

EP CASE REPORT

How to release PentaRay catheter entrapped in the hinge point of mechanical mitral valve?

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A 63-year-old woman with a mechanical bileaflet mitral valve (MV) (St. Jude Medical Heart Valve: St. Jude Medical and Abbott, St. Paul, MN, USA), replaced for severe MV regurgitation, underwent radiofrequency catheter ablation for drug-refractory symptomatic atrial tachycardia. During left atrial mapping for sustained atrial tachycardia using PentaRay catheter on CARTO system (Biosense Webster, Inc., Diamond Bar, CA, USA), the catheter was suddenly entrapped in the mechanical MV (Figure 1A, Supplementary material online, Video S1). Fluoroscopy and transoesophageal echocardiography demonstrated the fixation of the ipsilateral disc in mechanical MV, which indicated the stuck spines in the hinge point between the disc and orifice ring (Figure 1B). Further simple traction freed the PentaRay catheter

to leave the distal portion of two spine tips behind with the fixation of the disc (Figure 1C). The next moment, the spine tips were disappeared from the hinge point and the disc motion of MV was recovered. One of the spine tips floated in the left inferior pulmonary vein (PV) was safely retrieved (Figure 1D,E). The other spine tip was remained in the right deep femoral artery, but the retrieval was not tried for its stability (Figure 1F). The sheared and retrieved spine tip fitted the rest of the PentaRay catheter (Figure 1G). After non-restricted motion of mechanical MV was confirmed, left atrial ablation were performed as scheduled.

In *in vitro* verification, the entrapment of the spines in the hinge point was replicated only when the PentaRay catheter was pulled back around the hinge point at the timing of the disc closing (Figure 1H, Supplementary material online, Video S1). Furthermore, the entrapped spines were easily released by advancement of the catheter (Figure 1I). When PentaRay catheter is entrapped in mechanical MV, simple traction of the entrapped catheter induces the shearing-off of the spines with high probability.¹ Fortunately, in this case, one sheared spine tip in the left inferior PV could be retrieved and the other tip was remained in the deep femoral artery without harmful effect. Rapid ventricular

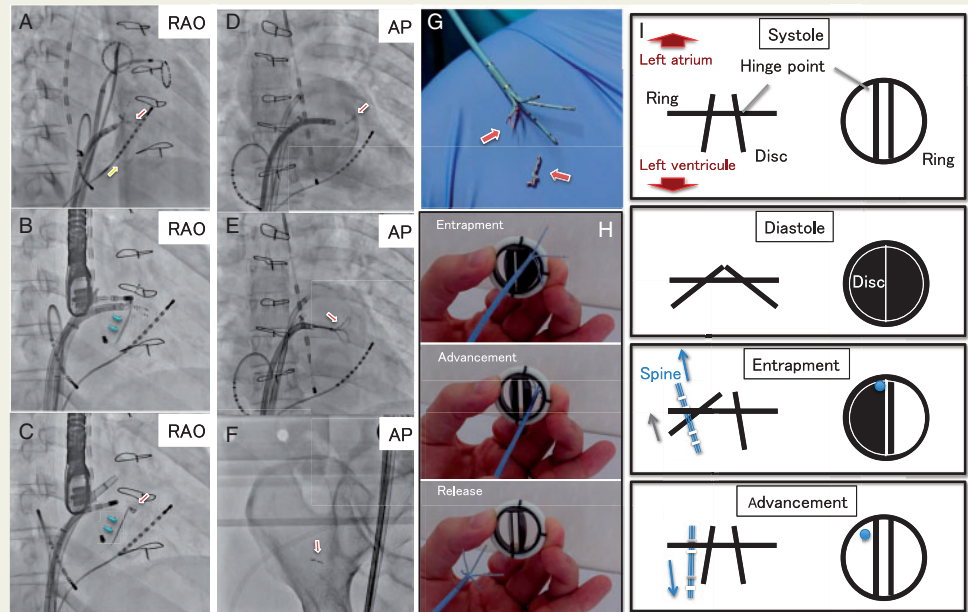


Figure 1 Fluoroscopic images and *in vitro* verification of the entrapped PentaRay catheter entrapment. (A–F) Fluoroscopic images of the entrapped PentaRay catheter. (G) Retrieved spine tip. (H) Schema of mechanical mitral valve and spine. (I) How to release entrapped PentaRay catheter in the hinge of bileaflet mechanical valve. Red arrow: the entrapped or sheared spines, yellow arrow: mechanical mitral valve, and blue arrow: fixed disc of mechanical valve. AP, antero-posterior view; LAO, left anterior oblique view; RAO, right anterior oblique view.

pacing or adenosine injection to change the timing of MV opening during diastolic phase may help release of the entrapped catheter.^{2,3} Furthermore, from the insights of this case and the *in vitro* verification, it may be important to push the PentaRay catheter without traction or rotation.

This case demonstrates the entrapment of PentaRay catheter in the hinge point of mechanical mitral valve and emphasizes the importance of the advancement of the catheter without traction in the situation.

Conflict of interest: none declared.

References

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