

Pneumothorax after pacemaker implantation localized contralaterally to the side of implantation – a rare but possible complication

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Abstract

Case report – An 86-year old patient developed pneumothorax a few hours after pacemaker implantation. Surprisingly, the pneumothorax localized contralaterally to the site of subclavian vein puncture. It was treated with chest tube puncture,

under the care of a pneumonologist, resulting in full recovery. Although pneumothorax localized contralaterally to the site of subclavian vein puncture during pacemaker implantation is very rare, it has been reported in the literature.

Case

An 86-year-old male patient underwent dual chamber pacemaker implantation due to symptomatic second degree atrioventricular block 2:1. His medical history was also positive for paroxysmal atrial fibrillation, hypertension, and chronic obstructive pulmonary disease. No significant deviations were reported in laboratory tests.

The device (Medtronic Sensia DR) was implanted in the left prepectoral region via a subclavian approach. An active fixation ventricular lead (Medtronic 5076-58 MRI) was implanted into the right ventricular outflow tract through left

cephalic vein venesection, while another active fixation atrial lead (Medtronic 4076-52) was located within the right atrial appendage using left subclavian vein puncture. The procedure went without perioperative complications. Post-procedure chest radiographs taken directly after the intervention were satisfactory.

Five hours later, the patient suddenly reported shortness of breath and a stabbing pain in the chest intensified by inspiration. A chest X-ray (posteroanterior view) revealed a right-sided (contralateral) pneumothorax (Figure 1), while the lateral view appeared normal (Figure 2). A chest tube



Figure 1. Chest x-ray in the posteroanterior view revealing right-sided pneumothorax.

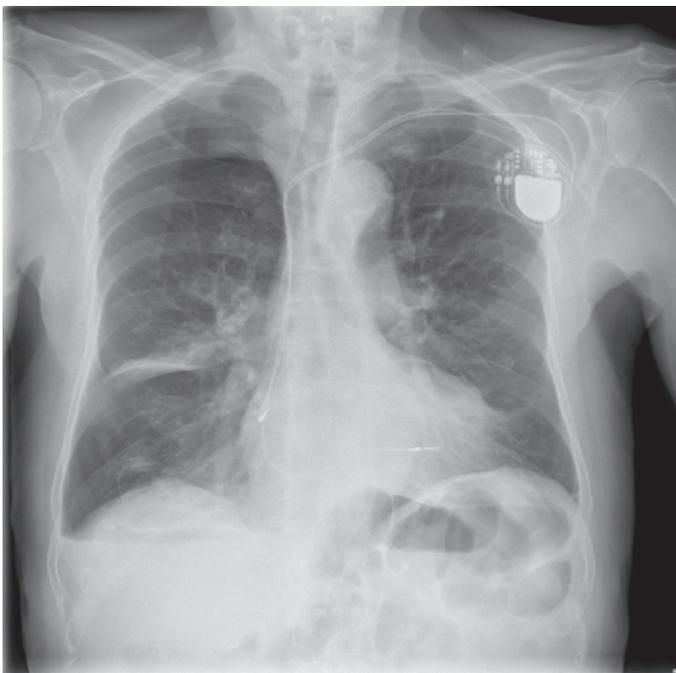


Figure 2. Position of leads appears normal in the posteroanterior view.

was inserted in the third intercostal space, evacuating 720 ml of air and promptly relieving the symptoms. Pacemaker interrogation revealed no change in lead data or pacemaker activity parameters.

During several days of in-hospital observation the patient was found to be in a good general condition, leads' electrical parameters were stable, and function of the pacing system was proper.

Discussion

The patient was admitted to our department with second-degree type 2 atrioventricular block presenting a class I recommendation for pacing, irrespective of symptoms, and there is evidence of superiority of dual-chamber pacing over only ventricular pacing^[1].

Pneumothorax as an early complication occurs with a frequency between 0.9% and 1.9% and next to lead dislodgement/loss of capture is one of the most common complications^[2,3]. However, our patient's pneumothorax occurred on the opposite side of the procedure. This situation is possible, although rarely described in publications^[4-9]. The first case of right-sided pneumothorax contralateral to the site of implantation was described in 1999 and occurred in a 79-year-old, small-built Taiwanese woman (body weight of 51 kg and height of 140 cm)^[10].

Presumably this situation can be caused by incidental subclavian or brachiocephalic vein puncture during lead insertion and subsequent puncture of the right pleura (as described in^[8]). Another situation in which contralateral right-sided pneumothorax can occur is atrial lead extrusion through the right atrial appendage, which abuts the right pleura^[7]. Last but not least, atrial wall perforation caused directly by the atrial lead can also cause right-sided pneumothorax with or without pericardial effusion^[6,11]. Importantly, atrial leads are implanted by an active fixation (screw-in) mechanism to the atrial wall, which increases the risk of perforation. Therefore these leads must be implanted with caution and overscrewing should be avoided^[10]. In our case no intra-procedural problems with leads' insertion or implantation were reported by the operator. Overscrewing of the atrial lead is rather unlikely because of the specified number of clockwise turns that are done during lead fixation under fluoroscopic control. However, our patient had a history of longstanding smoking and chronic obstructive pulmonary disease and received chronic therapy of inhaled fluticasone propionate and salmeterol xinafoate. This situation increases the risk of complications, given that a case of contralateral pneumothorax in a patient on long-term steroid therapy has been described^[12].

In conclusion, the case of our patient shows that contralateral right-sided pneumothorax as a complication of pacemaker implantation is possible, even though very rare. Moreover, a patient can manifest the symptoms many hours after the operation. In our case it was 5 hours, in the first case described in the literature it was 4 hours^[10], but in the case described by Dilling-Boer D and colleagues it was 3 days^[6]. Therefore patients discharged from hospital shortly after the intervention should remain in direct contact with the electrotherapy center, which enables an appropriate response as soon as possible when necessary.

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