



Atypical advanced interatrial block or junctional rhythm?

Antoni Bayés de Luna, MD, PhD^{a,*}, Pyotr G. Platonov, MD, PhD^b,
Javier García-Niebla^c, Adrian Baranchuk, MD, FACC, FRCPC, FCCS^d

^a Cardiovascular Research Foundation, Cardiovascular ICCG-Program, Research Institute Hospital de la Santa Creu i Sant Pau, IIB-Sant Pau, Barcelona, Spain

^b Department of Cardiology, Clinical Sciences, Lund University, Sweden

^c Servicios Sanitarios del Área de Salud de El Hierro, Valle del Golfo Health Center, El Hierro, Spain

^d Heart Rhythm Service, Kingston Hospital, Kingston, Ontario, Canada

A 78-year-old man was attended in the outpatient clinic due to recurrent crisis of palpitations. He was taking beta blockers due to mild hypertension. His 12-lead ECG showed sinus rhythm (50 bpm) with negative P-wave morphology in leads III and aVF that may be considered due either to atypical advanced interatrial block (A-IAB) or junctional rhythm. Clues for the differential diagnosis between these two entities are discussed.

The ECG (Fig. 1A) shows sinus rhythm. A detailed P-wave analysis reveals: 1) Prolonged P-wave duration (160 ms). Proper measure using vertical lines (calipers) help identifying the true onset and offset of the P-wave in simultaneous leads. 2) P-wave morphology presents low voltage in the horizontal plane with biphasic morphology and a positive initial component and a negative or isodiphasic terminal component. In the frontal plane, the P-wave is biphasic in lead II and negative in leads III and aVF. Closer inspection using calipers reveals a short isoelectric line before the negative component of P-wave in leads III and aVF. This type of P-wave morphology corresponds to a variant of A-IAB named atypical A-IAB type-3 [1] which is characterized by negative P-waves in leads III and aVF, and a biphasic P-wave in lead II.

This case is important because it could be easily confused with a junctional atrial rhythm that could also manifest as negative P-wave

in leads III and aVF (Fig. 1B). The key points to perform this differential diagnosis are: 1) In atypical A-IAB type-3 [1], the P-wave is negative in leads III and aVF. In lead II, a biphasic pattern is observed (initial positive deflection). In junctional rhythm, the P-wave is negative in leads II, III, and aVF. 2) In atypical A-IAB type-3 there is an isoelectric period before the onset of the negative P-wave in leads III and aVF, which is not present in junctional rhythm (see vertical lines in the figure). 3) In atypical A-IAB type-3, the P-wave in the left precordial leads (V5, V6) is positive or biphasic. In junctional rhythms the P-wave is negative in leads V5–V6.

This case highlights the importance of detailed analysis of the P-wave [2], which helps in determining the rhythm (sinus or not), the diagnosis of A-IAB (typical and atypical) which carries on relevant clinical implications due to its association with atrial fibrillation (Bayes' syndrome) [3]. Recognition of these patterns may help in the assessment of thromboembolic risk, allowing new strategies for stroke prevention.

Disclosures

None.

* Corresponding author at: C/ Sant Antoni M^è Claret, 167, 08025 Barcelona, Spain.
E-mail address: abayes@santpau.cat (A.B. de Luna).

