Leadless pacemaker implantation in postpneumonectomy syndrome

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Introduction

Postpneumonectomy syndrome (PPS) is a rare condition with extreme anatomical changes that occur following pneumonectomy. In this clinical scenario, cardiac rhythm management device implantation is challenging owing to the unusual topography of the heart. There are isolated reports of pacemaker implantation in acquired dextrocardia or dextroposition. We hereby report the first case described of a leadless pacemaker in acquired dextroposition.

Case report

A 77-year-old man, with a history of lung cancer treated with right-sided pneumonectomy and radiation therapy, was referred to our center because of a failed previous attempt of transvenous pacemaker implantation. The patient complained of weakness, dizziness, and severe dyspnea on mild exertion, and he had syncope. The 12-lead electrocardiogram showed atrial fibrillation with a mean heart rate of 40 beats per minute. Transthoracic echocardiogram showed normal ventricular ejection fraction and heart orientation compatible with dextroposition. Preprocedural chest radiograph revealed a right-sided pneumonectomy, rightward displacement of the cardiac silhouette, mild pulmonary congestion, and pleural effusion.

Standard upper limb venography confirmed the absence of left- and right-sided venous accesses to the right chambers; thus, the patient had indication for implantation of a leadless pacemaker.

The procedure was performed under local anesthesia and light sedation and analgesia using intravenous boluses of midazolam and fentanyl. Briefly, ultrasound-guided femoral venous access was obtained to minimize groin complications. A stiff guide wire was advanced up to the superior vena cava. Owing to the abnormal course of the guide wire and the difficulty to obviously appreciate the cardiac silhouette or the heart’s orientation within the right hemithorax, we decided to perform contrast injection through the Micra introducer system (Medtronic Inc., Minneapolis, MN) (Figure 1A and B). Under fluoroscopic guidance in right anterior oblique 45° view, the Micra introducer system was advanced into the right atrium with a continuous clockwise and counterclockwise rotation to facilitate its movements. The subsequent steps of the procedure were performed according to the manufacturer recommendations (Figure 1C–E). Final parameters were satisfactory with an impedance of 660 ohms, R-wave sensing of 8 mV, and right ventricular threshold 0.50 V @ 0.24 ms. The patient underwent a chest scan (Figure 1F) and was discharged after 2 days without any complications.

Discussion

PPS is a rare condition occurring after pneumonectomy, caused by an extreme shift of the mediastinum, heart, and great vessels toward the empty hemithorax.1 Acquired dextrocardia following right pneumonectomy has been previously reported.2 Dextrocardia is defined as the presence of the heart in the right chest. Dextrocardia may be in the

KEY TEACHING POINTS

- This case report may help readers in case of specific clinical scenario such as postpneumonectomy syndrome (PPS). Although PPS is rare, the operators must be aware of anatomical variants secondary to extensive surgery in order to adequately plan the procedure (ie, preprocedure imaging, tools during implantation, etc).
- There are differences between congenital dextrocardia and acquired dextroposition that can make the implantation more difficult.
- Our case showed that leadless pacemaker implantation seems to be feasible even in this complex anatomy.
form of dextroposition or dextroversion. In cardiac dextroposition the major axis of the heart is directed from right to left, while in cardiac dextroversion the major axis of the heart is aligned from the left toward the right. In this clinical scenario, cardiac rhythm management device implantation can be challenging. This patient was an ideal candidate for leadless pacing because he had symptomatic atrial fibrillation with a slow ventricular response rate and there were no venous accesses from the upper extremities. Few cases have been reported of leadless pacemaker implantation in patients with congenital dextrocardia. It is important to recognize that in cases of acquired dextrocardia or dextroposition after pneumonectomy there is poor fluoroscopic definition of the thoracic anatomy, and in particular poor visualization of the heart and vessels, and increased radiopacity of the right chest when compared to congenital dextrocardia. To the best of our knowledge, leadless pacemaker implantation in acquired dextroposition owing to PPS has never been previously reported.

References
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