NON-FLUOROSCOPY RADIOFREQUENCY CATHETER ABLATION OF LEFT-SIDED ACCESSORY PATHWAYS IN CHILDREN USING 3D-MAPPING SYSTEM AND RETROGRADE APPROACH

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Abstract

Background: Non-fluoroscopic transcatheter ablation of right-sided supraventricular tachycardia substrate has been proved to be an effective strategy for pediatric patients. Left-sided accessory pathway (AP) ablation can also be achieved fluorolessly by ICE or TEE guided transseptal puncture. However, ICE is not reimbursed in some countries and TEE needs general anesthesia.

Objective: To report non-fluoroscopic transcatheter radiofrequency (RF) ablation of left sided accessory pathway via retrograde transaortic approach in pediatric patients.

Methods:

The electrophysiology study and transcatheter ablation were performed via fluoroscopic, mixed fluoroscopic and 3D electroanatomic map (3D-EAM), 3D-EAM guidance for patients with left-sided APs. For 3D-EAM guidance group, a NavX 3D-EAM reconstruction of right atrium, right ventricle and coronary sinus with an electrophysiological study was performed in every patient. A 5F or 7F 4-mm non-

irrigated ablation catheter was inserted into right femoral artery. Aorta and left ventricle geometry were created with a transaortic retrograde approach to reach the mitral annulus. Catheter ablation was targeted to the site of the earliest activation.

Results:

From August 2017 to September 2021, we included 37 patients (median age: 14 years, median body weight: 52 kg) with manifest or concealed left-sided APs underwent retrograde transaortic RF catheter ablation in three hospitals. No fluoroscopy was use in 18 patients. Between fluoroscopic group (X+) and non-fluoroscopic group (X-), there were no significant difference in acute access rate, AP location, number of radiofrequency application, ablation time, time to AP block. Significant longer procedure time was noted in X- group (128 min vs. 90 min, $p=0.006$). No fluoroscopic time was noted in X- group (0 min vs. 31.7 min, $p<0.001$). No major complication was noted in both groups. No recurrence was observed in X- group, 3 cases of recurrence were noted in X+ group ($p=0.23$). No significant different in recurrence-free survival between groups ($p=0.13$).

Conclusion:

The non-fluoroscopic transcatheter RF ablation of left sided accessory pathway via retrograde transaortic approach in pediatric patients is feasible and safe compared

with fluoroscopic transcatheter RF ablation.

