

Successful release of an entrapped circular mapping catheter using a snare and a multidisciplinary approach

Uwolnienie uwięźniętego cewnika okrężnego do mapowania przy użyciu pętli i z zastosowaniem podejścia wielodyscyplinarnego

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A 44-year-old attended for pulmonary vein isolation procedure as treatment for highly symptomatic, paroxysmal atrial fibrillation. SLO sheaths (St Jude Medical, USA) were used to facilitate introduction of a 3.5-mm irrigated tip ablation catheter and a 15-mm circular mapping catheter (Lasso[®], Biosense Webster, USA) into the left atrium via trans-septal access. Geometry for a non-contact mapping system was collected using the circular mapping catheter. During manipulation of the catheter, it became entangled in the mitral valve apparatus (Fig. 1). Following a number of unsuccessful manoeuvres to free the catheter including gentle clockwise or anticlockwise rotation whilst either advancing or withdrawing the catheter, performing the same motions with the sheath advanced to the fixed portion of the catheter, and trying to free the catheter using a pigtail catheter introduced retrograde via the femoral artery (Fig. 1D), we sought assistance from an Interventional Radiology colleague. Our hypothesis from fluoroscopic and echocardiographic imaging was that a pair of chordae had entwined the point of intersection of the catheter in opposite directions, thus fixing it and preventing release by rotation in either direction. The distal tip of the circular mapping catheter was captured using a snare (9–15 mm EN Snare[™] Endovascular Snare System, Merit Medical, USA) delivered through a trans-septal Agilis[™] steerable sheath (St. Jude Medical, USA), positioned in place of the free SLO. By combining the experience of the radiologist in utilising snare devices and the detailed cardiac anatomical knowledge and catheter manipulation skills of the electrophysiologist, we were able to fix the distal tip of the mapping catheter and provide counter

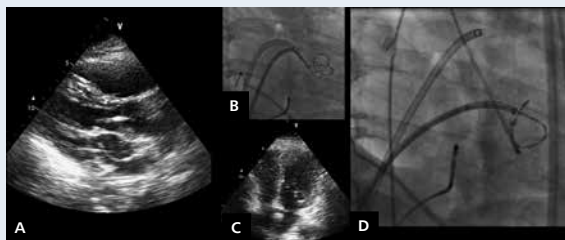


Figure 1. Entrapped circular mapping catheter. Transthoracic echocardiogram and fluoroscopy images (A–C) demonstrating circular mapping catheter entrapped in mitral valve apparatus. Unsuccessful attempt to free mapping catheter using pigtail catheter via retrograde aortic approach (D)

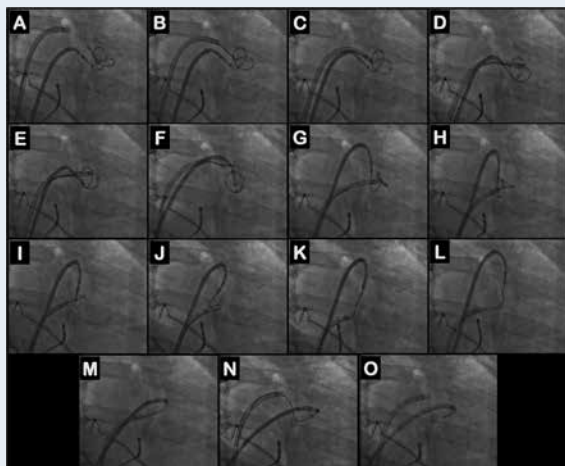
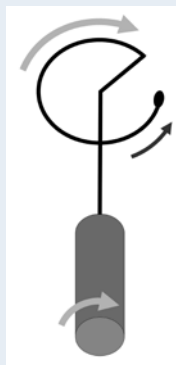


Figure 2. A–O. Series of fluoroscopy images demonstrating the successful release of the circular mapping catheter using a snare to manipulate the distal tip

traction as it was rotated, thus facilitating its safe release from the mitral valve apparatus (Fig. 2). Transthoracic echocardiography directly after catheter release and at 4 weeks post procedure demonstrated no significant mitral regurgitation. The patient has since undergone successful pulmonary vein isolation without incident. The rotational techniques of manipulation and the shape of a circular mapping catheter are such that it is now well established that it can entangle in the mitral valve apparatus and become trapped. Measures to prevent this complication include using only clockwise rotation of the catheter (Fig. 3) and deliberate manipulation of the catheter along the posterior rather than anterior aspect of the left atrium. Specific features that may contribute to the tendency include the bulbous distal tip and the inherent “shape memory” from the Nitinol composition of the catheter. The incidence of entrapment as a complication is not well understood; some publications place it as high as 0.9% [Kesek M et al. *Heart Rhythm*, 2007; 4: 17–91]. Reported consequences of the phenomenon include surgical extraction of the catheter [Grove R et al. *Clin Res Cardiol*, 2008; 97: 628–629], severe damage to the valve requiring surgical repair during percutaneous removal of the catheter, and a small number of reports of techniques used to affect safe, percutaneous release of the device.



Ours is the first to document the successful use of a snare to facilitate catheter release. We believe that co-operation between the 2 interventional specialists was a major component of the safe release of the instrument.

Figure 3. Diagram depicting a circular mapping catheter. Arrows demonstrate that clockwise rotation of the catheter results in the shaft “leading” and tip “trailing” rather than the opposite with anti-clockwise rotation. It is thought that this minimises the tendency to entangle

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