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Comparison of a simplified, minimally invasive, non-fluoroscopic approach for catheter ablation of supraventricular arrhythmias in children and adults

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Introduction: Although the “near zero-X-ray” or “no-X-ray” catheter ablation (CA) approach has been reported for treatment of various arrhythmias, few prospective studies have strictly used “no-X-ray” simplified 2-catheter approaches for CA in patients with supraventricular tachycardia (SVT). We compared the feasibility of a minimally invasive, non-fluoroscopic (MINI) CA approach in adult and pediatric such patients.

Methods: Data were obtained from a prospective multicenter CA registry of patients with regular SVTs. After femoral access, 2 catheters were used to create simple, three-dimensional electroanatomic maps (Ensite Velocity NavX, St Jude Medical, St. Paul, MN, USA) and to perform electrophysiologic studies. The medical staff did not use lead aprons after the first 10 MINI CA cases.

Results: The first 188 patients (age, 45 +/-21 years; 35 pts <19 years; 55% women) referred for the no-X-ray approach were included. They were compared to 714 consecutive patients referred for a simplified approach using X-rays (age, 52 +/- 18 years; 50 pts <19 years; 55% women). In pediatric population (n=35, age, 14+/-4) the procedure time (64 +/- 20 vs. 63 +/- 29 min, p=NS), incidence of major complications (0% vs 0%, p=NS) and complete non-fluoroscopic imaging in MINI CA approach (94% vs 95%, p=NS) were similar as compared to adult population. In patients with age < 19 an acute (98% vs. 98%, P=NS) success rate were similar in MINI CA approach and X-ray approach (n=50, age 15+/-3), however significant increase in recurrences were reported in pediatric population (15% vs 5%, p<0.01, in both MINI CA and X-ray approach, within a mean 10-month follow-up). The implementation of MINI CA approach in pediatric population with SVT resulted in very significant reduction of mean X-ray exposure time from 11.1 +/- 9.4 to 0.1 +/- 0.7 min (p<0.001).

Conclusions: The implementation of a strict “no-X-ray, simplified 2-catheter” CA approach is safe and effective in the majority of children and adults with SVT. No-fluoroscopic approach should become “the golden standard” in training of next generation of electrophysiologists, especially in pediatric population that is prone to higher incidence of recurrences and redo procedures.