

EP CASE REPORT

Leadless pacemaker implantation in achondroplastic dwarfism and recurrent cardiac implantable electronic device infections: a case report

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The safety and performance of the micra transcatheter pacing system (MTPS) seems to be very high both in the investigational studies and in the real world setting.^{1,2} Much of currently available data comes from normal-sized adults, with only limited data on small-sized patients.³

We describe the MTPS implantation in a 71-year-old male, suffering from recurrent pacemaker infections and lead failure, who is affected by achondroplastic dwarfism with the pathognomonic phenotypical signs characterized by small size (height 120 cm; weight 39 kg), disproportionately short upper limbs, often limiting self-care skills, with an abnormal limb-to-trunk ratio. Other comorbidities include type 2 diabetes and severe thoracolumbar kyphosis.

Previously, in 1970, the patient underwent a single-chamber pacemaker implantation via the right subclavian vein for complete atrioventricular block. Due to recurrent ventricular lead failure, a contralateral pacemaker implantation via the left subclavian vein was performed in

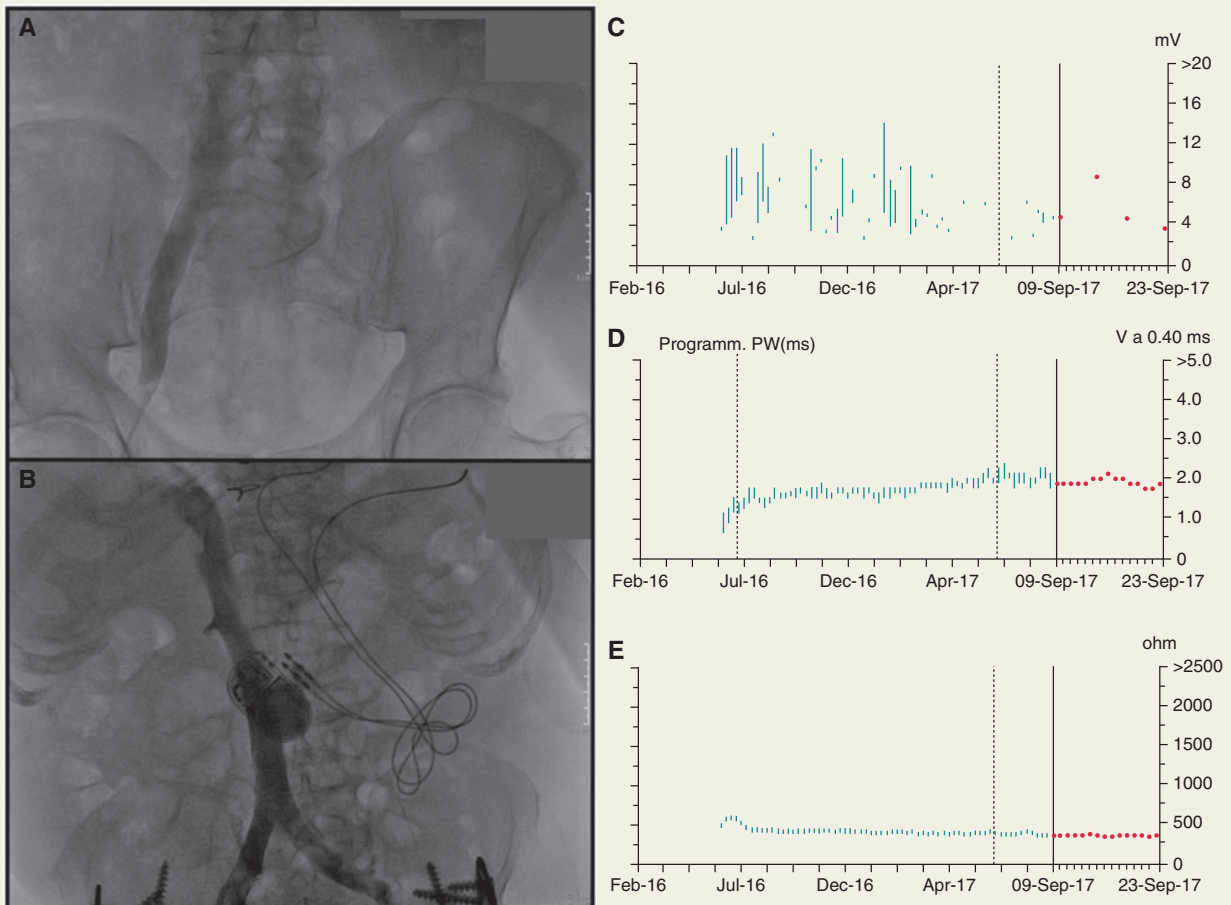


Figure 1 On the left side, two angiograms from the femoral access, with the same X-ray magnification, showing the differences in size between a normal-sized adult (A) and the achondroplastic dwarf (B). A centimetric scale is embedded into the picture. On the right side, the trend of micra parameters from implantation until the last follow-up: (C) the trend of the R wave amplitude (6.6 mV at the implantation, 3.5 mV at the last follow-up) is shown, (D) the trend of the pacing threshold (0.8 at 0.24 ms at the implantation, 1.88 at 0.40 ms at the last follow-up) is shown, (E) the trend of the impedance (470 Ohm at the implantation, 340 Ohm at the last follow-up) is shown.

1998, and 6 years later a new ventricular lead was added through the same route. In 2010, after pacemaker replacement for battery depletion, a pocket infection occurred due to *Staphylococcus epidermidis* oxacillin-resistant. After unsuccessful pocket revisions, the infection evolved into sepsis with endocarditis of the tricuspid valve. The patient underwent cardiac surgery to perform lead extractions, tricuspid valve plasty, and epicardial dual chamber pacemaker (EDCPM) placement with tunnelization of the leads to an abdominal pocket. The surgery was complicated by pneumo-mediastinum and post-procedural permanent tracheostomy. In 2015, after elective pacemaker replacement, an abdominal pocket infection occurred. After unsuccessful pocket revisions, the patient was referred to our centre for EDCPM extraction. At that time the patient was pacemaker dependent, with permanent atrial fibrillation.

Once the systemic infection was excluded by repeated negative laboratory examinations and 18-F-fluoro-2-deoxyglucose positron-emission tomography/computed tomography, we decided first to implant the MTPS and second to remove the EDCPM, because of the absolute pacing dependency of the patient.

A thoracoabdominal computed tomography angiography was performed to define the visceral and vascular anatomy, and then an MTPS was implanted via the right femoral vein. A venous angiogram was obtained by contrast media injection from the femoral access (*Figure 1B*). The delivery catheter was then advanced and carefully manipulated because the length of the delivery catheter greatly exceeded the inferior limbs of the patient. The pacing capsule was successfully deployed at the low septum of the right ventricle, with satisfying electrical parameters (*Figure 1C–E*). Procedural time, skin to skin, lasted 55 min. There were no complications and an echocardiogram excluded pericardial effusion. The EDCPM was subsequently removed by a cardiac surgeon via minithoracotomy. At 18 months follow-up the patient was free from infections. Pacing parameters showed a mild increase in pacing thresholds (*Figure 1C–E*).

Our experience confirms the suitability of an MTPS on very small-sized adults and might suggest the hypothesis of extending the MTPS technology to highly selected pediatric cases.

References

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