

The Use of the Magnetic Navigation System Allows Shorter Procedure Times and a Reduction of Radiation Risk in Small Children Undergoing Catheter Ablation

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Background: Transcatheter ablation is an effective method to eliminate arrhythmia substrates in symptomatic children with various types of arrhythmias. Unfortunately, in small-sized children only a limited number of dedicated devices (i.e.: significantly smaller size and specially designed curves) are available for ablation procedures. Reduction of procedure and fluoroscopy times decreases hazardous effects of ablation such as complications and the potential long-term effects of radiation exposure. The magnetic navigation system (Niobe, Stereotaxis, St Louis, MO, USA) (MNS) utilizes atraumatic catheters, with superior navigation capabilities and allows attainment of all targeted regions for mapping and treatment.

Aim: to compare the efficacy and safety between manual and MNS guided approach for the mapping and ablation of arrhythmias in a general pediatric arrhythmia population and in a subgroup of very small children.

Results: 58 pediatric patients (mean age: $12,9 \pm 4,2$ years) were included into this study. 29 consecutive patients were treated with MNS system, while 29 consecutive patients underwent conventional manual ablation. There were no demographic differences between the groups (MNS: age $12,1 \pm 2,9$ years, AVNRT 4, atrial tachycardia (AT) 3, right sided accessory pathway (RAP) 10, left sided accessory pathway (LAP) 12 pts vs. conventional group: age: $14 \pm 3,4$ years, AVNRT 7, AT 1, RAP 11, LAP 10, $p=NS$). Acute success was achieved in 26 out of 29 vs. 27 out of 29 pts ($p=NS$). The mean procedure and fluoroscopy times were not different between the study groups (168 ± 55 vs. 182 ± 52 ($p=NS$), 22 ± 17 vs. 29 ± 29 $p=NS$). In small children (age under 10 yrs) the success rate did not differ between the groups (9/11 vs. 6/10, $p=NS$). However, significant decrease in procedure and fluoroscopy times were achieved (147 ± 60 vs. 204 ± 48 min, $p<0.01$; and 22 ± 24 vs. 30 ± 27 min, $p<0,01$ respectively).

Conclusion: Our data strongly suggest that using the MNS in small children is advantageous because it significantly reduces procedure and fluoroscopy times without compromising efficacy.

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Summary

- Abstract presented at the American Heart Association 2009 Scientific Sessions comparing manual and magnetic ablation techniques in 58 pediatric patients.
- EP procedures in children tend to be difficult because of the small anatomy and the fact that medical device companies do not make devices specifically for use within this subset of patients.
- Magnetic EP catheters provide a safe device for pediatric patients due to the floppy nature of the catheter and the high degree of safety reported within the literature.
- Compared to manual techniques, magnetic procedure times and fluoroscopy times trended lower although not reaching statistical significance with nearly identical success rates.
- In small children (under 10 years old), procedure times and fluoroscopy exposure for magnetic navigation were significantly better than those observed during manual catheter procedures.