

Case Series: Atrial Antitachycardia Pacing in Systemic Left Ventricle, Systemic Right Ventricle and Single Ventricle Congenital Heart Disease Morphologies

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Abstract

Background: Among the congenital heart disease (CHD) population, intra-atrial reentrant tachycardia (IART) is a common sequela resulting from anatomical anomalies and surgical scars which significantly increases morbidity and mortality. Atrial anti-tachycardia pacing (ATP) delivered by atrial antitachycardia devices (ATD) has been used to treat IART in the CHD population. However, there is limited data on ATP safety and efficacy as well as comparisons amongst different CHD morphologies.

Methods: A single-center review of 3 patients with ATDs was carried out at the University of Iowa. One patient with each of the following CHD morphologies was selected for comparison: systemic left ventricle, systemic right ventricle and single ventricle. Data collected included ATP success rates, medications, direct current (DC) cardioversions and any complications related to ATDs.

Results: The patient with a systemic left ventricle had an ATD implanted for approximately 9.5 years, with 695 of 956 (73%) episodes successfully converted. Unsuccessfully treated episodes were generally asymptomatic and self-terminating. The patient with a systemic right ventricle had an ATD implanted for approximately 16 years with 333 of 348 (96%) episodes being successfully converted. The patient with a single ventricle had an ATD implanted for approximately 12.5 years with 404 of 416 (97%) episodes being successfully converted. The patients with systemic right and left ventricles were able to forgo DC cardioversion after receiving their ATDs. However, due to medical non-compliance as well as multiple episodes of IART which presented with 1:1 conduction (disabling ATP therapy) or rates below the detection level, the single ventricle patient still required DC cardioversions status post ATD implantation.

Conclusions: Our findings demonstrate that while ATP can be effective in a wide variety of CHD, experiences can vary based on individual arrhythmias substrates, morphologies and medical compliance. Additionally, challenges remain in IART detection and treatment in patients with especially complex CHD morphologies.