficiency (AI) is an important sign of proximal AD (50%-66%) with a musical murmur at the right sternal border with intensity depending on blood pressure. Due to the associated cardiac arrest, the murmur and peripheral signs of the aortic insufficiency may disappear. Aortic root and ring dilatation, leaflet retraction, flap prolapse and ring torsion are involved in its origin.
-Neurological manifestations (6%-19%): stroke may occur in 3%-6% due to direct involvement of the common carotid or innominate artery; coma, paraplegia and paraparesis with less frequency.
-Inferior acute myocardial infarction (AMI) (1-2%) due to involvement of the coronary artery ostium because of the flap. The dissection may not be recognized, with catastrophic consequences if treated with thrombolytics.

-Renal infarction, renal failure and severe AHT due to compromised renal artery (5%-8%).
-Ischemia and mesenteric infarction (3%-5%).
-Femoral pulse deficit (12%) due to compromised iliac arteries, with minimum chest pain that may be confused with peripheral embolism.
-Other clinical manifestations may be hemothorax, hemoptysis and hematemesis due to ruptures in the pleural space, bronchi and esophagus. Ruptures in the left or right atrium, in the right ventricle with cardiac arrest have been described occasionally.
-Superior vena cava syndrome, sternoclavicular pulsation, pulsatile neck mass and Horner's syndrome.

The aortic dissection is characterized by the creation of a false lumen in the middle layer of the aortic wall. The types of dissections are classified according to the presence and location of early tears, as well as to the retrograde or antegrade extension of the dissection.

DIAGNOSTIC METHODS

As aortic dissection is an entity with very different forms of clinical presentation, the doctor needs to have a high level of suspicion to establish a quick and accurate diagnosis. The three clinical factors most frequently associated with aortic dissection are a history of arterial hypertension, sudden-onset intense chest pain and pain irradiation.1 These factors, together with a normal electrocardiogram, high blood pressure in anamnesis, the absence of any of the peripheral pulses, the murmur of aortic insufficiency and a widened mediastinum evidenced in the chest X-ray, force the doctor to rule out an aortic dissection.

There is no test of choice in the evaluation of aortic dissections because available techniques have advantages and disadvantages; for this reason, each technique will be more complete in the study of some of the different diagnostic aspects.

Electrocardiogram

The electrocardiogram is normal in most cases. In very hypertensive patients, it may show signs of left ventricular hypertrophy. Although it does not support the diagnosis of aortic dissection, it is essential to differentiate this entity from acute myocardial infarction, since the clinical picture may be very similar. It should be noted that, in cases where the flap dissects the coronary artery, the ECG can reveal signs of AMI.

Chest X-ray

Although it has been suggested that a chest X-ray properly performed and interpreted by experts has high diagnostic accuracy[2], in fact there are unmistakable signs of dissection in less than 30% of patients.[3] However, it is accepted that in the diagnostic process it is essential to have a chest X-ray because it can not only offer compatible signs and consequently support the need for another imaging test to confirm the diagnosis but also identify other causes of chest pain. On the other hand, high interobserver variability is recognized[2], so it should not be the only imaging test in case of a suspected dissection. Radiographic signs suggesting an aortic dissection are[2]: effacement or widening of the aortic knob, pleural effusion (usually left), tracheal deviation, distance over 6 mm between an intimal calcification and the

contour of the aortic wall, widened mediastinum, widened ascending or descending aorta, and widening of the paraspinal line. The separation between the intimal calcification and the aortic contour, a sign widely referred to in the literature, is much unspecified.

Laboratory data

Laboratory data are very non-specific. Leukocytosis is frequent and there may be anemia due to blood sequestration in the false lumen or to blood extravasation from the aorta. Creatinine may increase when renal perfusion decreases. Blood hemolysis in the false lumen causes a lactodehydrogenase rise in some patients[4]. Recently, the detection of specific anti-myosin antibodies has proven to have very high diagnostic accuracy for aortic dissection[5], although it is a method that is not yet available.

