First-degree atrioventricular block and pseudopacemaker syndrome

Bloc atrioventriculaire du premier degré et pseudosyndrome du pacemaker

Gabriel Laurent\textsuperscript{a,*}, Jean-Christophe Eicher\textsuperscript{a}, Jean-Eric Wolf\textsuperscript{a,b}

\textsuperscript{a} Service de cardiologie, centre hospitalo-universitaire du Bocage, Dijon, France
\textsuperscript{b} Laboratoire LE21 UMR CNRS 5158, université de Bourgogne, Dijon, France

Received 24 January 2012; received in revised form 1st February 2012; accepted 3 February 2012
Available online 21 December 2012

IMAGE

An 80-year-old man was referred to our institution for recent dyspnoea on exertion associated with asthenia for a few months. Physical examination, blood tests, chest X-ray and spirometry were normal. An electrocardiogram (Fig. 1A) showed first-degree atrioventricular block (AVB) with a PR interval of 560 ms. Holter monitoring showed that during morning activity (walking), the P waves gradually merged with the QRS complexes. Wenckebach periods appeared as the heart rate exceeded 100 beats/min (Fig. 1B). A transthoracic echocardiogram revealed normal left ventricular systolic function but low cardiac output (3.8 L/min). Doppler tissue imaging at the mitral and tricuspid annulus showed A′ waves before the E′ waves (Fig. 2A and C). Left and right ventricular filling was compromised because the atria were contracting before the atrioventricular (AV) valves opened (Fig. 2E). We observed reversed blood flow inside the inferior vena cava (IVC), responsible for expansion of the IVC following each right atrial contraction (Fig. 3A). A dual-chamber pacemaker was implanted, with an immediate improvement in both clinical and echocardiographic variables (Fig. 2B, D and F) once the AV delay had been programmed at 200 ms (Fig. 1C). Right and left ventricular filling improved once AV synchrony was restored. At follow-up, 6 months after the procedure, the patient was free of symptoms. Pacemaker implantation is a class IIa recommendation for marked first-degree AVB responsible for haemodynamic compromise due to loss of AV synchrony.

\textbf{KEYWORDS}
Pacemaker; First-degree AV block; AV synchrony

\textbf{MOTS CLÉS}
Stimulateur cardiaque ; Bloc atrioventriculaire du premier degré ; Synchronisme atrioventriculaire

\textit{Abbreviations}: AV, atrioventricular; AVB, atrioventricular block; IVC, inferior vena cava.
\textsuperscript{*} Corresponding author.
\textit{E-mail address}: gabriel.laurent@chu-dijon.fr (G. Laurent).

1875-2136/$ – see front matter © 2012 Elsevier Masson SAS. All rights reserved.
http://dx.doi.org/10.1016/j.acvd.2012.02.014
First-degree AV and pseudopacemaker syndrome

Figure 1.  A. Twelve-lead surface electrocardiogram showed first-degree atrioventricular block (positive P waves in the preceding T waves). B. Electrocardiogram strip from Holter monitoring showing that during walking at 8:53 a.m., P waves gradually merged with the preceding QRS complexes and Wenckebach periods appeared beyond 100 beats/min; arrows show the P waves. C. Stimulated surface electrocardiogram with a PR interval programmed at 200 ms.
Figure 2.  A. Doppler tissue imaging (DTI) at baseline at the mitral annulus showed $A'$ waves before the $E'$ waves; left ventricular filling was therefore compromised. B. DTI after a normal atrioventricular (AV) delay was programmed; the normal left $E'$-$A'$ sequence was restored. C. DTI at baseline at the tricuspid annulus showed $A'$ waves before the $E'$ waves; right ventricular filling was therefore compromised. D. DTI after a normal AV delay was programmed; the normal right $E'$-$A'$ sequence was restored. E. Doppler mitral inflow at baseline showed no A wave; the left atrium was contracting before the mitral valve opened; arrows show mitral regurgitation during the diastolic phase. F. Doppler mitral inflow after a normal AV delay was programmed; $A$ waves were restored.
Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

Figure 3.  A. M mode study at the inferior vena cava at baseline showed inferior vena cava expansion following each right atrial contraction. B. Normal M mode study after a normal atrioventricular delay was programmed.