An Unusual Cause of Stroke in a Patient With Permanent Transvenous Pacemaker

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SUMMARY

We report the case of a 61-year-old man with a stroke secondary to cerebral embolism resulting from inadvertent malposition of a permanent transvenous pacemaker lead in the left ventricle. An electrocardiogram and chest X-ray were suggestive of a left-sided positioned lead which was confirmed by transthoracic echocardiography. Because this malposition was complicated with a cerebrovascular event, transcatheter lead extraction was planned, however, the patient chose lifelong anticoagulation therapy. (Jpn Heart J 2004; 45: 873-875)

Key words: Pacemaker malposition, Stroke

We report a case where pacemaker catheters placed inadvertently in the left ventricle via a patent foramen ovale resulted in cerebral embolism. A 61-year-old man who had history of permanent transvenous pacemaker implantation at another institution 2 years earlier and a stroke 5 months after implantation was referred to our clinic. He had an uneventful course for 19 months with warfarin treatment that was started after the stroke. Physical examination was normal. An electrocardiogram (ECG) showed paced complexes with a typical right bundle branch block (RBBB) configuration (Figure 1A). Chest radiography identified 2 leads; one in the right atrium, and the other directed more posteriorly with a cephalad course, which led us to suspect a malpositioned ventricular lead (Figure 1B and 1C). A 2-dimensional transthoracic echocardiographic study revealed a pacemaker lead traversing the interatrial septum (probably through a patent foramen ovale) across the mitral valve and implanted in the basal lateral wall of the left ventricle (Figure 2). While there is limited experience regarding management of this complication, transcatheter or surgical lead extraction should be considered first, especially for patients complicated with cerebrovascular events. Therefore, we planned transcatheter extraction of the lead for our patient, but he has preferred lifelong anticoagulation therapy.
Figure 1. A: Electrocardiogram showing paced complexes with typical right bundle branch block morphology with right QRS axis deviation. B: Anteroposterior chest X-ray of a malpositioned left ventricular lead (thin arrow) with a cephalad course as it traverses the foramen ovale. The right atrial lead (thick arrow) appears in the normal position. C: Lateral chest X-ray of same patient. The right atrial lead (thick arrow) is in a normal position, but the left ventricular lead (thin arrow) is located posteriorly as it sits in the left atrium and is oriented downward, which is consistent with a left ventricular position.

Figure 2. Transthoracic echocardiogram (apical 5-chamber view) showing the pacemaker lead (PL) traversing the interatrial septum across the mitral valve into the left ventricle (LV). RV= right ventricle; LA= left atrium.
Inadvertent malposition of the pacing lead in the left ventricle occurs rarely and requires a high level of suspicion for proper diagnosis. Generally, cardiac examination findings consistent with RBBB, an ECG at paced mode, and chest X-rays are suggestive of malposition. However, because the cardiac examination findings consistent with RBBB are not always prominent and interpretation of chest X-rays showing an abnormal pacemaker lead route requires a high level of experience, ECG at paced mode showing an RBBB pattern provides the most useful and clear information to suspect this complication. Transthoracic echocardiography is the test of choice to confirm this diagnosis, but in difficult cases transesophageal echocardiography might be needed. Because the left ventricular location of the lead is a predisposition to thrombus formation, development of any neurologic symptoms in a patient with a pacemaker should be attributed to the malpositioned lead until proved otherwise.