Echocardiography

The echocardiographic diagnosis is based on the detection of the intimomedial flap, which divides the aorta into the true and false lumens. The transthoracic echocardiography provides a sensitivity of between 50% and 80% and a specificity of between 70% and 90%.[6,7] The study must include the visualization of the aorta not only through the usual windows (left parasternal and apical) but also through the suprasternal, supraclavicular, subcostal, abdominal and, if there is pleural effusion, subscapular projections. Thus, the aorta is recognized in its entirety. Despite this, visualizing the descending aorta is particularly difficult.[8]

The transesophageal echocardiography (TEE) has changed the diagnostic attitude for aortic dissection radically. The esophagus is in close contact with the aorta, so its study is very comprehensive. The great limitation is the difficulty to study the highest part of the ascending aorta due to the interposition of the trachea and the left main bronchus, although it is very rare that dissections are exclusively located in that region. Adequate sedation of the patient is essential to prevent sudden blood pressure rises that may precipitate an aortic rupture. The sensitivity, specificity and predictive values are above 95%.[9] A transesophageal study must include the following aspects: identification of the flap and the true and false lumens; identification of the entry tear; thrombosis of the false lumen; involvement of the ascending aorta, arch and descending aorta; aortic diameter; aortic valve assessment; involvement of aortic branches including the proximal part of the coronary arteries and supra-aortic trunks; ventricular function study; and the presence of pericardial effusion. In all these aspects, the TEE has proven to have a high level of performance; therefore, if available, it could be the technique of choice. In addition, it is fast and can be performed with no need to transfer to the patient.

Computed tomography

The results offered by the computed tomography (CT) are comparable to those of the TEE. Its sensitivity and specificity are nearly 100%.[10] As compared to other techniques, it has some limitations such as the need for nephrotoxic contrast, the limited

possibility of detecting the entry tear[10] and the lack of hemodynamic information especially concerning the state of the aortic valve. Instead, the CT is widely available and is much less dependent on the operator than the other techniques. In those centers where TEE or magnetic resonance imaging (MRI) is not available, the combination of the transthoracic echocardiography and the CT provides rapid and accurate diagnostic information.[11] Undoubtedly, it is adequate to decide the urgent transfer of the patient to a reference center with cardiovascular surgery or to rule out the diagnosis of aortic dissection.

Magnetic resonance imaging

The MRI can be considered the most complete technique in the diagnosis of aortic dissection, since it allows for a thorough evaluation of the aortic morphology and its surrounding structures.[12] All the characteristics of the dissection studied by other techniques can also be properly evaluated with MRI. The cine MRI technique can also identify aortic regurgitation as it shows the areas of turbulent flow in the left ventricle during diastole.[13] Its great limitations are limited availability, the need for more time for its performance than other techniques and the difficulty of its performance on unstable and intubated patients. Also, it is contraindicated in patients with pacemakers and implantable cardioverter defibrillator.

Angiography

The use of angiography as a diagnostic tool in aortic dissections dates back to 1960. It has a sensitivity of 88%, a specificity of 94% and a diagnostic accuracy for aortic dissections of 98%.

The high-speed injection of iodinated contrast in the aorta allows to study its lumen and branches, including the coronary arteries, and to evaluate the aortic valve and its competence.

The angiographic diagnosis of aortic dissection is based on the demonstration of anatomical anomalies.

Direct signs are: *a)* Presence of an intimomedial flap, visualized as a linear and mobile intraluminal repletion defect; *b)* visualization of a false lumen with less density than the true one and slow washout of the contrast, and *c)* deformation of the border and normal curvature of the aorta due to the compression exerted by the false channel.

Indirect signs are: *a)* rigidity, lack of mobility in a segment of the aortic wall, which may express the presence of hematoma, and *b)* increase in the thickness of the aortic wall above 5 mm.

This technique may fail primarily for the following reasons: a) when the filling of the false channel is very good and the density of contrast is equal to that of the true channel, or when it is very bad and there is practically no passage of contrast; *b)* when the dissection is very small; and *c)* when with the angiography the aortic lumen "is seen" but the wall "is not seen", as in ultrasound images.

In brief, the angiography is a technique with good diagnostic performance for aortic dissections, safe, well tolerated even by patients in a critical situation, and with the advantage that it allows to visualize the state of aortic branches, including the coronary arteries.

