Leadless pacemaker implantation in a patient with a double-chambered right ventricle

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DESCRIPTION

Double-chambered right ventricle (DCRV) is an extremely rare disorder, accounting for 0.5%–2.0% of all congenital heart diseases (CHDs). Anomalous muscle bundles divide the right ventricle (RV) into two cavities: proximal high-pressure and distal low-pressure chambers, which is associated with mid-cavity obstruction. This congenital disorder commonly concurs ventricular septal defects (84.4%), membranous subaortic stenosis (31.2%) and other cardiac anomalies.1

A man in his 70s presented with recurrent syncope. His medical history included an isolated DCRV with mid-cavity obstruction (peak systolic pressure gradient of 65 mm Hg) under conservative non-surgical treatment, chronic heart failure, permanent atrial fibrillation and chronic kidney disease. His medical therapy included direct oral anticoagulant, diuretics and beta-blocker. In an emergency room, he lost his consciousness because of a ventricular pause of 10 s. A temporary pacing lead was emergently placed through the right jugular vein. Permanent pacemaker implantation was required for a paroxysmal atrioventricular conduction defect. However, considering his advanced frailty and dementia, leadless pacemaker implantation (LPI) was deemed to be suitable due to its low rate of complications. Subsequently, a Micra VR transcatheter leadless pacemaker (Medtronic, Minneapolis, MN, USA) was implanted with a small amount of contrast media because of his kidney dysfunction. The Micra pacing capsule was delivered and located at the distal right ventricle (figure 1, video 1). Worsening right ventricular mid-cavity obstruction or tricuspid valve dysfunction was not detected. Colour Doppler imaging revealed the mid-cavity turbulent jet measuring 39 mm in a systolic phase. The catheterisation finished without any complications. Postprocedural transthoracic echocardiography confirmed that the Micra pacing capsule was located at the distal RV (figure 1, video 1). Worsening right ventricular mid-cavity obstruction or tricuspid valve dysfunction was not detected. Colour Doppler imaging revealed the mid-cavity turbulent jet measuring 39 mm Hg. The pacing parameters were acceptable at 3 weeks follow-up (R-wave: 17.4 mV, impedance: 620 Ω and pacing threshold: 2.25 V at 0.24 ms). The proportion of ventricular-paced beats was 3.2%. Thereafter, the patient was transferred to the rehabilitation hospital. The Micra transcatheter pacing system (TPS) is an established bradycardia management, which has eliminated device-related complications (including pocket infection and lead failure) compared with traditional transvenous pacemakers.2–4 Nowadays, the population of adult CHD patients are growing where they are prone to develop conduction disorder requiring device therapy.5 In transvenous implantation, CHD patients have a higher risk of complications than non-CHD patients.6 However, studies on the safety and efficacy of the Micra TPS for CHDs...
are limited. To our knowledge, this is the first report of LPI in DCRV. In this case, RV anomaly of anomalous muscle bundle did not disturb the catheterisation procedure. This case suggests the efficacy of LPI for CHDs, even though preprocedural morphological assessment of the RV and concomitant cardiac anomalies is essential for safe transcatheater procedures. Besides, the Micra AV pacemaker (Medtronic) enabling atioventricular synchronous pacing is now available.7 Leadless pacemakers would be beneficial not only for non-CHD patients, but also for CHD patients.

Acknowledgements The authors thank Dr Hajime Saeki and Dr Masako Okada for helping with the patient’s treatment.

Contributors TF: conception and design, writing the article. MM, NO: final approval of the manuscript.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Consent obtained directly from patient(s).

Provenance and peer review Not commissioned; externally peer reviewed.

Case reports provide a valuable learning resource for the scientific community and can indicate areas of interest for future research. They should not be used in isolation to guide treatment choices or public health policy.

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