

# Perception and experience of spontaneous coronary artery dissection in Spain. Results of a national survey



## *Percepción y experiencia sobre la disección coronaria espontánea en España: resultados de una encuesta nacional*

Fernando Macaya,<sup>a,\*</sup> Santiago Jesús Camacho-Freire,<sup>b</sup> Marcos García-Guimaraes,<sup>c</sup> Vicente Peral,<sup>d</sup> Fernando Alfonso,<sup>c</sup> and Javier Escaned<sup>a</sup>

<sup>a</sup> Instituto Cardiovascular, Hospital Universitario Clínico San Carlos, Madrid, Spain

<sup>b</sup> Servicio de Cardiología, Hospital Universitario Juan Ramón Jiménez, Huelva, Spain

<sup>c</sup> Servicio de Cardiología, Hospital Universitario La Princesa, Madrid, Spain

<sup>d</sup> Servicio de Cardiología, Hospital Universitario Son Espases, Palma de Mallorca, Islas Baleares, Spain

### To the Editor,

Spontaneous coronary artery dissection (SCAD) is a low incidence disease that can cause acute coronary syndromes.<sup>1,2</sup> Although substantial advances have been made in the knowledge of the physiology, diagnosis, clinical management, and prognosis of SCAD, the degree to which such knowledge has entered the medical community is still uncertain. For this reason, it was decided to conduct a descriptive research on the knowledge and attitude of the Spanish interventional cardiologists towards SCAD.

The authors developed a 24-question survey including the clinical presentation, diagnosis, and acute and postcritical management of SCAD.<sup>3</sup> The initiative was approved and supported by the Working Group on Hemodynamics and Interventional Cardiology of the Spanish Society of Cardiology. The survey was closed in December 2018 with 161 answers from 72 centers (26 respondents did not complete the variable "center").

Figure 1 shows the answers given to the question "diagnosis". Two thirds of the respondents associated the SCAD with the profile of a young woman without any risk factors or pregnancy/puerperium-related. Regarding the angiographic manifestation, the most common pattern recognized by the respondents was not an angiographic dissection, but the loss of diffuse caliber in the blood vessel (type 2). Also, most respondents reported a low use of intracoronary imaging for the diagnosis of SCAD. More detailed answers to other questions can be found on the [supplementary data](#).

On suspicion that a stenosis can be a SCAD in the mid anterior descending artery with preserved flow in a patient with acute coronary syndrome, 40% of the respondents said they would use intracoronary images to clarify the diagnosis, while 58.7% responded that they would choose a purely conservative approach and complete the procedure; most of these respondents (72.4%) would perform a follow-up coronary angiography.

Another question in the survey revealed the lack of consensus on the time frame recommended to perform the follow-up coronary angiography. On the indications for performing a coronary computed tomography angiography, 39.8% of respondents said they use it for follow-up purposes of SCADs with high-risk anatomies without revascularization (proximal/multivessel), while 39.1% said they use it for routine follow-up. A minority of respondents (18.6%) indicated the coronary computed tomography angiography in patients diagnosed with SCAD with recurring pain and no confirmed ischemia.

During the acute management at the cath lab, most respondents (54.7%) claimed that less than 20% of the patients with SCADs are treated using percutaneous angioplasties at their centers. For patients with SCAD who require interventional management, 67.7% of respondents said they choose drug-eluting stents; 14.3%, bioresorbable stents; 3.1%, conventional stents, and 14.9% said they always try to avoid implanting a stent (angioplasty without stent). To the question on the experience with cutting balloons, only 8.1% claimed to have used them in the past, while 45% thought this technique was interesting. Coronary revascularization surgery had been indicated as a bailout surgery for percutaneous angioplasty (19.3%) more or less for the left main coronary artery/multivessel (34.7%). However, 46% of respondents admitted they had never indicated surgery.

Figure 2 shows the answers given to the question of postcritical care in patients with SCAD in the mid left anterior descending artery undergoing conservative therapy. It should be mentioned that most respondents recommended prolonged monitoring (> 3 days).

In the medical practice, there is a great variety of antiaggregant drugs and other therapies to be prescribed; still, beta-blockers are indicated by most respondents (82.6%) in patients with preserved ventricular function.

\* **Corresponding author:** Instituto Cardiovascular, Hospital Universitario Clínico San Carlos, Profesor Martín Lagos s/n, 28040 Madrid, Spain. E-mail address: [fernando@macaya.eu](mailto:fernando@macaya.eu) (F. Macaya).

Online: 17-09-2019.

