

Scientific Letters

Tricuspid Percutaneous Repair With the MitraClip System: First Implant in Spain**Reparación percutánea de la válvula tricúspide con el sistema MitraClip: primer implante en España****To the Editor,**

Severe tricuspid regurgitation (TR) can have a poor long-term prognosis.¹ Given that its isolated surgical treatment has been associated with increased mortality,¹ the need for minimally invasive techniques has prompted the development of the percutaneous treatment of this valve. In recent years, several percutaneous techniques have been proposed for the correction of TR. Although little evidence is available, implantation of the MitraClip system (Abbott Vascular, Santa Clara, United States) in the tricuspid position appears to be the most commonly-used technique at present.² In this article, we present the first case of percutaneous tricuspid repair performed in Spain.

The intervention was performed in a 65-year-old woman with symptomatic severe primary TR (extreme fatigue and lower limb edema), with right ventricular dilatation but no pulmonary hypertension. Transesophageal echocardiography (TEE) showed severe TR with a central jet, probably secondary to restriction of the septal leaflet (Figure 1), but with an anatomy favorable for clip implantation, as leaflet length was > 10 mm, with adequate thickness and no areas of calcification. Because surgery was contraindicated due to morbid obesity, we decided to perform a percutaneous repair with MitraClip. The technical details of the procedure have been described previously,³ but, briefly, 2 clips were implanted between the anterior and septal leaflets, as after release of the first clip we observed a partial detachment of the septal leaflet, which was stabilized with the effective implantation of a second clip in a more central position (Figure 2). The patient

was discharged at 48 hours with a transthoracic echocardiogram (TTE) that showed a reduction in TR from grade 4/4 to grade 2/4.

At follow-up at 4 months postimplantation, the patient reported clear symptomatic improvement. Follow-up TTE demonstrated the stability of the result at discharge, with grade 2/4 residual TR, and normalization of the right ventricular diameters and a mean tricuspid gradient of 2 mmHg (Figure 1).

In recent years, percutaneous intervention on the cardiac valves has undergone rapid growth.⁴ While interventional treatment of the aortic, pulmonary and mitral valves has the advantage of more available clinical evidence, interventional treatment of the tricuspid valve is still in a very early phase. With various degrees of success, numerous conceptually distinct techniques have been proposed, such as percutaneous implantation of an aortic valve on top of degenerative tricuspid prostheses, percutaneous annuloplasty devices, and even balloon-type devices with the aim of occupying space in the valve and thus reducing the regurgitant orifice.¹ However, despite the scarcity of the available evidence, MitraClip appears to be the most frequently-used system with the largest number of presented cases to date.^{1,2} The largest series published so far is that of Nickenig et al.² which had 64 patients. In that series, 1 clip was implanted in 48% of patients and 2 to 4 clips were implanted in 42%. In 78% of the patients, the clip was positioned between the anterior and septal leaflets. In addition, in 97% of patients, at least 1 clip could be implanted, in 91% TR was reduced by at least 1 grade, and no periprocedural deaths were recorded.

After reviewing the literature and presenting our impressions after this first implantation, we believe that the use of MitraClip in the tricuspid position has 3 inherent challenges: a) the use of a system that can only attach 2 leaflets in a valve with 3 leaflets (anterior, posterior and septal); in this regard, after studying several ex vivo models, we concluded that the attachment of the anterior and septal leaflets appears to be the combination that is

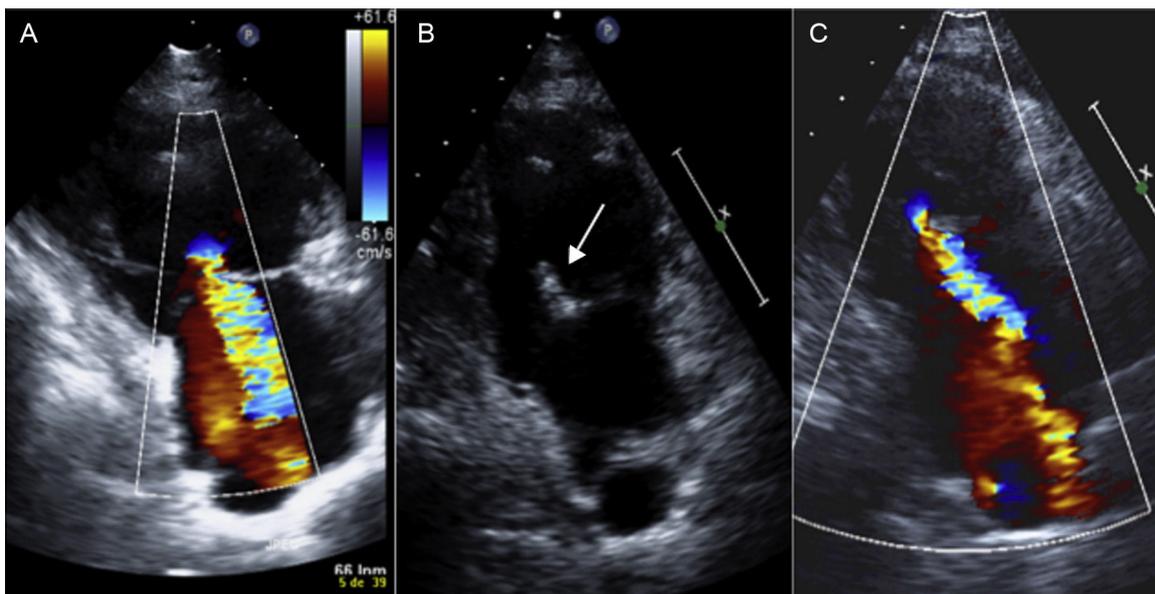


Figure 1. Images showing TR severity before and after attachment of 2 clips. A: 4/4 TR before the procedure. B: imaging after clip attachment (arrow). C: 2/4 TR at 2 months postprocedure. TR, tricuspid regurgitation.

