Abstract: P1437

Superior vena cava mapping and electrical isolation using a novel ultra-high resolution 3-dimensional mapping system

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Topic(s):
Rhythm Control, Catheter Ablation

Citation:
Background: A few studies have examined the morphological characteristics of atrial myocardial extensions into the superior vena cava (SVC) using autopsied hearts.

Objective: This study investigated the SVC sleeve length, activation pattern during sinus rhythm, and length of isolated SVC sleeves by SVC isolations using an ultra-high resolution mapping system.

Methods: Twenty-three patients with atrial fibrillation underwent SVC mapping using a novel mini-basket catheter with 64 electrodes (0.8mm diameter, 2.5mm spacing) and automatic electrogram annotation (left panels in Figure). After SVC mapping, the isolation was performed with irrigation-tip catheters in 18(78.3%) patients followed by repeated SVC mapping (right panels in Figure).

Results: Ultra-high resolution SVC maps were successfully created in all. The median acquisition time was 7.5[5.5-9.7]mins, and 2268[1467-3347] data points were automatically annotated. The SVC sleeve length was asymmetric, and longest at the septal SVC (28.4[19.1-34.1]mm) and shortest at the antero-lateral SVC (20.0[6.3-29.9]mm). Electrical SVC isolation was successfully achieved in all 18 patients without any complications. The total number of radiofrequency applications, radiofrequency duration, and procedure time were 11.7±5.9, 4.1±2.2mins, and 9.9±8.9mins, respectively. Conduction block pre-existed at the SVC-right atrial junction prior to ablation in 3(13.0%) patients. SVC isolation was achieved without any applications at the lateral SVC in 4(22.2%) patients. The isolation line was a median of 20[13.9-29.0] mm apart from earliest activation sites during sinus rhythm. The isolated SVC sleeve length was also longest at the septal SVC(19.1[11.8-24.2]mm) and shortest at the antero-lateral SVC(6.4[0-11.3]mm).

Conclusions: Ultra-high resolution human SVC mapping demonstrated asymmetric SVC musculature sleeves. The sleeve length and activation pattern vary among individual patients.
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