EP CASE REPORT

A case of removal of a "dancing" Micra

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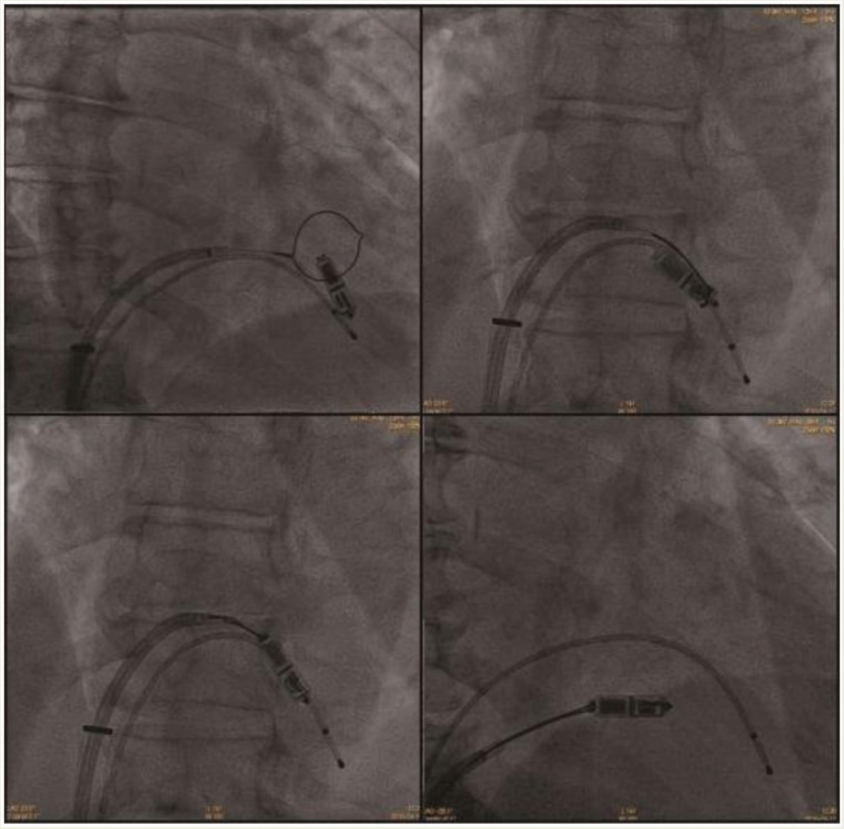
Micra™ (Medtronic Inc) transcatheter pacing system (TPS) is a leadless pacemaker with a nitinol tine-based fixation mechanism. Growing scientific evidences seem to confirm safety and effectiveness in acute and mid-term settings.[1]

While TPS implantation, requiring a specialized skill set, is a well-established step by step procedure, far most challenging seems to be TPS retrieval, after cutting the tether.[2]

In addition to the fact that there is no specialized system for TPS retrieval, there is some evidence of early endothelialization of the TPS that raises the question about how and until when the TPS removal is feasible.[3]

We describe a case of an 80-year-old man with *hypertensive cardiopathy* and permanent atrial fibrillation (AF) who underwent TPS implantation and then TPS removal 1 month later.

During the first implant the TPS was deployed to the interventricular mid-septum and successfully recaptured for three times, due to unsatisfying pacing thresholds (2 V/0.24 ms), until final mid-septal position under the septomarginalis trabeculation was achieved with



acceptable electrical parameters (pacing threshold 1.5 V/0.24 ms). The tug test confirmed a good engagement in the myocardium of at least two tines.

The patient was discharged and his beta-blocker therapy was discontinued to reduce ventricular pacing percentage with the aim of saving battery.

Forty days later, at scheduled pacemaker follow-up, the patient was on AF with fast ventricular response and the pacing threshold was high and unstable (4.88 V/1 ms at 100 bt/min, 4.75 V/1 ms at 120 bt/min). At fluoroscopic check there was a wide movement of the tail of the TPS, mimicking a dance, without any obvious dislodgment. The echocardiogram showed an apparently good engagement of the tip of the TPS just under the septomarginalis trabeculation, with possible interference of the tail with sub-valvular apparatus of tricuspid valve.

The patient was admitted to our department and then submitted to further invasive procedure. In order to remove the TPS, we used a new technique by advancing the introducer of the TPS into the mid right atrium. We subsequently introduced a steerable deflectable catheter (Agilis, SJM) through a short 14 F sheath to avoid blood leak from the haemostatic valve of the introducer. Once we crossed the tricuspid valve, we advanced a 6 F/20 mm snare kit (Amplatz, goose neck) to grab the tail of the TPS (*Figure 1*). A gentle pull back allowed first the release of tines from the myocardium and then the crossing upstream the tricuspid valve. Finally, the TPS was retrieved into the introducer sheath and then removed.

A careful examination excluded signs of fibrosis, endothelialization, or clot, involving tines or body of the TPS. A new TPS was successfully deployed during the same procedure with optimal electrical values.

This case supports the reproducibility and safety of the TPS removal technique previously described by Gerdes *et al.*[2] and the feasibility of the procedure within at least one month from implantation. Further data are required to address this issue. Interestingly, a more careful retrospective analysis of tug test at first implantation showed a slight rotation of the device around its body that might be misleading in correct evaluation of firm fixation of the device. Finally, AF with fast ventricular response, causing an excessive movement of the tail of the TPS, may have negatively affected the contact of the tip of the TPS with the myocardial tissue, and possibly impaired fixation of the TPS to the myocardium. We could hypothesize microdislodgement as the most likely mechanism of marked increase in threshold of Micra.

References

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3. Chen K, Zheng X, Dai Y, Wang H, Tang Y, Lan T *et al*. Multiple leadless pacemakers implanted in the right ventricle of swine. *Europace* 2016;**18**:1748–52.