MEDICAL TREATMENT FOR AORTIC DISSECTIONS

Once again, it is important to focus on the high index of suspicion, i.e. to think about this entity in order to establish the correct diagnosis of aortic dissection.

Once there is suspicion of this disease, and while waiting for the performance of the appropriate diagnostic studies, the patient must be admitted to the ICU, where blood pressure, heart rate, central venous pressure, urine volume and even pulmonary capillary pressure will be monitored. Pain and arterial hypertension will be carefully treated.

Pain is present in 90% of patients and is often unbearable. Morphine is a good drug given its blood pressure lowering effect, but other analgesics may also be used.

Arterial hypertension is also a very common finding, especially in abdominal aortic dissections. When hypotension is registered, the doctor will need to think about: *a)* cardiac tamponade; *b)* rupture of the aorta to the pleura or the peritoneum, and *c)* "pseudohypotension" due to the dissection of the brachiocephalic trunks.

The most recommended treatment for hypertension, in this entity, is fast-acting vasodilators, specifically nitroprusside. In order to try to avoid the progression of the dissection and the rupture of the aorta, in addition to the control of blood pressure by reducing the systolic level to 100-120 mmHg, the reduction of the speed and ejection force of the left ventricle with beta-blocker therapy was proposed. The most classic guideline is 1 mg of propranolol i.v. every 5 min to get a heart rate of 60-70 beats per minute. Naturally, other beta-blockers with fewer side effects may be used. Calcium antagonists, especially sublingual nifedipine, are also recommended for AHT control. ACE Inhibitors are useful in refractory AHT resulting from renal artery occlusion.

In brief, the medical treatment for aortic dissection is intended to control pain and arterial hypertension and to reduce the speed and ejection force of the left ventricle. All this is aimed at providing patient welfare and avoiding the progression of the dissection.

Once pain and hypertension are controlled and the contraction speed of the left ventricle decreases, the future therapeutic choice differs depending on the anatomical location of the dissection.

The treatment most widely used for a distal aortic dissection is also medical, with a hospital survival of 80%. This location occurs in older patients with a more advanced atherosclerotic disease and frequently also with a superimposed pulmonary disease. All these factors expose this kind of patients to high surgical risk. Naturally, this therapeutic recommendation is not universal and there are groups that advocate surgical treatment. However, there are studies showing the same results with the medical and surgical treatments of uncomplicated distal aortic dissections. A recent communication describes higher mortality in a group of patients with type B dissection treated with surgery as compared to those medically treated.

RESULTS

Case 1

37-year-old male patient referred from another hospital with 4-day precordial pain radiated to the back. A history of uncontrolled hypertension. A chest tomography was performed upon admission, diagnosing a type A aortic dissection from the arch to the aortic bifurcation. According to the echocardiogram, a dissection flap was observed in the ascending aorta 3 cm from the valve plane, which is thrombosed. Arch and descending aorta dissection flap with permeable false lumen.

He remained asymptomatic since the admission, with control of blood pressure. Surgical treatment was proposed and the patient refused it. After 10 days, the patient was released with antihypertensive therapy. He has been on follow-up for 12 months, presenting resorption of ascending aorta hematoma and permeable dissection in descending aorta without increase of aortic diameters. He continues asymptomatic.

Case 2

49-year-old male patient referred from another hospital with a diagnosis of 10-day type A aortic dissection. Upon admission, he was asymptomatic and presented dissection and aneurysm of ascending aorta, arch and descending aorta. An echocardiogram was performed and a dissection flap was observed in the ascending aorta 2 cm from the valve plane without compromising the valve. A computed tomography (CT) was performed and an aortic dissection was observed in the ascending aorta (with false lumen thrombosed), arch and descending aorta with permeable false lumen. The patient refused surgery. He was released after 7 days. He has been on follow-up for 24 months with no change observed in the aortic diameters. He remains asymptomatic.

