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Case Report

# Subacute pneumothorax contralateral to the venous access site associated with atrial lead perforation in a patient who was receiving corticosteroid therapy

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ABSTRACT

Pneumothorax contralateral to the venous access site due to the right atrial lead is an uncommon complication. Concomitant steroid use is known as a risk factor of pacemaker lead perforation. We report a rare case of subacute contralateral pneumothorax due to a screw-in atrial lead perforation that occurred after dual-chamber pacemaker implantation in a patient who was receiving steroid therapy. The pneumothorax disappeared, and no recurrence was observed during follow-up with close observation alone.



## 1. Case report

A 67-year-old man who had been taking long-term steroid therapy (prednisolone 11 mg/day for 12 years) for pemphigoid was admitted to our hospital because of 2:1 atrioventricular block. Dual-chamber pacemaker implantation (St. Jude Medical Assurity MRI) was indicated, and the atrial and ventricular leads were inserted via the puncture of the left subclavian vein. The right ventricular (RV) bipolar screw-in lead (St. Jude Medical Tendril MRI) was positioned against the RV apex. The right atrial (RA) bipolar screw-in lead (St. Jude Medical Tendril MRI) was positioned at the RA anterolateral wall. RA/RV lead sensing, pacing threshold, and pacing impedance were within the expected normal ranges (RA lead: pacing threshold, 1.75 V/0.4 ms; sensing threshold, 2.7 mV; lead impedance, 430 Ω; RV lead: pacing threshold, 0.5 V/0.4 ms; sensing threshold, 4.6 mV; lead impedance, 680 Ω). The right subclavian and jugular veins were not punctured throughout the implantation procedure. The chest radiographic examination performed immediately after the procedure did not reveal any abnormalities. Four days after pacemaker implantation, chest radiographic examination revealed a right-sided asymptomatic pneumothorax, and no penetration of the atrial lead body or helix of the atrial lead was confirmed (Fig. 1). Chest radiographic computed tomography revealed a right anterior pneumothorax and perforation of the RA wall by the helix of the atrial screw-in lead (Fig. 2). No pathological pericardial effusion was observed on transthoracic echocardiography. The interrogation parameters of the pacemaker at that time did not show any changes in comparison with those at the time of implantation. The pneumothorax was gradually improved along the time course with observation and disappeared 14 days later. No recurrence was observed during the 3-month follow-up.

## 2. Discussion

A few case reports have described contralateral pneumothorax associated with perforation of the right atrium [1–3]. However, subacute contralateral pneumothorax associated with atrial lead perforation in a patient receiving corticosteroid therapy has not been previously reported. Previous reports identified steroid use, use of a helical screw-in lead, and use of transvenous temporary pacing as risk factors of cardiac perforation [4]. Especially the use of a screw-in lead to the atrial thin wall itself is a potential risk factor of perforation [2]. On the other hand, long-term steroid therapy is known to induce muscular tissue weakness and/or atrophy [4]. Therefore, this case was considered to have dual risks for lead perforation, that is, the use of a helical screw-in lead and concomitant long-term steroid therapy. A few cases with a contralateral pneumothorax associated with perforation of the right atrium have been reported [1,2]. In these reports, most of the patients needed repositioning of the atrial lead. However, pathological pericardial effusion and/or changes in lead parameters were associated in such cases, which were not observed in the present case. Oginosawa et al. reported the case of a patient with a

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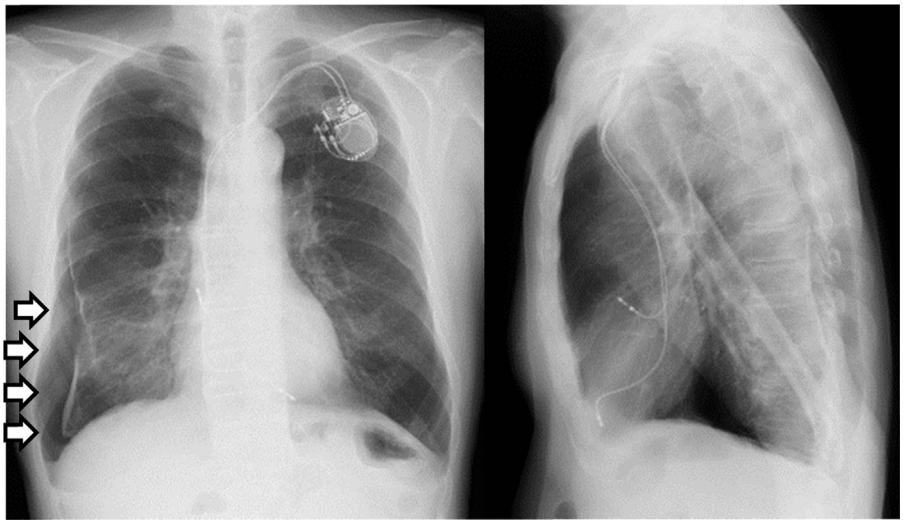

**Fig. 1.** Chest radiograph 4 days after pacemaker implantation The chest radiograph shows a right-sided pneumothorax (open arrows).

