Contralateral pneumothorax following repositioning of an atrial lead

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A right-sided pneumothorax developed several hours after atrial lead repositioning following otherwise straightforward implantation of a biventricular defibrillator from a left subclavian approach. Right atrial lead perforation was presumed, though this could not be demonstrated on computed tomography. The patient was managed conservatively and made a full recovery.

Case presentation

A 63-year-old man with no underlying lung disease underwent implantation of a biventricular defibrillator. The device was implanted in the left prepectoral region via a subclavian approach. Vascular access was straightforward. An active fixation Sprint Quattro ICD lead (6947) was located at the right ventricular apex, an active fixation CapSure Fix Novus (5076) within the right atrial appendage, and a unipolar Attain Ability lead (4196) in an anterolateral vein (Medtronic Ltd, Hertfordshire, UK).

Post-procedure chest radiographs taken immediately and the next day were satisfactory. Technical checks on Day 1, however, revealed loss of atrial capture at high output, without macrodisplacement. Revision of the pacing system was undertaken, with repositioning of the atrial lead to an anterolateral position with satisfactory pacing parameters. No further instrumentation of the subclavian vein was required. An initial post-procedure radiograph was satisfactory but 12 h later the patient developed acute dyspnoea. A further film showed a significant right-sided pneumothorax (Figure 1).

Pacing and sensing parameters remained satisfactory, echocardiography did not reveal any pericardial effusion and helical computed tomography (CT) showed the right atrial lead abutting the atrial wall but no evidence of lead perforation. Chest drain insertion by the respiratory physicians failed. The patient was managed with high-flow oxygen and the pneumothorax resolved over approximately five days. The patient made a full recovery with no pacemaker or respiratory complications at 18-month follow-up.

Commentary

Right-sided pneumothorax following device implantation on the left side has been reported in a handful of cases. Most of these had evidence on CT, chest radiography, or echocardiography suggesting atrial perforation and were managed by lead revision.1 We surmise that perforation occurred with repositioning to an anterolateral position. Loss of capture on Day 1 suggests that injury may have already occurred, with pneumothorax developing upon helix retraction during revision. The absence of macrodisplacement is against this. This report indicates that conservative management may be a reasonable option in cases where there is no definitive evidence of perforation, satisfactory pacing parameters are present, and the patient is stable.

Theoretical alternative explanations include incidental dual pathology such as a ruptured bulla, contralateral pleural puncture by the introducer needle during subclavian vein cannulation, or traumatic puncture in the presence of a buffalo chest. Buffalo chest describes a pleuropleural communication where puncture or spontaneous pneumothorax on one side can lead to contralateral pneumothorax or bilateral pneumothoraces. A unilateral chest drain results in reinflation of both lungs.2

Right atrial perforation is uncommon and generally occurs with active fixation leads. Risk is higher with leads placed in the anterolateral position because of the thin wall and its relationship to the right lung. It is important not to overextend the helix during lead implantation.

Conflict of interest: none declared.

References


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