Dislodgement of circular mapping catheter electrode in the left atrium: A near miss

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Introduction

Use of a circular mapping catheter (CMC) in pulmonary vein (PV) isolation procedures is standard practice and generally considered to be safe in patients with atrial fibrillation (AF).1 However, we report a case where a metallic electrode displaced from a distal CMC was seen free-floating in the left atrium (LA) on fluoroscopy. Unexpectedly, the electrode traveled retrograde and became lodged in a terminal branch of the right inferior pulmonary vein (RIPV).

Case report

A 66-year-old Chinese man with paroxysmal AF underwent isolation of all 4 PVs using a cryoablation balloon. All 4 PVs were successfully isolated. A CMC (AFocus II; 7F, 15 mm diameter; St. Jude Medical, St. Paul, MN) was placed through a steerable sheath (FlexCath Advance; 12F inner diameter; Medtronic, Minneapolis, MN) to confirm PV isolation at the end of the procedure. Upon removal of the CMC from the LA with significant exertion owing to resistance, a free-floating metallic electrode that had displaced from the CMC was seen on fluoroscopy free-floating within the LA (Figure 1A–D, Supplemental video 1). This catheter was removed and the absence of the distal pole was observed. Potential for cerebral embolization was of utmost concern and the patient was counseled on options and risks. The patient agreed to proceed with urgent cardiac surgery to retrieve the electrode. While we were waiting for the operating theatre to be ready, the electrode had surprisingly traveled retrograde and become lodged in a terminal branch of the RIPV, as seen on fluoroscopy (Figure 1E, F, Supplemental video 2) and computed tomography angiography (Figure 1G, H). Repeat imaging during 12-month follow-up confirmed that the electrode had not

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migrated any further, and the patient remained asymptomatic, with no significant mitral regurgitation on echocardiography.

Discussion

A variety of complications have been described during AF ablation. Wu and colleagues reported CMC entrapment in the mitral valve apparatus in a patient during AF ablation. The case of catheter fragments being displaced and retained in patients is not a commonly reported occurrence. The case reported by Calvo and colleagues is similar, except that it involved a proximal electrode from a different CMC (Reflxon Spiral, St. Jude Medical). The floating metallic electrodes did not induce serious complications because they lodged in a terminal branch of the RIPV.

Catheter fragment displacement involves the important sheath–electrode relationship during catheter removal. Some combinations of CMC and sheath design are more prone to this complication and should warrant careful removal of the CMC. Particular care should be given when the proximal and distal portions of the CMC interface with the sheath tip. The mechanism of dislodged electrode ending up in the RIPV is unclear but may be owing to the weight of the catheter fragments and the posterior anatomy of the RIPV. This may allow for retrograde travel into the RIPV as opposed to the more deleterious route into the left ventricle or aorta. We considered this incident a near miss with potential for systemic embolization, and the appropriate regulatory authorities have been notified.

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Appendix

Supplementary data

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.hrcr.2017.06.001.

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KEY TEACHING POINTS

- It is important to be aware of possible complications involving electrode dislodgement occurring during circular mapping catheter removal.
- Serial imaging should be performed to monitor location of retained fragments while preparing for possible intervention.
- Given the risk of distal embolism, careful consideration should be given to urgent intervention to remove a mobile, retained foreign object.