Merging three-dimensional CT with electroanatomical mapping facilitates mapping and ablation of ventricular arrhythmias originating from aortic root

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Introduction: When radiofrequency ablation is performed in aortic root, angiography is traditionally recommended to avoid injury of coronary arteries. However, this strategy cannot real time monitor distance from coronary ostia to catheter tip if catheter is moved and increases exposure to X-ray. To avert limitations mentioned above, we introduce an alternative approach to intuitively show special location of ablation catheter and coronary arteries by integrating three-dimensional CT (3D-CT) and electroanatomical mapping (EAM) in mutual-perpendicular planes (PA and LL views).

Methods: 12 patients (49.7±15.0 years old, 5 men) were prospectively recruited. Among them, ventricular arrhythmias (VAs) originated from left coronary cusp (LCC) in 9 patients, right coronary cusp (RCC) in 1 patient and junction between left and right coronary cusps (LCC-RCC) in 2 patients. Before mapping and ablation, we merged 3D-CT with EAM to monitor distance between coronary ostia and catheter tip.

Result: Ablation got acute success in all patients including 7 patients (5 LCC-originating cases and 2 LCC-RCC-originating cases) without coronary angiography and 5 patients (4 LCC-originating cases and 1 RCC-originating case) needing additional coronary angiography. No complication and technical difficulty occurred during operation.

Conclusion: Integration of 3D-CT and EAM facilitates mapping and ablation in aortic root, especially in LCC-originating and LCC-RCC-originating cases.