

**Remote Magnetic Navigation Shows Superior Long-Term Outcomes in Pediatric Atrioventricular (Nodal) Tachycardia Ablation Compared to Manual Radiofrequency and Cryoablation**

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**Purpose:**

Catheter ablation (CA) is the first-choice treatment for tachyarrhythmia in pediatric patients. Currently available CA techniques differ in the mechanism of catheter steering and energy sources. There are no large studies comparing long-term outcomes between available CA techniques in pediatric patients with atrioventricular reentry tachycardia (AVRT) or atrioventricular nodal reentry tachycardia (AVNRT) mechanisms.

The aim of this study was to compare procedural parameters and outcomes of remote magnetic navigation-guided radiofrequency (RF) ablation (RMN), manual-guided RF ablation (MAN) and manual-guided cryoablation (CRYO) in a pediatric population.

**Methods:**

This single-center, retrospective study included all first consecutive CA procedures for AVRT or AVNRT mechanisms performed in pediatric patients without structural heart disease from January 2008 until June 2019. Three study groups were defined by the ablation technique used: RMN, MAN or CRYO. Primary outcome was recurrence of tachyarrhythmia and/or pre-excitation on ECG. Baseline clinical parameters, procedure times and complication rates were also evaluated.

**Results:**

In total, we included 223 patients, with a median age of 14 (IQR 12 – 16) years and median weight of 56 (IQR 47 – 65) kilograms. In total, 108 procedures were performed using RMN, 76 using MAN and 39 using CRYO. RMN had significantly lower recurrence rates compared to MAN and CRYO at a mean follow-up of  $5.5 \pm 2.9$  years (AVRT ablation: 4.3% vs. 15.6% vs. 54.5%,  $P < 0.001$ ; AVNRT ablation: 7.7% vs. 8.3% vs. 35.7%,  $P = 0.008$ ; for RMN vs. MAN vs. CRYO respectively). In AVRT ablation, procedure and fluoroscopy times were comparable between groups. However, in AVNRT ablation, RMN and MAN had significantly lower fluoroscopy times compared to CRYO [10 (IQR 7-14) vs. 9 (IQR 6-26) vs. 15 (IQR 10-22)] minutes respectively,  $P = 0.040$ ). Moreover, procedure times were shortest in RMN and MAN ablation [101 (IQR 87-121) vs. 88 (IQR 62-99) vs. 120 (IQR 88-143) minutes respectively,  $P = 0.018$ ].

**Keywords:**

Catheter ablation, AVNRT and AVRT, Pediatric Catheter ablation

**Figure:**

This figure displays cumulative hazard on atrioventricular nodal reentry tachycardia (AVNRT) and atrioventricular reentry tachycardia (AVRT) recurrence, compared between three techniques: remote magnetic navigation guided radiofrequency ablation (RMN), manual guided radiofrequency ablation (MAN) and manual guided cryoablation (CRYO). AVNRT: Log-Rank P = 0.025; For RMN HR 0.20, 95%-CI 0.06 – 0.74; For MAN HR 0.19, 95%-CI 0.02 – 1.48; with CRYO as the reference group. AVRT: Log-rank P = 0.001; For RMN HR 0.07, 95%-CI 0.02 – 0.30); For MAN HR 0.26, 95% – CI 0.09-0.71; with CRYO as the reference group.

