

# Three-dimensional transoesophageal echocardiography allows unique assessment of pacemaker lead-related tricuspid valve dysfunction

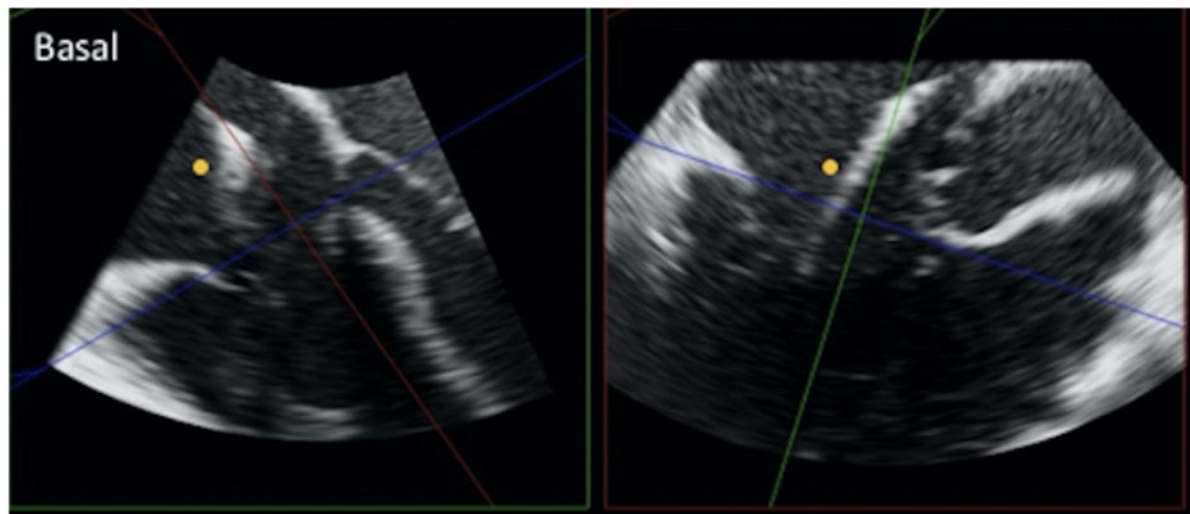
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A 66-year-old woman presented with exertional breathlessness, fatigue, and severe peripheral fluid overload resulting from severe right ventricular (RV) failure. She underwent pacemaker implantation 11 years prior for symptomatic trifascicular block.

Transthoracic echocardiography (TTE) demonstrated a dilated right atrium and dilated and severely impaired RV with tricuspid valve (TV) annular dilatation and severe tricuspid regurgitation (TR, [Supplementary material online, Data 1](#)) originating around the



**Figure 1** Three-dimensional transoesophageal echocardiography volumetric acquisitions allowed formation of multiplanar reconstructions of the tricuspid valve in full, from two orthogonal long-axis and resultant short-axis constructed en-face views at all levels within the valve. This image shows the multiplanar reconstruction at valve base level ('basal') and its component orthogonal long-axis images. The resultant short-axis constructed en-face image will be formed from the blue crosshair line of plane, and at its level in the valve complex (annulus to tips axis). The pacemaker ventricular lead is labelled with a yellow dot.

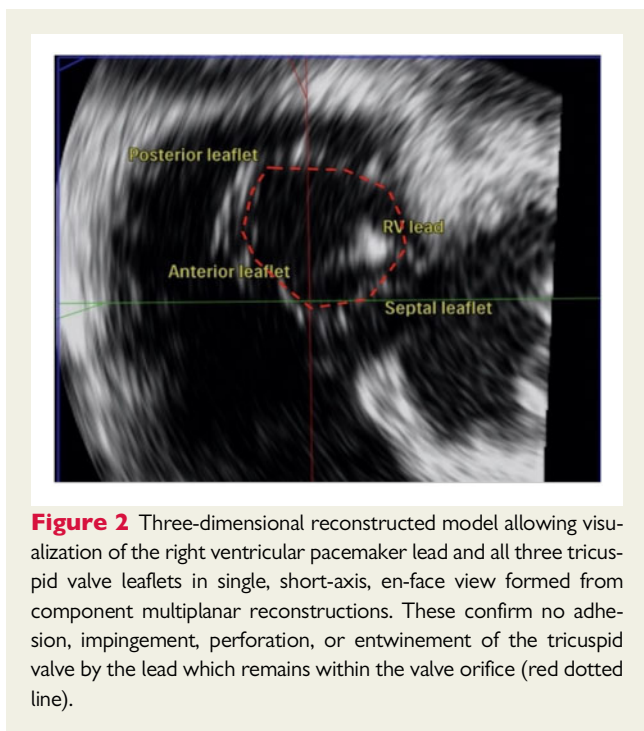
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**Figure 2** Three-dimensional reconstructed model allowing visualization of the right ventricular pacemaker lead and all three tricuspid valve leaflets in single, short-axis, en-face view formed from component multiplanar reconstructions. These confirm no adhesion, impingement, perforation, or entwinement of the tricuspid valve by the lead which remains within the valve orifice (red dotted line).

ventricular pacemaker lead.<sup>1–3</sup> The lead-valve interaction and resultant TR mechanism could not be confirmed on TTE or two-dimensional transoesophageal echocardiography (TOE) due to lead acoustic impedance and reflectivity and inability to visualize the valve en-face (Supplementary material online, Videos S1 and S2).

Acquisition of a single, three-dimensional TOE volumetric image permitted production of multiplanar reconstructions (Supplementary material online, Data 2) in unlimited planes at all levels of the valve, allowing short-axis, en-face reconstruction of the TV in full (Figure 1). This permitted uniquely comprehensive assessment of the lead-valve relationship and mechanism of severe TR, which resulted from a fixed and immobilized septal leaflet due to lead impingement. Crucially

there was no lead-related leaflet adhesion, perforation or entwinement at any point in the TV complex (Figure 2).

This allowed percutaneous lead extraction to be safely performed. Lead extraction in the presence of leaflet perforation or impalement can be associated with leaflet avulsion and considerable morbidity and mortality.

Despite lead extraction, the TR remained severe (Supplementary material online, Video S3) due to failure of normal septal leaflet mobility due to longstanding impingement, and annular dilatation. The patient underwent successful TV repair with an annuloplasty ring (Supplementary material online, Video S4) and implantation of epicardial pacemaker leads.<sup>1</sup>

## Supplementary material

Supplementary material is available at *European Heart Journal - Case Reports* online.

**Slide sets:** A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

**Consent:** The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

**Conflict of interest:** none declared.

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## References

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