<https://doi.org/10.24875/RECICE.M19000059>

2604-7322 / © 2019 Sociedad Española de Cardiología. Published by Permanyer Publications. This is an open access journal under the CC BY-NC-ND 4.0 license.

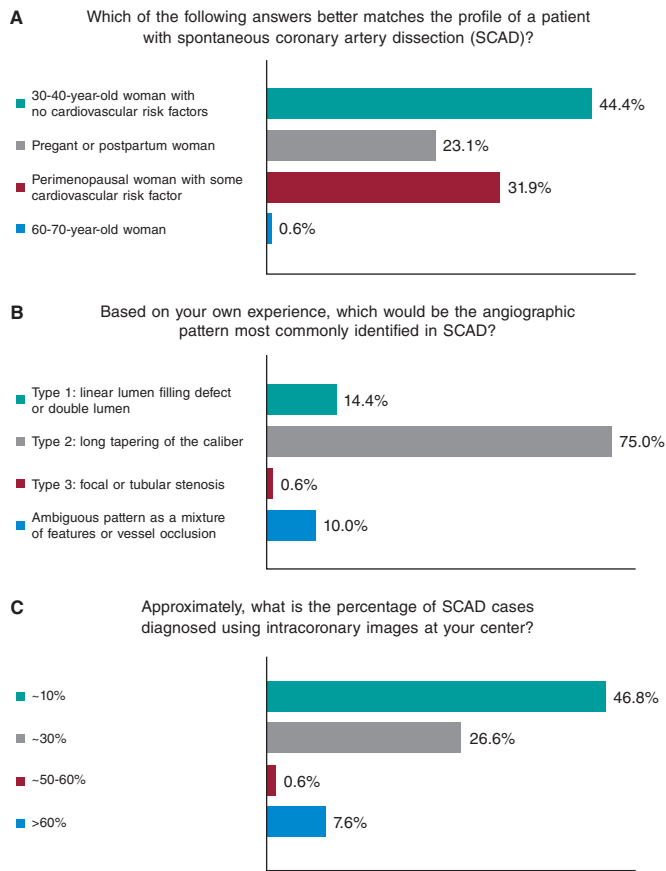


Figura 1. Questions on presentation and diagnosis.

The systematic practice of screening extra-coronary arteriopathy is performed by 44.8% of respondents. On this regard, the most widely used imaging modality is the computed tomography scan (76.4%) followed by magnetic resonance imaging (27.6%) and invasive catheterization (18.1%).

The results from this survey show that there is a significant variety in the perception and management of SCAD by the interventional cardiologists of our country.

Contrary to the classical profile of a fertile young woman, contemporary epidemiological data on SCAD reveal the prototypical profile of a 50-year-old woman during perimenopause and with a few risk factors.<sup>2</sup>

On the other hand, becoming familiar with the angiographic manifestation of this disease has facilitated diagnosis and reduced the use of intracoronary images, a technique with associated risks.<sup>4</sup>

When it comes to the time frame for performing the control coronary angiography, we have seen that most SCADs improve or resolve within a month; however, waiting a little longer turned out to be safe and can improve the diagnostic performance of this second coronary angiography.<sup>2</sup>

The percentage of conservative management reported in this survey is below the percentage reported in other series published,

