Resetting Atrial Tachycardia by a Scanned Extrastimulus from Downstream Sites on Multielectrode Catheters: A Novel Diagnostic Maneuver to Locate the Macroteleentraent Atrial Tachycardia Circuit

Yuji Wakamatsu
Koichi Nagashima
Kazuki Iso
Ryuta Watanabe
Masaru Arai
Naoto Otsuka
Yagyu Seina
Toshiko Nakat
Yasuo Okumura

Introduction: Entrainment pacing is a quick, useful method for locating reentrant atrial tachycardia (AT) circuits, but alteration or termination of the AT can derail the process. We hypothesized ATs reset by scanned single atrial pacing from a multielectrode catheter on the AT circuit at a downstream site during a period when the neighboring electrodes at an upstream site are refractory would be a diagnostic tool to avoid AT alterations (Figure A). This study was conducted to assess the relative value of commonly used entrainment pacing and this resetting maneuver in terms of diagnostic performance and risk of AT alteration or termination.

Methods: Forty ATs with a cycle length (CL) of 232±36 ms were included (26 common flutters, 6 left atrial roof flutters, 4 perimitral flutters, 2 left atrial scar reentry tachycardias, 1 pulmonary vein-gap reentry tachycardia, and 1 unknown circuit). Both entrainment pacing and scanned single atrial pacing were attempted for each AT at the cavotricuspid isthmus, LA roof, and mitral isthmus and/or critical AT isthmus.

Result: On the circuit, the post-pacing interval minus ATCL after entrainment pacing was <30 ms for all ATs and reset of the AT cycle ≥10 ms by scanned single atrial pacing occurred for 84% of the ATs (Figure B). No ATs were reset by scanned single atrial pacing outside the circuit. The positive predictive value of both maneuvers for locating the circuit was 100%, but the negative predictive value of scanned single atrial pacing was lower than that of entrainment pacing (89% vs. 100%, P=0.02). The incidence of AT alteration was lower during scanned single atrial pacing than during entrainment pacing (1% vs. 11%, respectively; P=0.003). For ATs with a CL <210 ms, SP and entrainment frequently failed to detect the circuit, due to reset failure and AT alteration, respectively.

Conclusion: AT reset by scanned single atrial pacing is a reliable diagnostic maneuver that avoids AT alteration and termination.