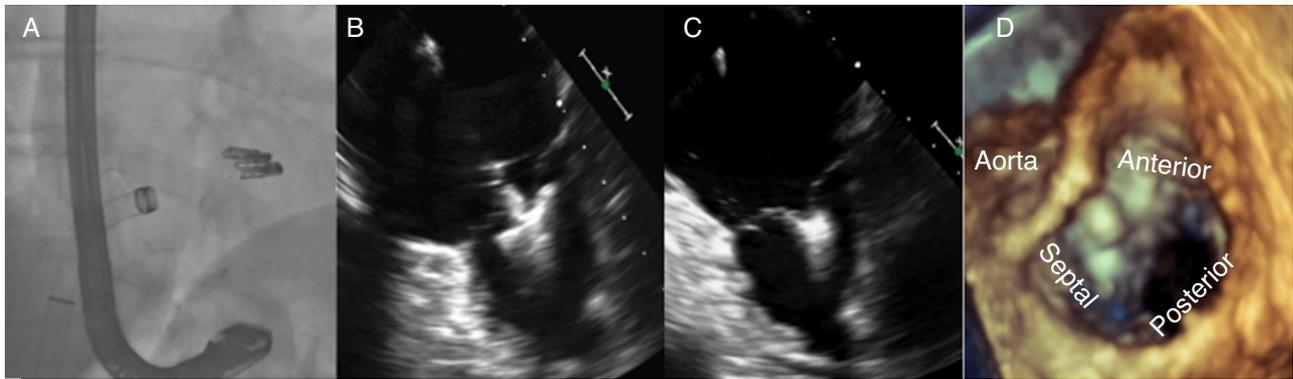


Figure 2. Fluoroscopy image sequence and TEE during the procedure. A: final position of the clips on fluoroscopy. B and C: 2D-TEE image at 0° with the clip open and closed after the attachment of the anterior (left) and septal (right) leaflets. D: 3D-TEE image showing the final position of the second clip between the anterior and septal leaflets. 2D, 2-dimensional; 3D, 3-dimensional; TEE, transesophageal echocardiography.

associated with greatest reduction in TR^{2,4}; as is the case with the mitral valve, the intervention also aims not to induce moderate or severe valve stenosis (mean gradient > 3 mmHg); *b*) the second is the tricuspid approach of a 24-Fr system designed to be directed at the mitral valve; although right femoral access is the most frequently-used, transjugular access has been proposed, which, despite being awkward for the operator and the difficulty of controlling hemostasis after the procedure, permits direct access to the valve²; and *c*) imaging assessment of the tricuspid valve with 2-dimensional/3-dimensional (2D/3D) TTE/TEE is another of the major challenges of this technique: the need to learn and obtain planes that allow good visualization of the valve anatomy and provide a reliable guide during the procedure is a crucial element in the development of this technique.

In conclusion, the use of MitraClip in the tricuspid position appears to have promising results, but new registries need to be published to determine whether the treatment is safe and effective in the long-term.

CONFLICTS OF INTEREST

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REFERENCES

1. Campelo-Parada F. Percutaneous treatment of the tricuspid valve disease: new hope for the forgotten valve. *Rev Esp Cardiol.* 2017;70:856–866.
2. Nickenig G, Kowalski M, Hausleiter J, et al. Transcatheter treatment of severe tricuspid regurgitation with the edge-to-edge MitraClip technique. *Circulation.* 2017;135:1802–1814.
3. Hernández-Enríquez M, Freixa X, Sanchís L, et al. *Concurso de Casos Clínicos en Cardiopatía Estructural para Residentes en Cardiología.* Salamanca: La gótica digital; 2017:161–166.
4. Vismara R, Gelpi G, Prabhu S, et al. Transcatheter edge-to-edge treatment of functional tricuspid regurgitation in an ex vivo pulsatile heart model. *J Am Coll Cardiol.* 2016;68:1024–1103.

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Transcatheter Tricuspid Repair With MitraClip in a Patient With a Failing De Vega Annuloplasty



Reparación transcatóter de tricúspide con MitraClip en paciente con anuloplastia de De Vega fallida

To the Editor,

A 71-year-old woman was admitted to our hospital for right-sided heart failure (HF). The patient had a history of rheumatic disease and 2 surgical interventions. In 1976, she underwent open mitral commissurotomy, and in 2003 she underwent mitral valve replacement with a mechanical prosthesis and De Vega annuloplasty of the tricuspid valve. During follow-up, symptoms and signs of right HF appeared, and echocardiographic studies documented normal functioning of the mitral prosthesis with severe tricuspid regurgitation (TR) due to restriction of the tricuspid valve leaflets (Figure 1A). She was given medical treatment, but after an initial response period, the clinical picture

recurred with severe limitation of quality of life. The multidisciplinary team decided that she was at very high risk for conventional surgery, but offered her the possibility of a MitraClip implant in the tricuspid position to treat her advanced HF symptoms. Prior to the procedure, transesophageal echocardiography (TEE) was performed, confirming the severity of TR and that the tricuspid leaflets were adequate for device implantation (Figure 1B). The catheterization procedure showed only mild pulmonary hypertension and the absence of coronary lesions.

The procedure was performed under general anesthesia and was guided by TEE. The guide catheter was advanced through the femoral vein and was positioned in the lower area of the right atrium. The clip was introduced into the guide catheter using the Munich technique and was then advanced into the atrium to the straddling position. Subsequently, it was deflected toward the tricuspid valve using wheel A and was guided to capture the anterior and septal leaflets. However, as the clip was advanced into the ventricle to capture the leaflets, we could not achieve an