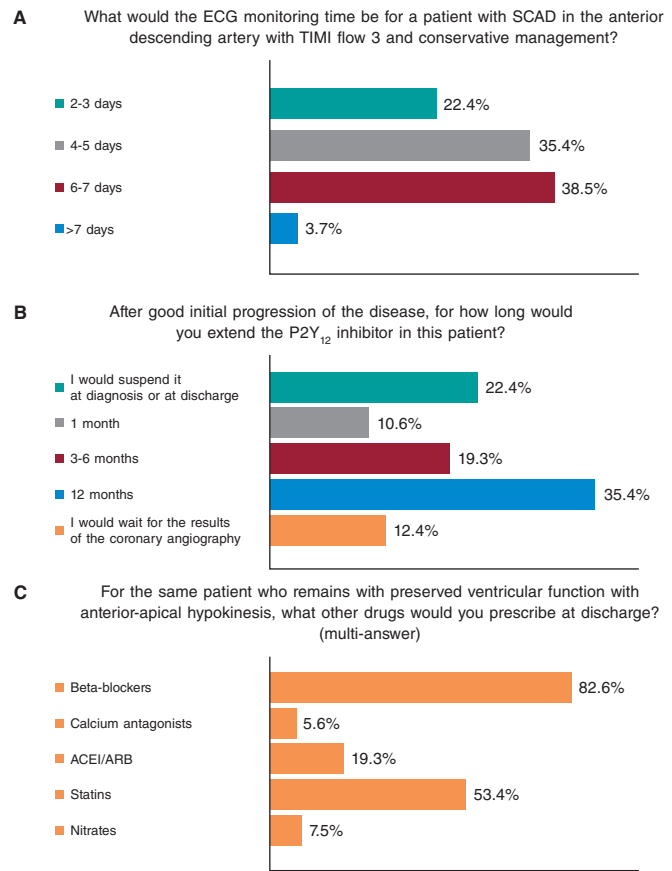


Figura 2. Questions on the postcritical care of patients with spontaneous coronary artery dissections treated conservatively. ACEI/ARB, angiotensin-converting enzyme inhibitor/angiotensin receptor blocker; ECG, electrocardiogram; SCAD, spontaneous coronary artery dissection; TIMI, Thrombolysis in Myocardial Infarction.

which may be a positive piece of information if we consider the preference of conservative treatment for this pathology.<sup>1</sup> Choosing prolonged monitoring in these patients makes total sense and is consistent with the fact that recurring events happen during the first week of convalescence.<sup>5</sup> Finally, the predominant use of beta-blockers is also logical considering their potential advantages and effects. Also because these are the only drugs with some degree of evidence of prophylaxis against SCAD recurrences.<sup>1</sup>

Despite the recent advances made on what we know about this disease and the clinical management of SCAD, there are some key issues in the clinical management of these patients that still need to be solved. The present survey showed a moderate degree of acceptance of the evidence and recommendations available today,<sup>1,2</sup> but also lack of consensus on other issues. If we want to move forward, a huge collective effort for the study of this disease is required through collaborations and prospective registries.

**ACKNOWLEDGEMENTS**

The authors wish to thank the interventional cardiologists for their time spent on filling this report, as well as the support received from the Working Group on Hemodynamics and Interventional Cardiology of the Spanish Society of Cardiology while conducting this study. The first author has received a grant from the *Fundación Interhospitalaria Investigación Cardiovascular*.

## SUPPLEMENTARY DATA



Supplementary data associated with this article can be found in the online version available at <https://doi.org/10.24875/RECICE.M19000059>.

## REFERENCES

1. Adlam D, Alfonso F, Maas A, Vrints C; Writing Committee. European Society of Cardiology, acute cardiovascular care association, SCAD study group: a position paper on spontaneous coronary artery dissection. *Eur Heart J*. 2018;39:3353-3368.
2. Macaya F, Salinas P, Gonzalo N, Fernández-Ortiz A, Macaya C, Escaned J. Spontaneous coronary artery dissection: contemporary aspects of diagnosis and patient management. *Open Heart*. 2018;5:e000884.
3. Percepción y experiencia sobre la disección coronaria espontánea: encuesta a cardiólogos intervencionistas de España. 2018. Available online: <https://forms.gle/8aySBLo3WxxbU88w9>. Accessed 3 Jun 2019.
4. Macaya F, Salazar CH, Pérez-Vizcayno MJ, et al. Feasibility and Safety of Intracoronary Imaging for Diagnosing Spontaneous Coronary Artery Dissection. *JACC Cardiovasc Imaging*. 2019;12:763-764.
5. Waterbury TM, Tweet MS, Hayes SN, et al. Early Natural History of Spontaneous Coronary Artery Dissection. *Circ Cardiovasc Interv*. 2018;11:e006772.

## Percutaneous valve-in-ring procedure for the management of failed tricuspid annuloplasty



### *Prótesis valvular percutánea para tratar la anuloplastia tricuspídea fallida*

Luis Fernández González,<sup>a,\*</sup> Roberto Blanco Mata,<sup>a</sup> Koldobika García San Román,<sup>a</sup> Fernando Ballesteros Tejerizo,<sup>b</sup> Alejandro Rodríguez Ogando,<sup>b</sup> and José Luis Zunzunegui Martínez<sup>b</sup>

<sup>a</sup> Servicio de Cardiología Intervencionista, Hospital Universitario de Cruces, Baracaldo, Vizcaya, Spain

<sup>b</sup> Servicio de Cardiología Pediátrica y Servicio de Hemodinámica, Hospital Universitario Gregorio Marañón, Madrid, Spain

#### To the Editor,

Over the last few years we have become aware of the adverse impact of tricuspid regurgitation on morbidity (worse quality of life, hospital admissions...) and mortality with the corresponding increase in the number of interventions performed on the tricuspid valve both surgically and percutaneously.<sup>1,2</sup> From the surgical point of view, the most widely used technique for the management of tricuspid valve disease is repair with an annuloplasty to reduce the size of the ring and facilitate leaflet coaptation, usually with incomplete rings, in an attempt to spare the septal conduction system. Short-term results are satisfactory in most cases but according to the series published so far, up to 25% of the patients show moderate or severe regurgitation at 5 years. Overall, we are talking about patients of great complexity, multiple comorbidities, and several prior cardiac surgeries with the corresponding surgical risk, which is why the development of percutaneous coronary intervention techniques may be a great ally.

