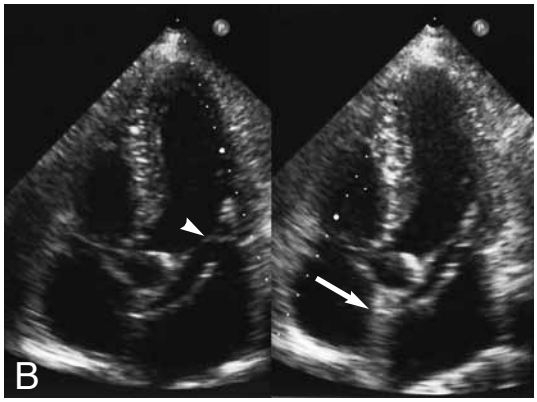
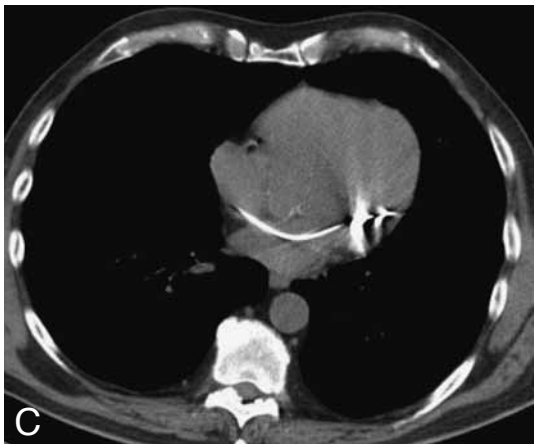
JBR–BTR, 2011, 94: 352.

IMAGES IN CLINICAL RADIOLOGY





Particular location of a cardiac pacemaker lead

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A dual-chamber pacemaker was implanted in a 69-year-old man. As far as the surgeon was concerned, there were no problems with implantation via a left subclavian transvenous route. The location of the leads seemed to be correct under the fluoroscope. Stimulation thresholds were correct. The chest radiograph was initially considered not revealing anomaly and the position of the electrodes was described as: "ends of leads appear to be correctly placed". On performing precise checks on the pacemaker, the ECG had the appearance of complete right bundle-branch block, during ventricular stimulation, a reason for fearing malpositioning in the left ventricle. The chest X-rays (A) were re-examined. On the lateral X-ray, the lower part of the ventricular lead has a first posterior small kink and is then distinctly directed anteriorly but its end remains clearly distant from the anterior surface. Was it still correctly positioned in the right ventricle? An ultrasound examination (B) was performed: the lead passed from the right atrium to the left atrium through the inter-atrial septum at the foramen ovale (arrow) then it penetrated the left ventricle through the mitral valve (arrow head). Despite the ambiguous appearance of the chest X-rays at the beginning, this lead was therefore malpositioned. A thoracic scan (C) was performed for another indication and also clearly showed the stimulation lead in the left atrium then the left ventricle.

Comment

It is important to make sure that a ventricular stimulation lead has been correctly positioned in the right ventricle (the usual position). Indeed its location in the left ventricle is not without consequence (1) because it clearly increases the risk of thromboembolic events and thus requires anticoagulation.

Correct positioning of the ventricular electrode is generally checked by frontal plus lateral fluoroscopy during implantation (but lateral fluoroscopy is sometimes difficult to perform in the operating theatre) then by standard post-operative PA and above all, lateral chest radiographs. Usually in the case of normal positioning in the right ventricle, the distal (inferior) part of the lead is directed anteriorly, while if it is positioned in the coronary sinus or the left ventricle, the stimulation lead is directed posteriorly. The chest X-rays are nevertheless sometimes more difficult to interpret, as in this case with a very slight posterior kink of the ventricular lead before a clear direction forward. An ultrasound examination can solve the problem in a non-invasive way without any radiation. If there is a doubt about the location of the end of a stimulation lead, it should be performed as soon as possible, while the cardiac electrodes are still easily moveable. A thoracic scan is an alternative but involves radiation.

Reference

1. Van Gelder B., Bracke F., Oto A., et al.: Diagnosis and management of inadvertently placed pacing and ICD leads in the left ventricle: a multicenter experience and review of the literature. *Pacing Clin Electrophysiol*, 2000, 23: 877-883.

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