

Delayed right-ventricular perforation by pacemaker lead; a rare complication in a 12-year-old girl

Kalp pili elektroduna bağlı geç dönem sağ ventrikül delinmesi; on iki yaşında kız hastada görülen nadir bir komplikasyon

Hayrettin Hakan Aykan, M.D., Alper Akın, M.D., İlker Ertuğrul, M.D., Tevfik Karagöz, M.D.

Department of Pediatric Cardiology, Hacettepe University Faculty of Medicine, Ankara

Summary– Developments in the diagnosis and treatment of congenital heart diseases have led to an increase in the need for intracardiac pacemaker and implantable cardioverter defibrillator (ICD) implantation. Various complications related to these interventions can be seen in the short term (pneumothorax, pericardial effusion, cardiac perforation, etc...) and in the long term (infection, subclavian vein thrombosis, sensing and pacing problems, battery erosion and cardiac perforation). In this report, we present a rare case of cardiac perforation occurring 2 years after pacemaker implantation.

Özet– Doğuştan kalp hastalıklarının tanı ve tedavi yöntemlerindeki gelişmeler kalıcı kalp pili ve kalp içi defibrilatörü yerleştirme gereksinimlerinde de artış ile sonuçlanmıştır. Girişimlere bağlı akut (pnömotoraks, perikart sıvısı, kalp delinmesi, vb) ve geç (enfeksiyon, subklaviya veni trombozu, sensing ve pacing problemleri, batarya erozyonu ve kalp delinmesi) dönemde olmak üzere değişik komplikasyonlar görülebilmektedir. Bu yazıda, kalp pili yerleştirilmesinden iki yıl sonra ortaya çıkan kalp delinmesi olgusu nadir görülmesi nedeniyle sunuldu.

Intracardiac pacemaker and implantable defibrillator implantation procedures have become a routine and often-performed procedure in pediatric cardiology practice. However, a number of complications may arise out of these procedures. In the short term, pneumothorax, pericardial effusion, cardiac perforation, etc... may be seen, and in the long term, infection, subclavian vein thrombosis, sensing and pacing problems, battery erosion and cardiac perforation may result. Although rarely seen, cardiac perforation is a recognized potential life-threatening complication of pacemaker or defibrillator lead implantation. Delayed perforations are often underdiagnosed and overlooked, and might cause significant morbidity with potentially undesirable fatal consequences.

Abbreviations:

ASD	Atrial septal defect
CT	Computerized tomography
ICD	Implantable cardioverter defibrillator
TEE	Transesophageal echocardiography

In this report, we present a rare case of cardiac perforation occurring 2 years after pacemaker implantation.

CASE REPORT

The patient was a 12-year-old girl with Down syndrome, mitral cleft and atrial septal defect (ASD), who had undergone an ASD closure and mitral valve replacement operation two years previously. Because of a postoperative complete atrioventricular block after this operation, she underwent implantation of a dual-chamber pacemaker with active-fixation leads. The pacemaker settings were normal, and chest radiographs confirmed appropriate positioning (right ventricle apex) of the leads after implantation and during the two-year follow up. In her last follow-up visit, a routine chest radiograph showed the pace-

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Correspondence: Dr. Hayrettin Hakan Aykan. Hacettepe Üniversitesi Tıp Fakültesi,
Çocuk Kardiyoloji Bilim Dalı, Ankara, Turkey.