Currently the treatment of tricuspid valve dysfunction through valve-in-valve procedures is the percutaneous treatment of the tricuspid valve for which we have more and most successful experience. The percutaneous implantation of valves in dysfunctional rings are usually procedures with a series of difficulties due

to the great heterogeneity of size, shape or rigidity of the rings. In many cases there are incomplete rings, which complicates the correct adaptability of the valve and often triggers the appearance of paravalvular regurgitation. Therefore, the correct planning of the case is required. For that purpose, imaging modalities are essential to obtain adequate results. However, these are frequently "compassionate use" procedures with a reported experience of just a few isolated cases or small series.<sup>3-5</sup>

We present the initial experience of 2 different centers with 2 cases of tricuspid percutaneous implantation with 2 of the most widely used bioprosthetic valves currently available for the treatment of tricuspid valve disease both aortic and pulmonary: the Edwards Sapiens XT valve (Edwards Lifesciences, Irvine, California, United States) and the Melody valve (Medtronic, Minneapolis, United States).

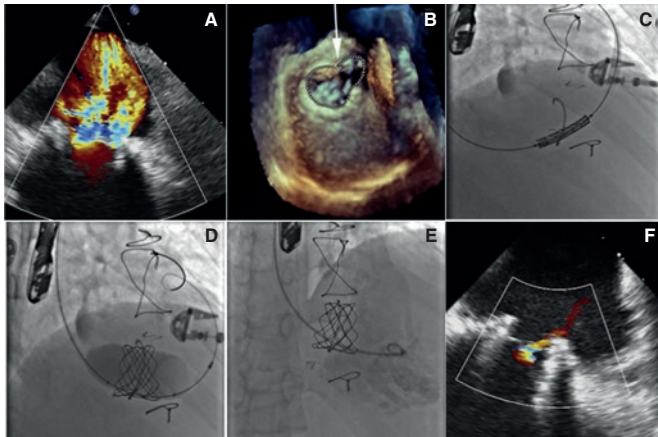
The first case is a 19-year-old female carrier of a heart transplant of 10-year duration with tricuspid annuloplasty with a dysfunctional, incomplete Medtronic 25 ring, and clinical signs of congestive heart failure refractory to medical treatment, and advanced renal failure. She was considered a very high-risk patient for reintervention, which is why percutaneous treatment was decided. In this case, the ring was measured using a 3D transesophageal

\* Corresponding author: Unidad de Cardiología Intervencionista, Hospital Universitario de Cruces, Plaza Cruces s/n, 48903 Baracaldo, Vizcaya, Spain. E-mail address: [luisfg82@hotmail.com](mailto:luisfg82@hotmail.com) (L. Fernández González).

Online: 01-10-2019.

<https://doi.org/10.24875/RECICE.M19000064>

2604-7322 / © 2019 Sociedad Española de Cardiología. Publicado por Permanyer Publications. Este es un artículo open access bajo la licencia CC BY-NC-ND 4.0.



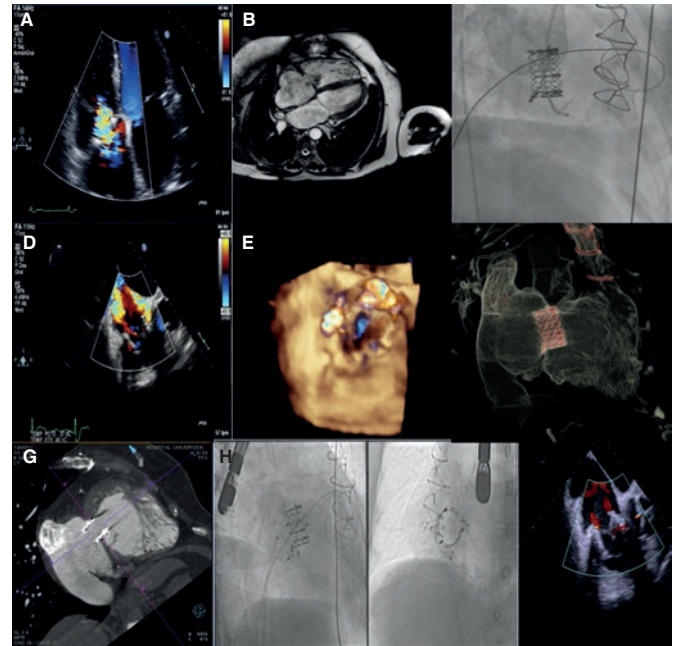
**Figure 1.** **A:** transesophageal echocardiogram (TEE) showing severe tricuspid regurgitation. **B:** measurement of the ring using 3D TEE. **C:** tricuspid valve-in-ring implantation using the Melody valve. **D:** post-dilation of the valve using a 24 mm-balloon. **E** and **F:** right ventriculography and TEE with correct valve apposition and without significant regurgitation.