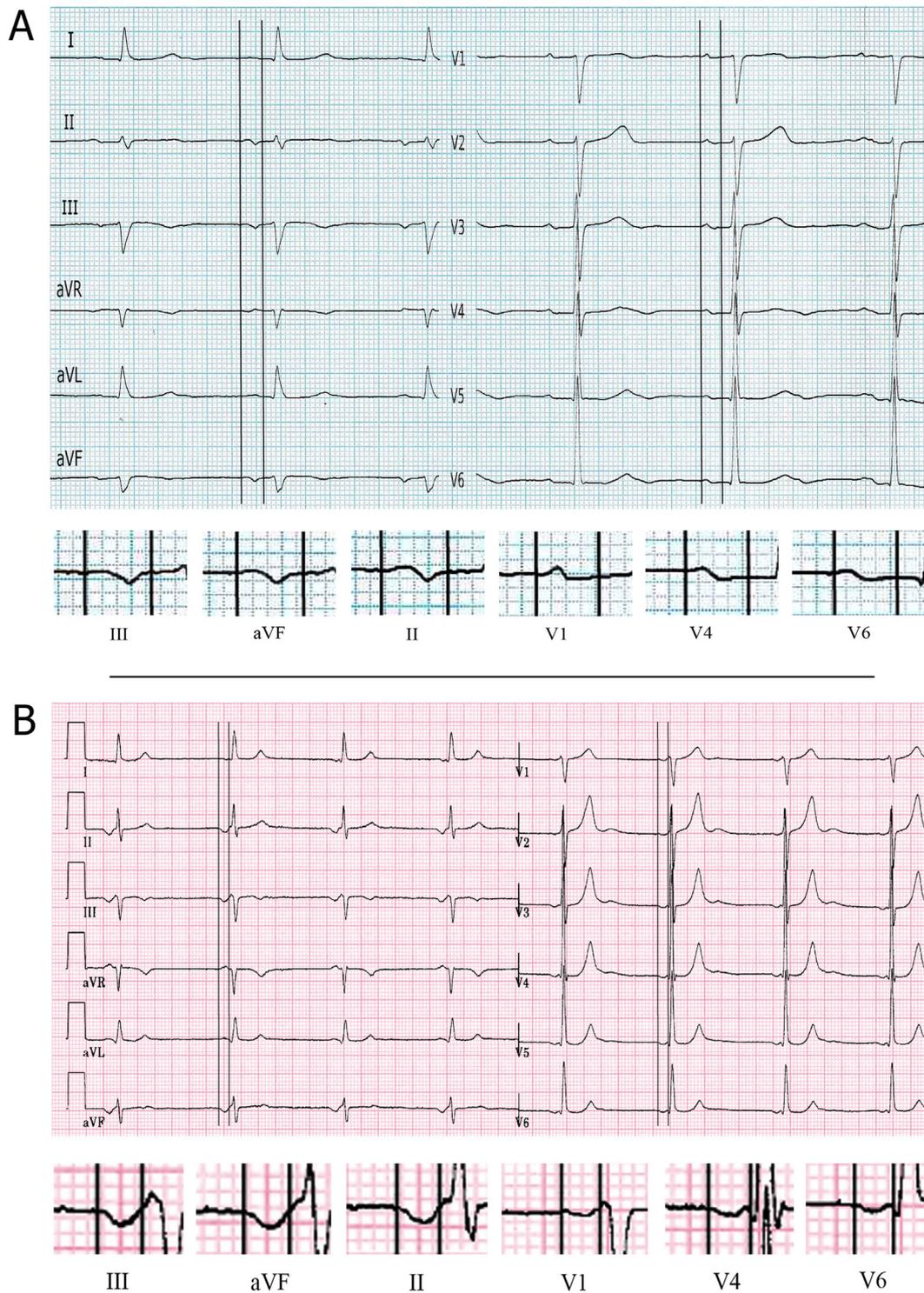


Fig. 1. A. P-wave in a case of A-IAB atypical type 3 by morphology (1). See that the P-wave is negative in III and aVF, but with a first part isodiphasic as may be seen with vertical lines. It may be confused with junctional rhythm, but in this case (see B), all the P-wave is negative and furthermore, the P-wave is also negative in V4-V6 (see text).

References

- [1] Bayés de Luna A, Escobar-Robledo LA, Aristizabal D, Weir Restrepo D, Mendieta Badimon G, Massó-van Roessel A, et al. Atypical advanced interatrial block: definition electrocardiographic recognition. *J Electrocardiol* 2018;51:1091–3.
- [2] Bayés de Luna A, Platonov P, García-Cosío F, Cygankiewicz I, Pastore C, Baranowski R, et al. Interatrial blocks. A separate entity from left atrial enlargement: a consensus report. *J Electrocardiol* 2012;45:445–51.
- [3] Baranchuk A. Interatrial Block and Supraventricular Arrhythmias. Clinical Implications of Bayés' Syndrome. Minneapolis, Minnesota, USA: Cardiotext Publishing; 2017.