

What is the diagnosis?

CASE PRESENTATION

Paced right bundle branch block pattern in an elderly woman

An 82-year-old female was hospitalized for pneumonia and mental confusion in the internal medicine clinic 1.5 year ago. Her electrocardiogram (ECG) revealed a third-degree AV block (Fig. 1a), and she was referred to the external center for a pacemaker implantation. After one year from the pacemaker implantation, the patient came to control. Baseline ECG was in pacemaker rhythm with a right bundle branch block (RBBB) pattern (Fig. 1b). The patient underwent a chest radiography to rule out electrode malposition (Fig. 2a). Fluoroscopic, transthoracic echocardiography (TTE), and transesophageal echocardiography (TEE) images are shown in Figures 2b, 2c and 2d, respectively. What is the most likely diagnosis of this electrocardiographic appearance?

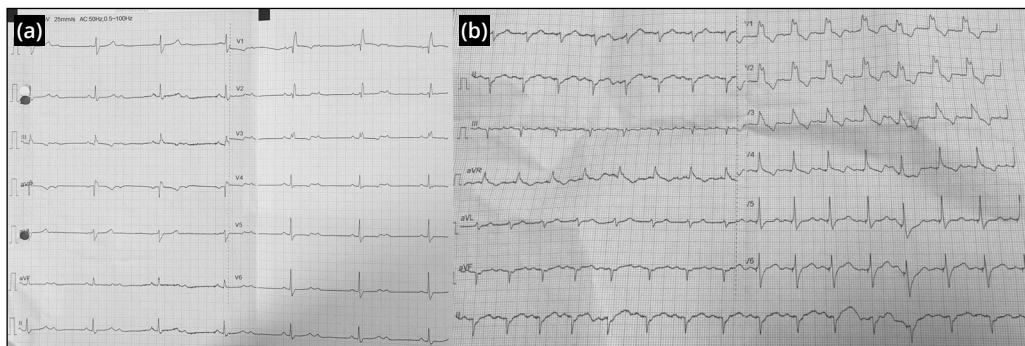


Figure 1. (a) The electrocardiogram before pacemaker implantation. (b) The admission electrocardiogram. RA: right atrium; LA: left atrium; LV: left ventricle.

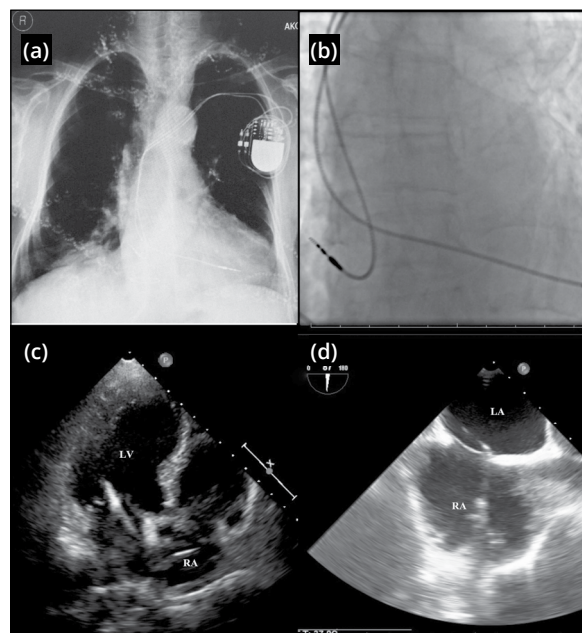


Figure 2. (a) Chest radiography. (b) Fluoroscopic image. (c) Transthoracic echocardiographic image (apical four chamber). (d) Transesophageal echocardiography image (bicaval view).

ANSWER

In the present case, fluoroscopic images taken during cardiac pacemaker implantation were evaluated (Fig. 2b), and it was concluded that the electrode was passed through the patent foramen ovale (PFO) to the left heart chambers. TTE showed normal left ventricular systolic function, mild mitral regurgitation and an image consistent with the pacemaker electrode in the left ventricle (LV) (Fig. 2c). On TEE examination, the pacemaker electrode was found to be passing through a PFO (Fig. 2d) without a thrombus formation.

Permanent pacemaker malposition is a relatively rare complication that may occur in different heart chambers or non-cardiac areas. It has been reported that complications such as cerebrovascular event and heart rupture may appear in these patients, and a few cases that may be asymptomatic for many years have also been reported^{1,2}. The ECG, chest radiography and TTE can be used for diagnosis. In cases of early malposition, electrode removal is a suitable option, but in the late stages anticoagulation is an alternative treatment option.

Although the incidence of electrode malposition is not known exactly, more frequent diagnosis can be made with the appropriate use of diagnostic tools such as TTE. A left bundle branch block is expected in the ECG of patients who have a pacemaker electrode in the right ventricle (RV). Paced RBBB can occur in the case of RV free wall perforation, malposition of a lead in the left heart through a septal defect, septal perforation, coronary sinus pacing, or retrograde transarterial pacing¹⁻³.

In the present case, lead extraction was recommended, but the patient refused any intervention. The procedure was conducted more than one year ago and, therefore, anticoagulant treatment with warfarin was initiated. Although no complication was observed, during the six-month follow-up period, in such cases the bleeding risk associated with lifelong anticoagulation should be considered.

In a previous study³, RBBB paced morphology was present in 14 of the 179 patients (8%). Among them, six patients (43%) had midseptal leads, two (14%) had distal septal leads, and six (43%) apical leads. Similarly, Nkoulou et al.⁴ reported the case of two patients with a paced RBBB pattern despite a well-placed right ventricular lead.

Klein et al.⁵ reported eight patients with RBBB morphology present in leads V1, and V2, left BBB pattern in lead I, and pacing leads located in the right ventricular apex. They suggested that placement of leads V1 and V2 with one interspace lower than standard could eliminate the RBBB appearance. By contrast, Coman and Trohman³ reported that RBBB pattern could not be always eliminated by movement of leads V1 and V2. They recognized that this technique can be useful in differentiation of patients with midseptal leads from those ones with leads in the distal septum and apex.

In conclusion, after a pacemaker implantation, fluoroscopic recordings should be taken from at least two different positions. In doubtful cases, not only the frontal image, but also the lateral image, should be shown in the chest X-ray. In cases with a RBBB pattern, TTE should be performed after the procedure. The removal of the electrodes in the early period is easier than in the late periods. However, in the late stages, anticoagulant therapy may be a viable option in patients refusing electrode removal.

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