echocardiogram to minimize the use of contrast while the use of a planning CT scan was discarded (figure 1A,B). Due to the size of the ring, it was decided to implant a Melody bioprosthetic valve using the 22 mm Ensemble balloon delivery system that was dilated using a 24 mm-balloon and remained in good ring apposition without significant residual periprosthetic regurgitation (figure 1C-F).

The second case is a 53-year-old woman with multiple comorbidities (pulmonary emphysema, peripheral vasculopathy), congenital heart disease operated 25 years ago (closure of interventricular communication [IVC], ductus, and correction of partially anomalous pulmonary venous drainage), reintervention the following year due to IVC patch dehiscence, new heart surgery a year ago due to IVC patch endocarditis and tricuspid valve abscess with IVC closure and tricuspid annuloplasty using the Carpentier-Edwards Physio 32 incomplete ring and resection of tricuspid septal tissue. In the immediate postoperative period, severe tricuspid regurgitation was found but reintervention was disregarded due to its high surgical risk (figure 2A).

A percutaneous valve-in-ring implantation was proposed as an alternative procedure and, in a second procedure, the closure of all paravalvular defects that would have likely occurred after the implantation since we are dealing with an incomplete ring (posterior region) added to the resection of the native valve septal tissue in the previous surgery (figure 2B). The diameter of the ring was measured using a CT scan to decide the size and type of bioprosthetic valve.

In a first procedure, the Edwards XT 29 bioprosthetic valve was implanted via femoral access with overpacing through the Safari guidewire with good ring apposition but 2 residual paravalvular leaks, 1 septal and 1 posterior (figure 2C-E). In a second procedure, and after performing a detailed planning, cardiac CT scan (figure 2F,G) and a rotational angiography, the percutaneous closure of all paravalvular defects was attempted using 2 Amplatzer Vascular Plug III devices with good final outcomes and residual mild tricuspid regurgitation (figure 2H-J).



**Figure 2.** **A:** transthoracic echocardiogram showing severe tricuspid regurgitation. **B:** CT scan prior to valve implantation. **C:** implantation of the Edwards bioprosthetic valve using the Safari guidewire. **D** and **E:** severe residual tricuspid regurgitation due to 2 paravalvular leaks. **F** and **G:** CT scan prior to the closure of paravalvular leaks. **H:** closure of posterior inferior leak. **I:** closure of septal leak. **J:** final outcome without significant tricuspid regurgitation.

In both patients, functional class improved and there were no hospital readmissions due to decompensation. With these cases we aim to illustrate that the percutaneous implantation of bioprosthetic valves not designed for this purpose is feasible for the management of dysfunctional tricuspid rings in patients non-eligible for surgical reintervention. In these cases, it is important to carry out detailed prior studies using multimodal imaging (3D echocardiogram, multislice CT scan, rotational angiography...) based on the availability and experience of each particular center, because tricuspid rings are usually asymmetric and often incomplete devices upon which the correct apposition of the valve can be difficult and with significant chances of paravalvular regurgitation that can be usually solved percutaneously.

## REFERENCES

- Nath J, Foster E, Heidenreich PA. Impact of tricuspid regurgitation on long-term survival. *J Am Coll Cardiol.* 2004;43:405-409.
- Antunes MJ, Barlow JB. Management of tricuspid valve regurgitation. *Heart.* 2007;93:271-276.
- Kondo N, Dhuto T, McGarvey JR, et al. Melody valve in ring procedure for mitral valve replacement: feasibility in four annuloplasty types. *Ann Thorac Surg.* 2012;93:783-788.
- Bouleti C, Himbert D, Brochet E, et al. Transfemoral tricuspid valve in ring implantation using the Edwards Sapien XT valve: one-year-follow-up. *Circ Cardiovasc.* 2015;8:e002225.
- McElhinney D, Cabalka A, Aboulhosn J, et al. Transcatheter Tricuspid Valve-in-Valve Implantation for the Treatment of Dysfunctional Surgical Bioprosthetic Valves. *Circulation.* 2016;133:1582-1593.