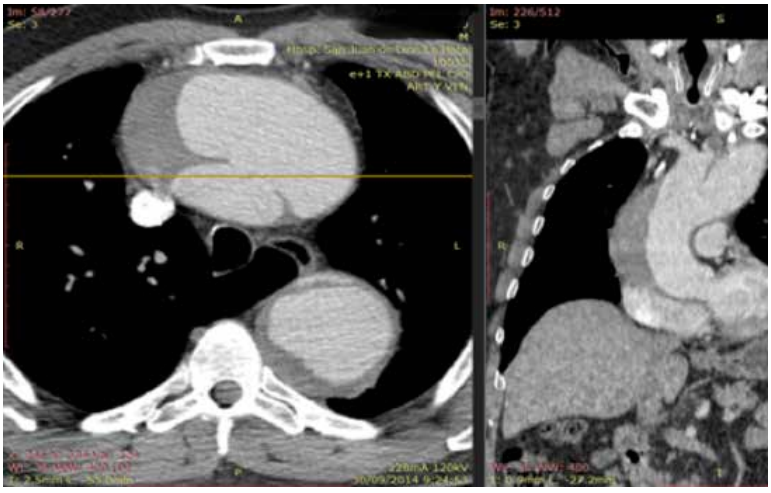
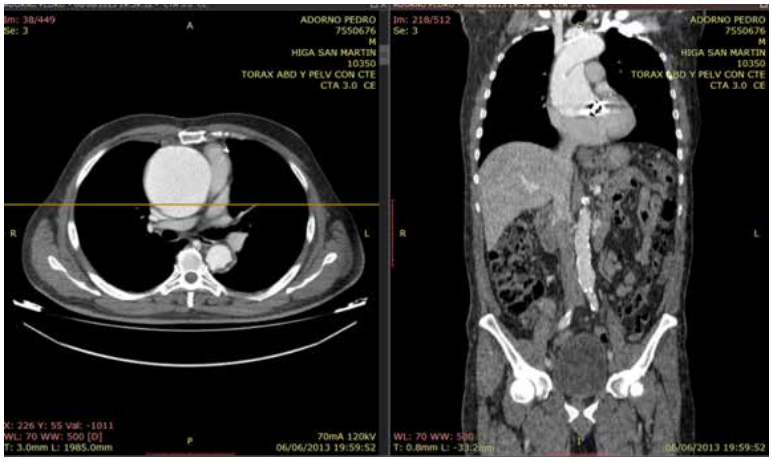


Image of admission in 2014.

Imagen control en 2016.

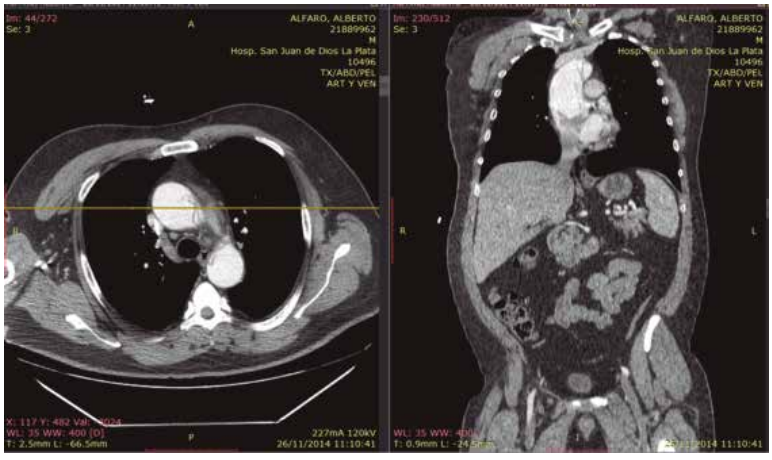
Case 3

75-year-old male patient with a history of two cardiac surgeries (myocardial revascularization with triple bypass 12 years ago and mechanical aortic valve replacement 7 years ago). Doctor's appointment due to 20-day precordial pain radiated to the back. Also a history of poorly controlled hypertension. A CT was performed and a type A aortic dissection was observed with no involvement of the descending aorta. The patient was asymptomatic and refused surgical treatment given the risks. He has been on follow-up for 34 months. He continues with similar aortic diameters.



Case 4

53-year-old male patient with a clinical picture of 36-hour type A aortic dissection. Upon admission, the patient was asymptomatic. A CT was performed and a type A aortic dissection was observed up to the aortic bifurcation. Echocardiogram: dissection flap in the ascending aorta, arch and descending aorta, permeable false lumen. Surgical treatment was proposed and the patient refused it. After 10 days, he was released. He continues on follow-up asymptomatic, with unaltered aortic diameters.



