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Imaging and Case Report

CardioMEMS Device Release Failure Necessitating Percutaneous Retrieval

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CardioMEMS (Abbott) is a wireless pulmonary artery (PA) sensor demonstrated to safely reduce heart failure hospitalization in patients with New York Heart Association class 2-3 heart failure.[1] Reported instances of device failure are rare and related to sensor failure, device malfunction or device embolization after release.[2] In this study, we report the first case of device release failure and its percutaneous retrieval.

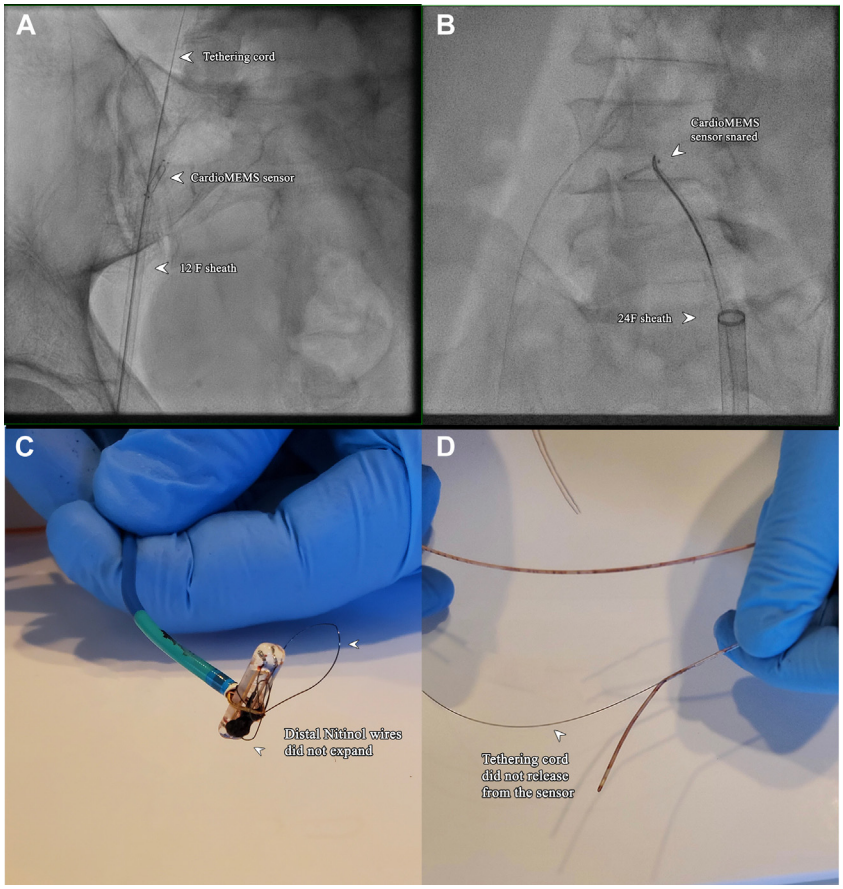

Figure 1.
(**A**) Intraprocedural fluoroscopic image showing the CardioMEMS sensor unable to pass through a 12F introducer sheath, (**B**) snaring of the sensor, and (**C**) the CardioMEMS device after removal. Note the distal nitinol did not expand. (**D**) The tethering cord did not release from the sensor.

Keywords: CardioMEMS; heart failure; pulmonary artery pressure monitor; snare.
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A 73-year-old man with ischemic cardiomyopathy and New York Heart Association class 3 symptoms was referred to our center for CardioMEMS device implantation. The left PA was accessed through the right femoral vein using a 12F catheter sheath, and the device was delivered using the over-the-wire delivery system. Attempts to release the device from the delivery catheter were unsuccessful. On fluoroscopy, the distal nitinol loop wire failed to release and expand.

Because the device was still attached to the delivery catheter, we decided to retrieve the device percutaneously. We elected to snare the device in the iliac veins and not the PA to avoid injury to the tricuspid valve apparatus (Supplemental Video 1).

Because the device measures 15.0 mm in length and 3.5 mm in width, we first attempted to retrieve it from the ipsilateral 12F catheter sheath (inner diameter, 4.0 mm) (Supplemental Video 2), failing which (Figure 1A) we accessed the contralateral femoral vein using a 24F Dryseal sheath (Gore; inner diameter, 8.0 mm) (Figure 1B). A 7F multipurpose guide catheter with a 20.0-mm gooseneck snare was used to successfully capture the device with assistance from a second operator gently pushing the delivery catheter from the contralateral side (Supplemental Video 3). The device was removed (Figure 1C, D), followed by the sheath and puncture site hemostasis achieved using a figure-of-8 stitch. The patient showed an uneventful recovery and was discharged the following day. The sensor was subsequently sent to the manufacturer for investigation, where inspection confirmed entanglement of the nitinol wire to the delivery catheter, although the exact cause of the damage remains unknown. In 2017, data from the Manufacturer and User Facility Device Experience database demonstrated that 18 of the 5500 implants were technically challenging, with 14 cases aborted altogether.[2] Subsequent interrogation of the Manufacturer and User Facility Device Experience database beyond 2018 showed 10 cases where the sensor could not be released from the tethering cord requiring frequent manipulations, such as the use of wires, external guide catheters, and Swan-Ganz catheter balloons with various success rates. This case is the first to demonstrate that retrieval of a failed CardioMEMS device release in such scenarios can be safely achieved percutaneously.

Declaration of competing interest

Amit Alam is a speaker for Abbott. The remaining authors have no disclosures to report.

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Ethics statement and patient consent

This study was approved by the institutional review board at Baylor Scott and White and adhered to relevant ethical guidelines. Patient consent was obtained.

Supplementary material

To access the supplementary material accompanying this article, visit the online version of the *Journal of the Society for Cardiovascular Angiography & Interventions* at 10.1016/j.jscai.2023.100967.

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