Anatomic distribution and electrophysiological characteristics of ventricular arrhythmias originating in aortic coronary cusps

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Introduction: Ventricular arrhythmias (VAs) arising from the aortic sinus cusp (ASC) regions are not fully characterized. This study was aimed to further investigate the anatomic distribution and electrophysiological characteristics of ASC VAs ablated above the aortic valves.

Methods: Forty-one consecutive patients with VAs originating from left coronary cusp (LCC) and right coronary cusp (RCC) were studied. Selective angiography and electroanatomic mapping were used to define the catheter position. RCC region was divided into three parts: lateral wall (LRCC), anterior wall (ARCC) and area adjacent to the junction of LCC and RCC (R-LRJ). LCC region was divided into LLCC, ALCC and L-LRJ.

Result: Nineteen (46.3%) VAs originated from RCC, including 1 LRCC, 7 ARCC, and 11 (57.9%) R-LRJ VAs. Twenty-two (53.7%) VAs arose from LCC, including 12 (54.5%) LLCC, 5 ALCC and 5 L-LRJ VAs. At the earliest activation sites, fractionated local electrograms occurred more frequently in LRJ VAs (75%, 12/16) compared to other areas in RCC (22%) and in LCC (37.5%), with a p value of 0.025. Local electrogram duration at the earliest sites of LRJ VAs (144.13 ± 43.56 ms) was significantly longer than that from the other areas in RCC (102.33 ± 17.23 ms, p = 0.003) and LCC (113.25 ± 39.33 ms, p = 0.044).

Conclusion: VAs from RCC often occur in R-LRJ area (57.9%) and rarely in LRCC (0.5%), but LCC VAs are more common in LLCC region (54.5%). Fractionated local electrograms at the earliest activation sites are more frequent in LRJ VAs, with longer duration time.