DISCUSSION

Today, no one questions the surgery indication for acute type A aortic dissection. Although our experience includes only 4 cases and there is no literature clarifying the chronic evolution of aortic dissections, these cases show that the aortic diameter remained unchanged, with an average follow-up of 24 months. Questions arise, like what happens with the aortic wall? or would the aortic diameter increase on long-term follow-up?

CONCLUSION

Type A aortic dissection is a high-mortality disease in its acute form. We presented 4 patients who refused surgery. Today, they remain asymptomatic after an average follow-up of 2 years, with aortic diameters similar to those presented in the acute phase.

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SCIENTIFIC LETTER

INFECTIVE ENDOCARDITIS CAUSED BY TOOTHPICK LODGED IN THE RIGHT VENTRICLE

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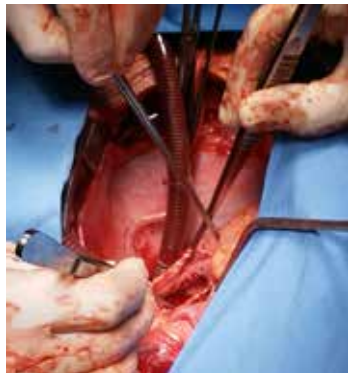
The ingestion of foreign bodies is a common cause of lesions in the gastrointestinal tract. Toothpicks and chicken and fish bones are sharp objects that may also damage other organs, migrate to other areas of the organism or generate an inflammatory mass in the intestinal tract. Papers reported 8,176 lesions by toothpicks in the United States from 1979 to 1982 occurring in 3.6 every 100,000 people a year. In all these cases, diagnosis was difficult and generally reached during the surgical procedure, and the patient usually does not remember having swallowed the toothpick. A rare case was reported of infective endocarditis by ingestion of a toothpick and migration to the right ventricle.

A 42-year-old male with a history of gastrointestinal bleeding at age 15 was admitted to the Emergency Room of the hospital on May 20, 2015 with 3-month febrile syndrome associated with a weight loss of 6 kg - 8 kg. He explained that he had consulted multiple institutions with different diagnoses and thus had received empiric antibiotic treatment without any improvement and with intermittent afebrile periods. He said that a few days earlier he had been admitted with an episode of hemoptysis to a hospital of Corrientes, where serology tests were performed for HIV, VDRL and hepatitis with negative results. Due to the persistence of symptoms, he returned to the hospital. PPD and HMC tests were performed isolating Pseudomona; he began treatment with meropenem+amikacin for 6 weeks. An echocardiography revealed a mass of 1.7 cm x 2.1 cm in RV, which was interpreted as thrombus or vegetations in the context of right-sided endocarditis. A new control echocardiography was performed after 27 days of antibiotic treatment, without evidence of the mass. An angio-CT evidenced septic embolism in the pulmonary parenchyma.

He completed an antibiotic treatment and was discharged from the hospital on July 7.

On July 31, he consulted the Infectology Service again due to a 48-hour febrile episode. Given his medical history, he was admitted to



the hospital. New HMC tests were performed and he was treated with meropenem+amikacin+colistin for a week. Upon admission, he was performed a new echocardiography evidencing a ragged hyperechogenic image of 2.30 cm x 1.7 cm at the vertex of the lateral leaflet of the tricuspid and the RV free wall, suggesting vegetation. Upon completion of ATB treatment, he was controlled by echocardiography revealing no mass. The patient was discharged from the hospital on August 11.

Ten days later, he returned to the hospital after having experienced 2 fever episodes of 39° C associated with a pyrogenic fever the day before. He was received by the infectious disease specialist of the Emergency Room, who admitted him to the hospital with a diagnosis of infective endocarditis. A new HMC test was performed and he was treated again with meropenem+amikacin+colistin.

