Successful Catheter Ablation of Fascicular Ventricular Tachycardia Originating from Posterior Papillary Muscle: experience in two cases

Introduction:  We report two cases of fascicular ventricular tachycardia (FVT) originating from posterior papillary muscle (PM), successfully treated with catheter ablation therapy guided by precise mapping using a PentaRay catheter.

Methods:  The first patient was an 87-year-old man who was taken to our hospital due to dyspnea and faintness. An electrocardiogram exhibited relatively narrow QRS tachycardia (cycle length = 320 ms) with sharp R wave, and right bundle-branch block configuration with right superior axis deviation. Slow injection of verapamil 2.5 mg decelerated the tachycardia, but the tachycardia persisted. Because accompanying congestive heart failure worsened, we terminated the tachycardia by electric shock, and we decided to undertake catheter ablation. The second patient was a 38-year-old who visited our hospital due to palpitation. His electrocardiogram of ventricular tachycardia also showed the similar characteristics to the former one, and we undertook catheter ablation.

Result:  In both cases, tachycardia was induced by burst pacing from RV septum, and atrioventricular dissociation was confirmed. Progressive fusion during RV entrainment pacing with variable cycle length was observed. In the first case, because mitral valve had been repaired with Mitraclip device, we inserted catheters to the LV with retrograde aortic approach. A linear duodecapolar catheter placed in the LV longitudinally did not record either left posterior fascicle potential (P2) or mid-to-late diastolic potential (P1), and thus we mapped the LV with PentaRay catheter using CARTO system. After 3D reconstruction of intracardiac echocardiography (ICE) images of the LV and the PMs using CARTO-SOUND system, we tagged the sites with P2 during sinus rhythm, and P1 during VT around the posterior PMs. Manipulating the mapping and ablation catheter carefully, we applied radiofrequency energy of 30 W to the site where P1 with subsequent muscle potential was recorded, and FVT was terminated and was never induced. By observing LV with ICE, success site was in the posterior PMs. In the second case, we recorded P1 and P2 with a linear duodecapolar catheter inserted to the LV longitudinally with retrograde aortic approach. We performed additional mapping using PentaRay catheter with trans-septal approach, and multiple P1 potentials preceding P2 potentials during VT were recorded around posterior PMs. We applied RF energy to the site where P1 with subsequent muscle potential was recorded, and the FVT was terminated and was never induced. By observing LV with ICE, success site was on the posterior PMs.

Conclusion:  The PentaRay catheter could become a useful tool in mapping and ablation of fascicular ventricular tachycardia originating from PM, which requires a precise mapping along endocardial
trabeculations and PMs, three dimensional structures.