

The Micra Leadless Intracardiac Transcatheter Pacing System

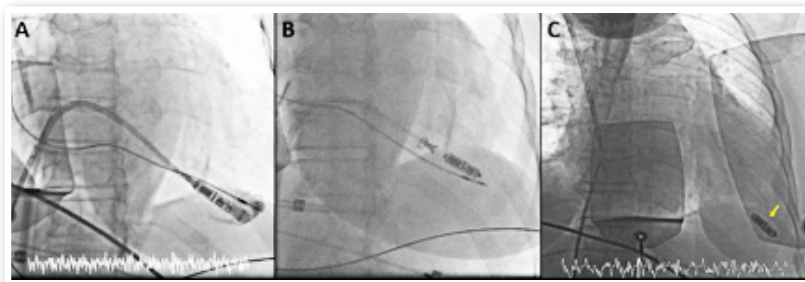
- The Electrophysiology Program at Penn Medicine offers the Micra Transcatheter Pacing System (Medtronic) for select patients with conduction system disorders including symptomatic bradycardia.

The world's smallest pacemaker, the Micra is a self-contained, leadless, percutaneous, single-chamber ventricular pacemaker delivered through the femoral vein to the heart. Held firmly in the right ventricle, the Micra can remain active for as long as 12 years to provide rate-responsive pacing and automated pacing capture threshold management, as needed.

The Micra is the result of recent advances in miniaturization, novel materials, high-density battery chemistry, and bioengineering innovation. Examples of the latter include the placement of electrodes directly on the pacemaker capsule and the use of a superelastic nitinol fixation mechanism to ensure firm and durable implantation.

By avoiding the need for transvenous leads and a subcutaneous "pocket", the Micra significantly decreases the risk of device-based infection and provides an alternative pacing strategy to patients with limited vascular access.

In safety studies, the Micra was associated with significantly fewer major complications than standard pacemaker devices, a disparity attributed to reduction in access site events (hematoma and infection at the site of implantation), device pacing issues and lead dislodgement.¹



► **Figure 1:** (A) Contrast medium injected to further define the region; (B) Micra deployed by releasing 4 fine nitinol tines; (C) A post-operative CXR shows proper device location.

CASE STUDY

Mrs. G, a 69-year-old woman, was referred to Robert Schaller, MD, at the Electrophysiology Program at Penn Medicine for pacemaker consideration due to chronic atrial fibrillation and symptomatic bradycardia. Mrs. G's medical history offered several obstacles to traditional transvenous pacing including hemodialysis-dependent end-stage renal disease and a dialysis fistula on the right side. Due to a recent systemic MRSA infection that involved her previous pacemaker on the left side, the unit had to be extracted, rendering the left side also relatively contraindicated.

Due to limited vascular options and high risk of future device-related infections with a traditional pacemaker, Mrs. G chose to have a Micra implantation. For the procedure, which took about an hour, Mrs. G was first placed under sedation. Percutaneous femoral venous access was acquired and the delivery sheath was guided to the heart. The Micra was then steered to the right ventricle under fluoroscopic guidance and placed in an apical septal location. Contrast medium was injected to further define the region (Fig. 1A). With confirmation of an ideal site, the Micra was deployed (Fig 1B) by releasing 4 fine nitinol tines. The electrode at the base and pacing anode at the exposed end of the Micra were then evaluated, followed by fluoroscopic assessment of the tines to ensure fixation. After confirmation of device fixation, pacing thresholds were tested and found to be excellent. At this point, the tether was cut and withdrawn and the sheath was removed from the heart. A superficial "figure of eight" suture was deployed at the venotomy site with immediate and complete hemostasis. A post-operative CXR showed proper device location (Figure 1C).

Mrs. G remained in the hospital overnight and after repeat interrogation the following day, discharge planning was initiated. In the ensuing weeks, she experienced no complications. Right ventricular pacing proved ideal in Mrs. G's case due to a history of chronic atrial fibrillation.

References

1. PMA 150033-FDA Summary of Safety and Effectiveness Data. April 6, 2016.

FACULTY TEAM

Penn Medicine has the largest electrophysiology program on the East Coast and one of the largest hospital-based programs in the U.S. Comprised of full-time, board-certified electrophysiologists, specialized nurse practitioners, and physician assistants, the EP team is dedicated exclusively to treating and eliminating serious and potentially life-threatening heart rhythm disturbances. The team's leadership in ablative and arrhythmia device therapy is evident in their continuing commitment to research and publication.

► Performing Micra Leadless Intracardiac Transcatheter Pacing System Implantations at Penn Medicine

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