A new control echocardiography performed on August 19 showed no differences in relation to the previous one. During hospital stay, multiple studies were conducted including ECG scan, scintigraphy, PET scan, and serial transthoracic and transesophageal echocardiographies, one of them revealing inside the right cavities a linear image of greater refringence with position and direction similar to the septomarginal trabecula going through the tricuspid ring and inside the atrium. Its morphology looked like a catheter. This echocardiography allowed to reach the diagnosis of infective endocarditis by a foreign body in the right ventricle. The patient continued with intravenous antibiotic treatment, and developing leukopenia and acute renal failure as a result of antibiotics. The antibiotic was adjusted for the renal function and changed to piperacilin-tazobactam.

A multidisciplinary medical panel agreed on the removal of the foreign body upon stabilization of the renal function.

First, there was an attempt to remove the echocardiographically detected foreign body endovascularly through the right internal jugular vein with a laparoscopy clip and ultrasound control (since it was radiopaque). As it was not possible to move it because it was firmly attached, it was decided to perform a median sternotomy with bicaval and aortic cannulation. He was connected to an extracorporeal circulation system, without developing cardiac arrest, and, by right auriculectomy, it was possible to see the object attached to the septum between the atrium and the ventricle and to determine that it was a whole toothpick. The patient tolerated the procedure, was extubated in the operating room and taken to the Coronary Unit without inotropic requirement. He evolved satisfactorily, received 3-week antibiotic treatment and was discharged from the hospital.

On 6-month follow-up, the patient is asymptomatic with full recovery after the procedure. When asked, he does not remember having ingested the toothpick. We suspect that the toothpick migrated through the thoracic esophagus, either through the atria or through the cava veins. We base on this assumption since the concentration of bacteria is quite larger in the infradiaphragmatic digestive tube and peritoneal innervation is more sensitive, and the patient mentioned that he never had painful digestive symptomatology and that the febrile syndrome symptoms began 4 months after ingestion. In addition, since the toothpick had its 2 tips intact, we suspect that the object made the perforation, caused the dilation, and its other sharp tip caused tissue closure.

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NOVEDADES

PERSPECTIVES

The Imminent Operationalization of the National Institute of Cardiology in Argentina

In the last Congress of the Argentine Society of Cardiology, the Vice-Minister of Health Néstor Pérez Baliño announced the delayed creation of the National Institute of Cardiology with the purpose of knowing and doing research into cardiovascular diseases in Argentina.[1] The implementing regulation of the law for the creation of this Institute will be possibly signed before the end of 2016 and become enforceable in 2017. The role of this Institute will be primarily to know about the health situation and to develop related prevention policies, to evaluate quality standards and to contribute to the design of the country's Universal Health Coverage Plan. Related scientific societies, such as the Argentine Society of Cardiology, the Argentine Federation of Cardiology and the Argentine College of Interventional Cardioangiologists, which could collaborate in the development of research programs, could be involved in the operation of the National Institute of Cardiology, and it is expected that the Argentine College of Cardiovascular Surgeons (CACCV) also participates. The CACCV should keep its eyes open for this new stage of cardiovascular health in Argentina and should promptly propose health ideas and public policies of interest to the new Institute. There are four basic areas on which to work within the field of cardiovascular surgery:

1) The collection of information about the number and type of surgical procedures performed per zone of the country, and the projected needs to fill coverage gaps and to meet the future demand;
2) The proposal and evaluation of quality standards of surgical procedures nationwide;
3) The participation in the evaluation and implementation of technological innovations in the specialization, as well as in the promotion of the local development of such technologies; and

4) The outline of guidelines and requirements to train human resources in cardiovascular surgery.

We need to be ready to support this initiative and to offer our ideas for the sake of the country's cardiovascular health.

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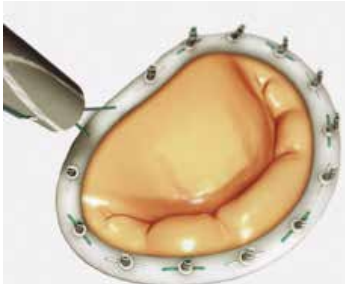

