

EP CASE REPORT

Implantation of leadless pacemaker through neo-orifice after tricuspid valve edge-to-edge repair

Agne Adukauskaitė*, Florian Hintringer, Wolfgang Dichtl, and Silvana Müller

Department of Internal Medicine III, Cardiology and Angiology, Hospital of Medical University of Innsbruck, Anichstraße 35, A-6020 Innsbruck, Austria

* Corresponding author. Tel: +43 512 504 83447; fax: +43 512 504 25622. E-mail address: agne.adukauskaitė@i-med.ac.at

A 71-year-old female patient suffering from dilated cardiomyopathy presented with severe functional tricuspid regurgitation (TR) due to secondary pulmonary hypertension and consecutive tricuspid annulus dilatation, which had been treated using edge-to-edge repair technique with implantation of three clips (MitraClip XTR, Abbott Inc.). The remaining TR was moderate. Ten months later, a pacemaker therapy was indicated because of bradycardic permanent atrial fibrillation.

An optimal therapeutic approach was considered to be an implantation of a leadless pacemaker (LPM) (Micra, Medtronic Inc.) since such a device would not permanently interfere with the repaired valve as a conventional pacemaker lead, although carrying a higher risk of intraprocedural valve damage due to a large guiding catheter.¹ A conventional ventricular pacemaker lead (usually 6 or 7 F in size) could have additionally increased the TR of the repaired valve. Hisian supra-tricuspid pacing (using a 4 Fr lead) is a good alternative in such a patient but may be limited by an increased selective pacing threshold and difficulties in precise mapping before lead implantation. Isolated left ventricular pacing through the coronary sinus may also be considered in patients with diseased tricuspid valve.

Using three-dimensional transoesophageal echocardiography (3D TOE) enface view the opening areas of the two tricuspid valve neo-orifices (NOs) remaining after percutaneous valve repair were determined as follows (Figure 1A): 1.6 cm² of the larger NO (1) between posterior leaflet and anterior leaflet (AL) and 0.6 cm² of the smaller one (2) between the septal leaflet and AL. The larger NO was initially chosen to introduce the delivery catheter (Cath) into the right ventricle. However, steering of the delivery catheter was significantly limited and the allowed course of the catheter led to unfavourable LPM position with unacceptable high stimulation threshold values, which did not improve even after repeated repositioning of the LPM. Under 3D TOE guidance (Figure 1B), the delivery catheter was then withdrawn and reintroduced through the smaller NO (2) into the septal-apical area of the right

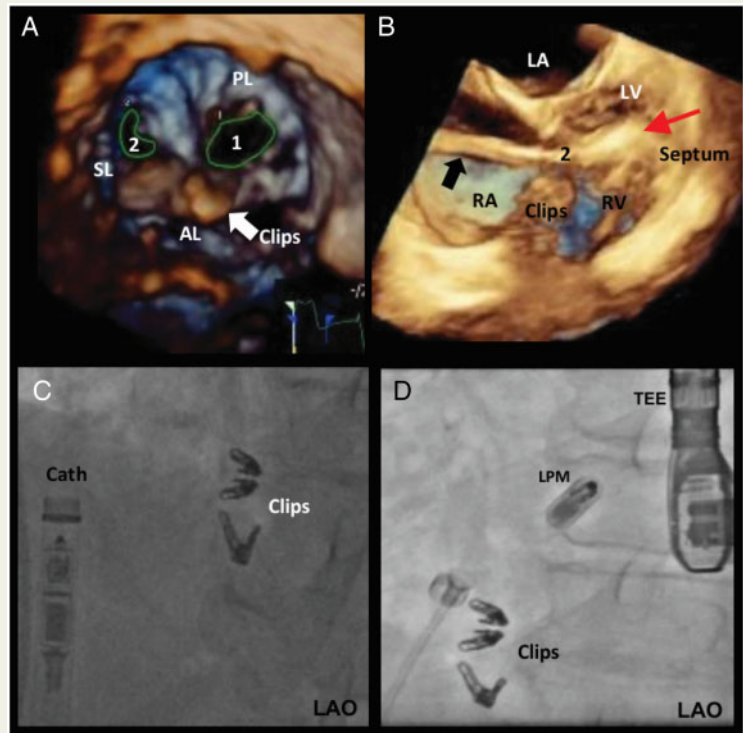


Figure 1 (A) 3D TOE enface view of the tricuspid valve from a right ventricular perspective showing three clips and two neo-orifices: the larger one (NO-1) between AL and PL and the smaller one (2) between AL and SL. (B) 3D TOE adjusted four-chamber view showing the delivery catheter (black arrow) with LPM (red arrow) introduced through the smaller neo-orifice (2) of the tricuspid valve into the RV. (C) LAO X-ray projection prior to insertion of LPM: delivery catheter on the left, three clips in tricuspid position on the right side. (D) LAO X-ray projection shows deployment of the LPM under TOE guidance. 1, large neo-orifice; 2, small neo-orifice; 3D TOE, three-dimensional transoesophageal echocardiography; AL, anterior leaflet; Cath, guiding catheter; LA, left atrium; LAO, left anterior oblique projection; LPM, leadless pacemaker; LV, left ventricle; PL, posterior leaflet; RA, right atrium; RV, right ventricle; SL, septal leaflet; TOE, transoesophageal echocardiography.

ventricular myocardium and the LPM was deployed (red arrow) with adequate stimulation threshold of 0.25 V/0.24 ms (Figure 1D). All clips and native valvular structures remained intact with unchanged moderate residual TR.

Combination of edge-to-edge tricuspid valve repair with LPM implantation has been reported previously.² The aim of this case report is to show for the first time that LPM implantation should not be discouraged if valve repair has been previously conducted. Limitations in terms of catheter steering can occur but may be overcome by choosing the optimal NO under 3D TOE guidance. The basic risk of damaging the repaired valve must be outweighed against the risk of worsening pre-existing TR by a conventional pacemaker lead.

Supplementary material

Supplementary material is available at *Europace* online.

Conflict of interest: none declared.

References

1. Sperzel J, Burri H, Gras D, Tjong FV, Knops RE, Hindricks G et al. State of the art of leadless pacing. *Europace* 2015;**17**:1508–13.
2. Tang GHL, Kaple R, Cohen M, Dutta T, Undemir C, Ahmad H et al. First percutaneous Micra leadless pacemaker implantation and tricuspid valve repair with MitraClip NT for lead-associated severe tricuspid regurgitation. *Eurointervention* 2017;**12**:e1845–8.