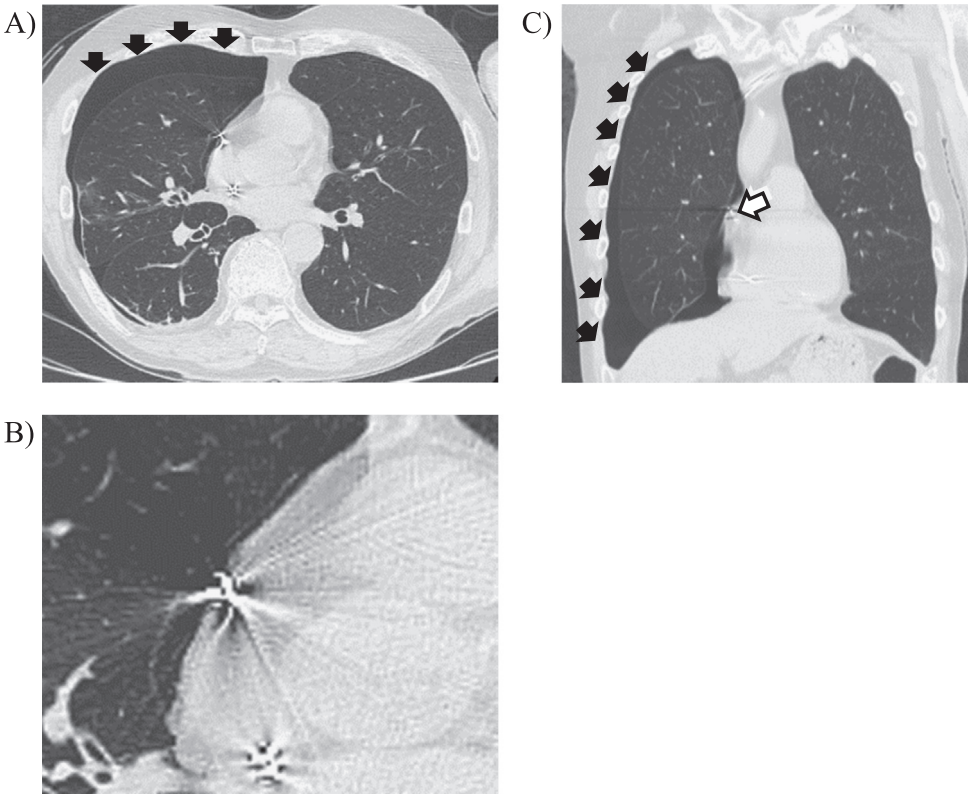


**Fig. 2.** Chest radiographic computed tomography (CT) image 4 days after pacemaker implantation. A) Axial CT image showing the right-sided pneumothorax (solid arrows). B) Axial CT image showing the atrial lead perforation through the right atrial wall. C) Coronal CT image showing the right-sided pneumothorax (solid arrows) and atrial lead perforation through the right atrial wall (open arrows).

similar event who recovered with simple close observation [3]. This report indicates the possibility of spontaneous cure even in a case with lead and screw perforations, which are suspected to result from fibrous tissue thickening and/or rapping around the helix, but such plan should be chosen under close observation.

Our present case suggests the possibility of atrial perforation in patients receiving long-term steroid therapy. The relatively high pacing threshold of the atrial lead may be the sign of atrial lead perforation in this case. In such a case, operators should pay attention to the lead type and parameters, and atrial septal lead position may reduce the risk of lead perforation [5]. Even in cases with perforation, spontaneous cure might be expected when changes in lead and pathological parameters or increasing pericardial effusion are not observed, but such plan should be chosen only under close observation.

## Conflicts of interest

This study received no financial support from commercial sources. All authors declare no conflict of interest related to this study. No specific unapproved use of any compound or product occurred.

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