

Double heart after heart transplantation

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Clinical vignette

A 34-year-old man with a history of dilated cardiomyopathy had undergone orthotopic heart transplantation with bicaval anastomosis 4 weeks ago. His postoperative course was uneventful, and he was asymptomatic. Physical examination revealed no obvious findings other than tachycardia. A routine electrocardiogram (ECG) was performed at follow-up. *Figure* demonstrates his ECG at rest this time.

Question 1

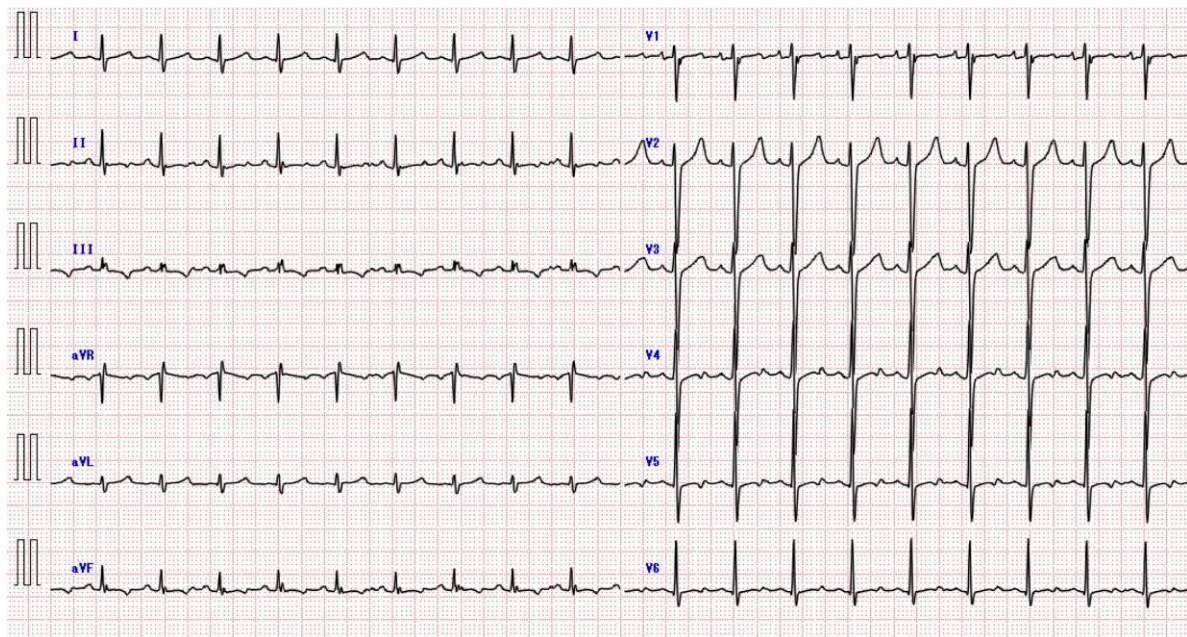
What is the diagnosis?

- A. Atrial tachycardia
- B. Atrial flutter

- C. Complete atrioventricular block
- D. Complete pseudo-atrioventricular block
- E. Mobitz Type II atrioventricular block

The correct answer is D.

The patient's post-transplant ECG showed sinus tachycardia with dissociated *P*-waves representing dual atrial depolarizations in lead II. The donor atrial rate was 116 beats per minute, while the recipient's was 75 beats per minute, which was dissociated from the donor atrial and ventricular rates (see [Supplementary material online, Figure S1](#)). This phenomenon, also known as a complete pseudo-atrioventricular block, occasionally occurs due to residual recipient atrial tissue after undergoing transplantation.¹



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Question 2

What is the mechanism of tachycardia in this patient?

- A. The effect of medications for heart transplantation
- B. Sympathetic nerve activation
- C. Vagolytic effect
- D. Elevation of circulating catecholamines
- E. Anaemia

The correct answer is C.

The heart is dually innervated by vagal and sympathetic fibres. However, heart transplantation results in complete surgical denervation of the donor heart.² Therefore, post-heart transplantation, patients usually have resting tachycardia, as was seen in our case.

Question 3

What would you do next?

- A. Follow-up
- B. Ablation
- C. Anticoagulation
- D. Pacemaker implantation
- E. Holter electrocardiography

The correct answer is A.

The incidence of atrial arrhythmias after orthotopic heart transplantation is reportedly 5–25% and that of bradyarrhythmias is up to 25%, with a majority being sinus node dysfunction.^{1,3} Tachyarrhythmia and bradycardia are more common after biatrial anastomosis than after the more widely used bicaval technique; the biatrial technique anastomoses the donor and recipient atria resulting in a dual P-wave phenomenon owing to the coexistent, electrically isolated donor and recipient sinus nodes. However, arrhythmic complications, including a complete pseudo-atrioventricular block, can occur even with the bicaval anastomosis technique. Treatment is usually not required for complete pseudo-atrioventricular block.



Supplementary material

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

Consent: The authors confirm that written informed consent for the publication of this case report was obtained from the patient.

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Data availability

On reasonable request, derived data supporting the findings of this study are available from the corresponding author.

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