Relationship between Diameter of Circular Mapping Catheter and Detection Rate of Disappearance of Pulmonary Vein Potential during Cryoballoon Ablation of Atrial Fibrillation

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Introduction: Cryoballoon Ablation (CBA) is efficient for achieving pulmonary vein isolation (PVI) in atrial fibrillation. The time-to-isolation [time required till electrical isolation of pulmonary vein (TTI)]-guided CBA has been reported to be effective and reduce complications. TTI-guided CBA needs the detection of disappearance of pulmonary vein (PV) potential during CBA. We compared the detection rates of PV potential disappearance between 25mm and 20mm circular mapping catheters.

Methods: The cryoballoon was introduced guided by a 20mm or 25mm circular mapping catheter. The patients were consecutive 52 patients (208 PVs) who underwent initial CBA at our hospital from May 2018 to June 2019 (ring diameter; 25mm=26cases, 20mm=26cases). We retrospectively examined the disappearance of PV potential during CBA using circular mapping catheters.

Result: There was no difference in left atrial diameter (LAD) or PV diameter in two groups. 1) The disappearance of PV potential during CBA could be detected in 79.8% (25mm) vs 41.3% (20mm). The 25mm mapping catheter demonstrated a significantly higher detection rate of PV potential disappearance than the 20mm catheter (p<0.05). 2) The PV potential detection rate was significantly higher with the 25mm diameter circular mapping catheter than 20mm catheter in both patients whose PV diameter is larger and smaller than the average (p<0.05). 3) When a 20mm diameter circular mapping catheter was used, the detection rate of PV potential was significantly higher in patients whose LAD were enlarged than in normal limit (P=0.005). However, when the 25mm diameter circular mapping catheter was used, there was no significant difference between large LAD patients and normal.

Conclusion: The 25mm circular mapping catheter improved the detection rate of disappearance of PV Potential during CBA of Atrial Fibrillation compared with 20mm catheter. It might suggest that we could get irreversible PVI with the short cooling time by using 25mm circular mapping catheter.