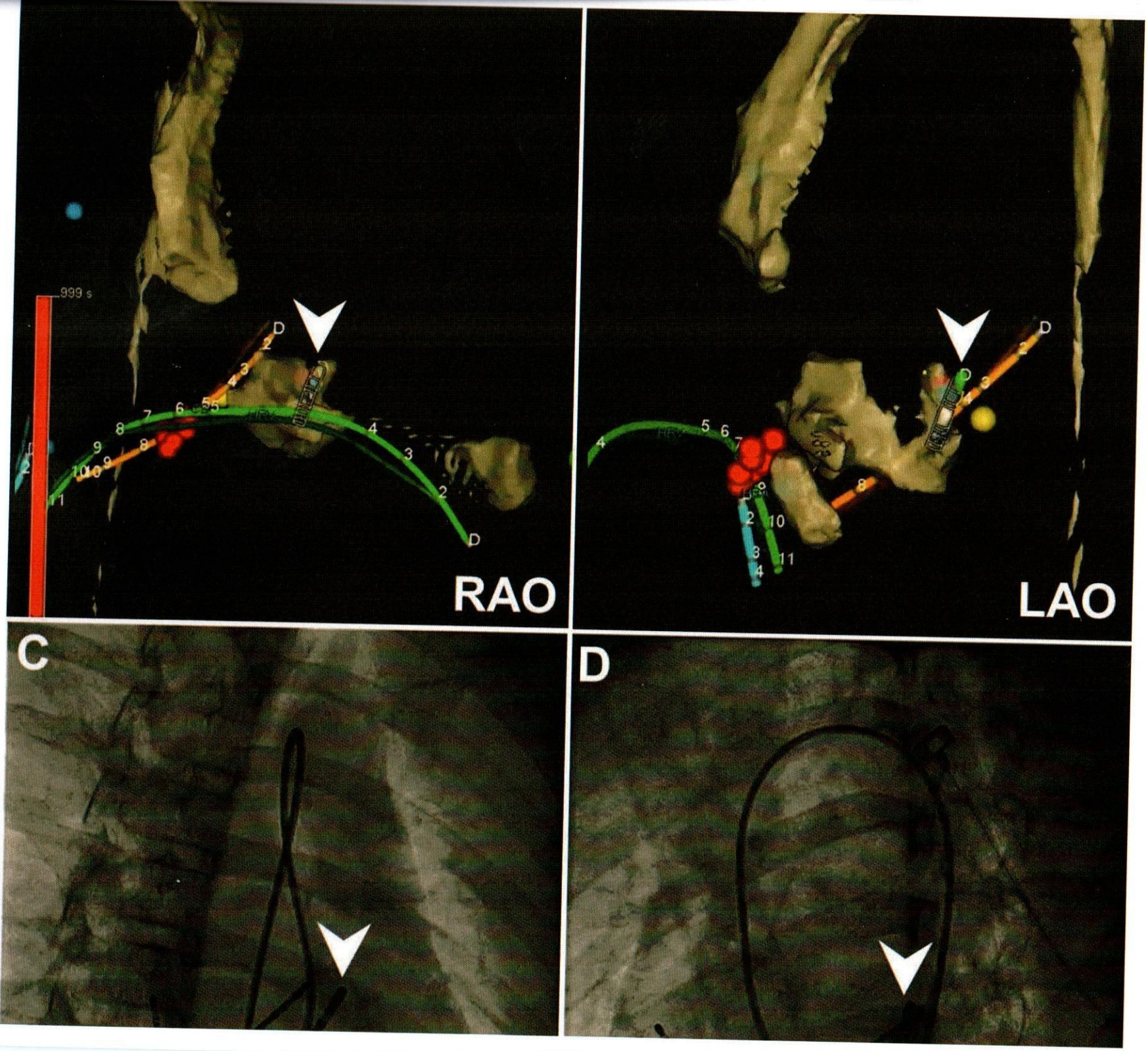
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Table1. Demographic data							
	Total (n=37)		X- (n=18)		X+ (n=19)		*p* value
Age	14	(9.5-16)	14	(11-15.25)	13	(9-17)	0.57
Gender [c]							1.00
Female	14	(37.84%)	7	(38.89%)	7	(36.84%)	
Male	23	(62.16%)	11	(61.11%)	12	(63.16%)	
BW (kg)	52	(37.65-62.5)	51.65	(36.53-55.48)	53	(39.4-64.4)	0.63
BH (cm)	157	(145.5-167)	158.3	(148.38-169.25)	156.5	(145-164)	0.69
BMI (kg/m^2)	20.89	(17.42-23.18)	19.87	(16.82-22.98)	21.20	(17.99-25.43)	0.30
Anti-arrhythmic drug [c]	14	(37.84%)	4	(22.22%)	10	(52.63%)	0.12
Previous ablation	2	(5.41%)	1	(5.56%)	1	(5.26%)	1.00
Manifest AP	6	(16.22%)	3	(16.67%)	3	(15.79%)	1.00

Table2. Electrophysiology study							
	Total (n=37)		X- (n=18)		X+ (n=19)		*p*
3D system [c]	19	(51.35%)	18	(100%)	1	(5.26%)	<0.001**

multiple accessory pathway	2	(5.41%)	1	(5.56%)	1	(5.26%)	1.00
other tachycardia	10	(27.03%)	6	(33.33%)	4	(21.05%)	0.48
other tachycardia type [c]							0.53
atrial flutter	3	(30.00%)	2	(33.33%)	1	(25.00%)	
atrial fibrillation	5	(50.00%)	2	(33.33%)	3	(75.00%)	
AVNRT	1	(10.00%)	1	(16.67%)	0	(0%)	
AF+AVNRT	1	(10.00%)	1	(16.67%)	0	(0%)	
AP potential	4	(10.81%)	2	(11.11%)	2	(10.53%)	1.00

Table 3. Catheter ablation							
	Total (n=37)		X- (n=18)		X+ (n=19)		*p*
No. of RF application (n=36)	5	(2-8)	6	(2.75-8.25)	4	(2-7)	0.14
Ablation time (sec) (n=36)	190.5	(120-234)	220	(120-250.75)	155.5	(109.5-208.25)	0.07
Time to AP block (sec) (n=35)	3.72	(2.5-4.8)	3.7	(1.8-5.28)	3.798	(2.51-4.2)	0.78
Steam pop	2	(5.41%)	1	(5.56%)	1	(5.26%)	1.00
Mechanical trauma	1	(2.70%)	0	(0%)	1	(5.26%)	1.00

Acute success	37	(100%)	18	(100%)	19	(100%)	---
Procedure time (min)	110	(73-135)	128	(105.75-141.5)	90	(60-110)	0.006**
Fluoroscopic time (min)	8.23	(0-32.75)	0	(0-0)	31.7	(16.6-42.76)	<0.001**
Follow up duration (month)	25	(13-43.5)	13	(4.75-23.25)	43	(36-45)	<0.001**
Recurrence	3	(8.11%)	0	(0%)	3	(15.79%)	0.23
Major Complication	0	(0%)	0	(0%)	0	(0%)	---