

## Unusual Pacemaker Lead Placement in an Unsuspecting Heart

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### Quiz

A 51-year-old man, with a negative cardiac medical history, presented with symptomatic 2:1 atrioventricular block. A permanent pacemaker was implanted.

During the implantation process, the pacemaker leads advanced easily into the atrium and ventricle from the left subclavian vein. On fluoroscopy, the locations of the leads in the atrium and ventricle appeared atypical (Fig. 1). An intraoperative transthoracic echocardiography was then performed, showing the atrial lead into the left atrium (Fig. 2). The pacemaker leads were then repositioned into the right heart chambers, but the procedure was quite difficult because the leads preferentially entered into the left heart chambers.

A transoesophageal echocardiography was performed postoperatively (Fig. 3). The patient remained haemodynamically stable and asymptomatic.

Which one of the following conditions was the cause of the displacement of the leads into the left heart chambers?

- a. Sinus venosus atrial septal defect
- b. Perforation of the ventricular septum
- c. Perforation of the atrial septum

- d. Persistent left superior vena cava
- e. Ventricular septal defect

### Discussion

The patient had a sinus venosus atrial septal defect that was previously undiagnosed. Perforation of the atrial septum was unlikely as the patient remained well with no haemodynamic compromise. The other 3 options are not compatible with a displacement of the pacemaker leads into the left heart chambers.

A sinus venosus atrial septal defect occurs when there is a deficiency of infolding of the atrial wall in the region of the superior vena cava. It is normally located in the upper part of the atrial septum, in a sub-caval position, overriding the rim of the fossa ovalis.<sup>1</sup> It is a rare lesion, making up approximately 10% of all atrial septal defects.<sup>2</sup> It is frequently not detected with a standard transthoracic echocardiography, but should be considered when the right ventricle appears dilated and volume loaded with an apparently intact inter-atrial septum.<sup>3</sup>

This case can be helpful to highlight the unusual way of detecting a sinus venosus atrial septal defect. Therefore, the diagnosis should be considered upon encountering the above-mentioned problems during pacemaker implantation.



Fig. 1. Fluoroscopic image in the left anterior oblique 20 degrees (LAO 20) projection, showing atypical locations of the pacemaker leads post-implantation.

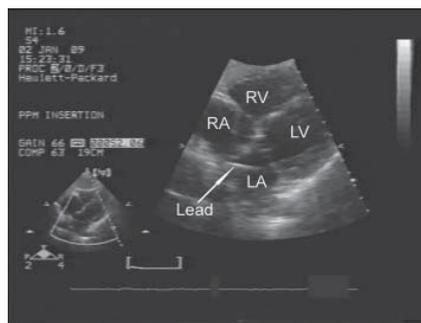


Fig. 2. Subcostal view of transthoracic 2D echocardiography performed during implantation, showing that the pacemaker lead was in the left atrium.

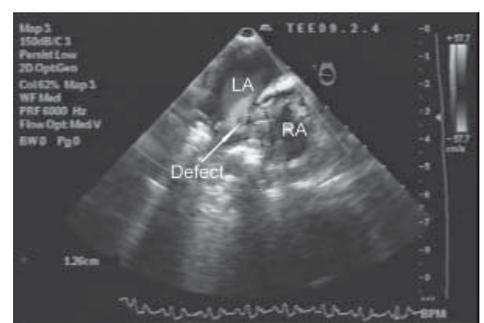


Fig. 3. Colour Doppler revealed a defect between the roof of the right and left atria, consistent with a sinus venosus atrial septal defect with left to right shunting.

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