The Sale of the Automated Suture Fastening System Cor-Knot® in Argentina

The Cor-Knot Mini® technology (LSI Solutions, USA), which allows to automatically tie (actually fasten) suture stitches in a prosthetic valve replacement or a mitral valve annuloplasty, began to be sold in Argentina in October 2016. The device consists of a system of titanium clips or fasteners that slide over sutures, adjust threads and automatically trim away excess suture tails. While this system facilitates tying in the case of a minimally invasive approach where reduced space makes the manual task difficult, it is equally useful through a traditional sternotomy. For the time being, there are few reports in the literature; however, it has been suggested that these devices could shorten the time of robotically-assisted mitral surgery considerably.[1] Also, the strength, resistance and speed of this method in adjusting stitches were compared in laboratory animals to those of hand-tying, and very satisfactory results were achieved with Cor-Knot.[2-3] According to other authors, these titanium clips could also serve as a radiopaque marker of the valvular ring for an eventual future valve-in-valve implant,[4] or for some other kind of less frequent surgical indication.[5] Recently, we have had the opportunity to test this device in a mitral valve replacement. After the stitches in the valve and prosthesis rings, loading each pair of sutures in the system through a loop was very easy and quick, as well as unloading each fastener, providing a sense of safety and firmness in securing the prosthesis. In any case, more reports with remote follow-up will be needed to assess the usefulness and safety of the procedure.

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The Failure of the First Leadless Pacemaker and the Premature Adoption of Innovations

Nanostim® Leadless Pacemaker (St. Jude Medical, Inc.) is a miniaturized single-chamber pacemaker (42 mm x 6 mm) with no leads that can be implanted into the right ventricle with an implant tool through a vein. The first clinical trial with 3-month follow-up (LEADLESS trial),[1-2] which assessed the safety of this new device, included only 33 patients with an implant success of 97% and a complication rate over 6%, although 15% of patients required more than one device or replantation for proper stimulation. Nanostim® was approved by the European Community in 2013, and the enrollment of patients in the clinical trial after approval began in March 2014 in Great Britain, Germany, Italy, Czech Republic, France, Spain and Holland. This LEADLESS II trial enrolled 667 patients, with an implant success of 95.8% and a complication rate of 6.7% (1.7% related to dislodgements, 1.3% to cardiac perforation, 1.3% to the need for a new implant, and 0.7% to vascular lesions). After a 6-month follow-up, the expected battery life was reported to be 15 years.[3] However, on October 28, 2016, St. Jude suddenly reported the suspension of the sale of Nanostim® due to problems with the battery of the device, the loss of telemetry and the switching-off of the pacemaker (7 cases in 1423 implants).[4] Given the number of implants to date, there would still be 1397 patients at potential risk of malfunction of this pacemaker. These unexpected events should make us reflect on the danger of the premature adoption of innovations in an area as sensitive as cardiovascular diseases and invasive treatments.

For the time being, the Micra® Medtronic Transcatheter Pacing System (TPS) is the other miniaturized leadless pacemaker that can be implanted in the same way. After an initial experience in animals,[5] a first clinical trial was conducted. By May 2015, 744 patients from 56 centers in 19 countries of North America, Europe, Asia, Oceania and Africa had already been enrolled. The authors concluded that the Micra® TPS could be implanted successfully in 99.2% of cases. The device reached the appropriate threshold criteria in 98.3% of the patients after a 6-month follow-up. While there were only 28 major complications (1.6% corresponded to ventricular perforations and 0.7% to vascular lesions), pre-established safety criteria were also met and 96.0% of patients did not present any complication after 6 months.[6] Based on this publication, on April 19, 2016, the FDA approved the first pacemaker that does not require leads to transmit the electrical pulse to the heart. During the 2016 Congress of the European Society of Cardiology, the company confirmed with new data that the risk of major complications after the implantation of the Micra® TPS remained at 4% on 12-month follow-up.

Although these devices have the advantage of avoiding complications related to the generator pocket and leads (including tricuspid failure) and the possibility of being implanted in the interventricular septum in order to reduce biventricular dyssynchrony, for now they only have VVI format, would not be easily removable in case of malfunction or endocarditis (only one out of three attempts to remove a Micra® with

a special catheter was successful),[7] may migrate and embolize to the lung, may puncture the ventricle, become encapsulated and eventually generate thrombus in the right cavities.[8-9] For the time being, more mid- and long-term results should be expected before adopting this new technology prematurely.

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