EP CASE REPORT

Successful implant of a leadless pacemaker with tine-based fixation next to an abandoned battery-depleted screw-in helix fixation leadless device

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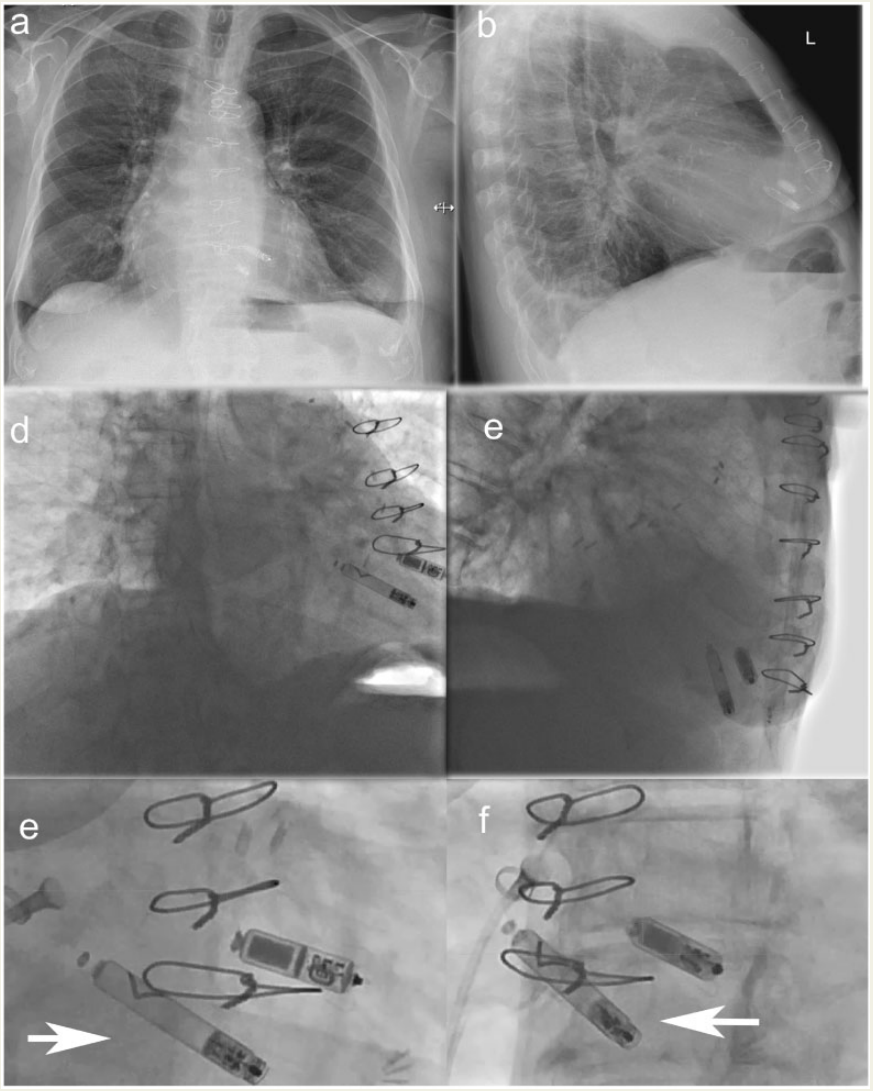
Background

Leadless pacemakers are increasingly employed in patients with an indication for single-chamber ventricular pacing. When faced with a need for replacement, physicians have several options, most commonly extraction and replacement or implantation of a standard pacemaker, either explanting or abandoning the leadless device. We here report a successful further option: addition of a second leadless pacemaker next to the abandoned device.

Case study

An 84-year old man was admitted to emergency with presyncope due to battery failure of a leadless pacemaker (Nanostim™ St. Jude Medical), which had been implanted for bradyarrhythmias in March 2014. Based on the presence of an occlusion in the subclavian vein and the patient's stated preferences a leadless pacemaker (Micra™ Medtronic) was chosen as replacement. As the patient had concerns about potential complications from an extraction procedure it was decided to implant the replacement device without extraction of the dysfunctional leadless pacemaker.



Access was through the femoral vein using a 23-French introducer. The device was placed at the mid-septum of the right ventricle sufficiently distant from the previous device to avoid mechanical device interaction (*Figure, panels A to D*). A pull-and-hold fixation test was performed under fluoroscopy to ensure that the leadless pacemaker was securely embedded in the myocardium (*Figure, panels E and F*). Excellent electrical parameters and unaffected papillary muscles and tricuspid valve function were confirmed at the time of implant and at the 3 month follow-up visit.

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Discussion

Multiple leadless pacemakers have been placed successfully in animals without mechanical device interaction or negative impact on cardiac function.[1] The present case represents the first published implantation of a leadless pacemaker in a human patient with an abandoned leadless device. The procedure presents an alternative to current options when battery depletion or failure occurs in leadless pacemakers. Explantation procedures for screw-in leadless pacemakers have a success rate >90%,[2] but extraction is not always feasible or without complications. Moreover, little is known about explantation at the projected (4–10 years) end of battery lives.[3] As a standard pacemaker may not be the most appropriate device for all patients with an existing leadless device, the option to implant a second leadless pacemaker without previous extraction would be a valuable addition to the interventional toolkit.

Caveats apply. Individual operator skills, implant conditions and patient characteristics may influence similar procedures in other individuals. The results may not be relevant to other types of leadless pacemakers. Further data in various settings and patient conditions will be needed to support decisions on the most appropriate management in individual patients of leadless pacemakers with battery failure or depletion. Further, it remains to be determined whether there is a limit to how many devices may be implanted in a single patient.

Conflict of interest: W.J. has received speaker and consultancy fees from St. Jude Medical, Medtronic, Boston Scientific and Biotronik.

References

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