Tel: +90 312 - 305 11 57 e-mail: h_h_aykan@yahoo.com

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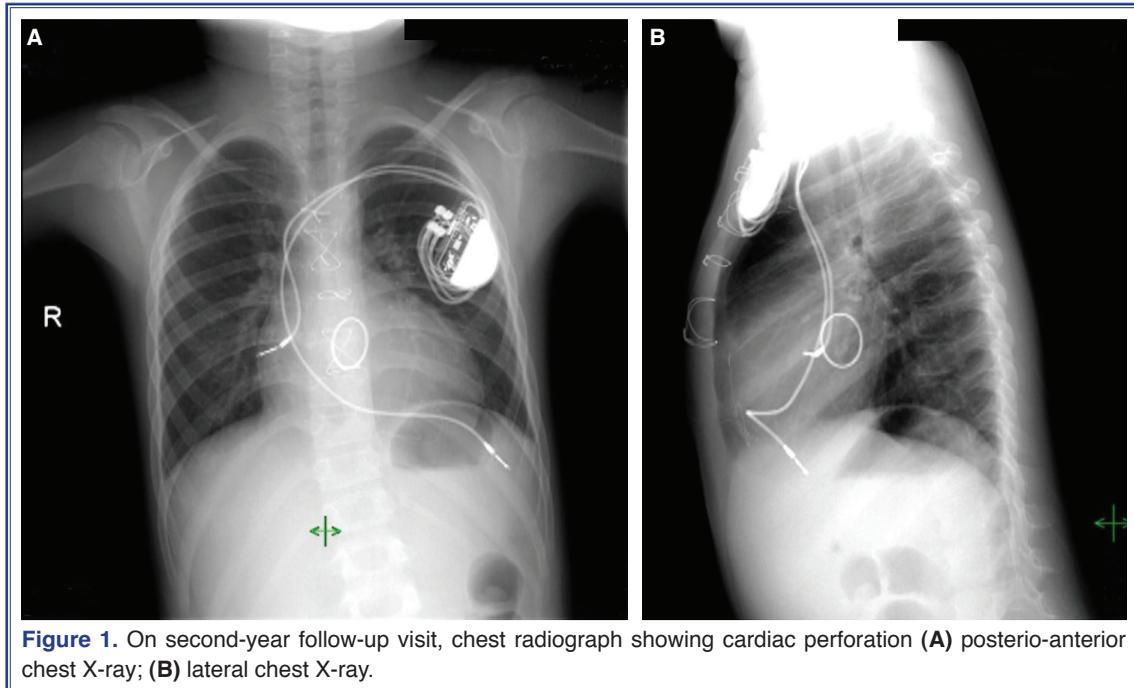


Figure 1. On second-year follow-up visit, chest radiograph showing cardiac perforation (A) postero-anterior chest X-ray; (B) lateral chest X-ray.

maker lead projecting over the left hemidiaphragm (Figure 1a and b). Computerized tomography (CT) confirmed cardiac perforation and showed the lead in the pericardial space. The patient showed none of the typical symptoms such as chest pain or diaphragmatic pacing. ECG findings reflected failure of ventricular sensing and pacing. The lead was smoothly extracted by simple traction, assisted by transesophageal echocardiography (TEE) in the operating room with cardiac surgery back-up.

DISCUSSION

Cardiac perforation is a well-known and life threatening complication related to implantable cardioverter defibrillator (ICD) or pacemaker leads. The frequency of cardiac perforation due to ICD leads is 0.6-5.2%, whereas cardiac perforation related to pacemaker leads ranges between 0.1% and 0.8%.^[1] Perforation which occurs immediately after the procedure is defined as acute, that which occurs within 24 hours after the procedure is defined as subacute, and that which occurs 1 month or more after the procedure is defined as delayed. Perforation cases are more common during the acute stage, but they may rarely occur during the delayed stage, as in the present case. Delayed perforation cases may be asymptomatic, or present as sudden cardiac death. Hirschl et al.^[2] in their CT

screening study conducted on 100 asymptomatic patients, reported that 15% of the patients had atrial perforation, whereas 6% had right ventricular perforation without any significant change in the electrophysiological parameters.

Mahapatra et al.^[3] reported that advanced age, steroid use, low weight, active fixation and temporary pacing are clinical predictors of cardiac perforation. However, Hirschl et al.,^[2] and Migliore et al.,^[4] found no relationship between type of fixation and frequency of perforation. Migliore et al., reported that asymptomatic right ventricular perforation constituted 35% of the cases and that all leads causing perforation were located in the right ventricular apex. To prevent perforation, implantation of right ventricular leads in sites other than the apex and free wall are recommended.

Because of lack of sufficient evidence, the technique by which leads should be removed in subacute and delayed cardiac perforation cases is still controversial. However, studies done on a small scale report that in right ventricular perforation cases, simple manual traction is the safest way for lead removal, independent of the lead model, whether the lead has penetrated the pericardium or not, or the patient is symptomatic or not.^[4,5] However, it should not be forgotten that this technique may lead to catastrophic results, so it is advised that this procedure be assisted

by fluoroscopy or TEE, and with surgical back-up present.

Delayed lead perforation is a rare complication. Given that it may be asymptomatic, patients should be screened periodically with electrophysiological evaluation and chest radiographs, and fluoroscopy and CT used in suspicious cases. Even though fluoroscopy or TEE assisted manual traction is safe in most cases, it should be kept in mind that emergent surgical interventions may be needed.

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Key words: Child; heart injuries/etiology; pacemaker, artificial/adverse effects; wounds, penetrating/etiology.

Anahtar sözcükler: Çocuk; kalp yaralanması/etyoloji; kalp pili, yapay/yan etki; yaralanma, delici/etyoloji.