Experience of CARTO-ablation of atrial tachycardias in preschool children.

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Prolonged X-ray radiation during RFA is a risk of remote complications especially in children of yearly age.

It was assessed that risk of cancer increases by 0.03% as a result of every 60 minutes of fluoroscopy.


According to Wong K.T. et al. time of fluoroscopy during RFA in children is 71,0±45,3 minutes.

Grutter et al. presented 2 cases of drug-resistant tachycardia with WPW syndrome. Tachycardia was successfully resolved by RFA with CARTO™ System. Patients’ age and weight were 17 and 18 months and 9.4 and 11 kilos, correspondingly.


Zeng et al. used CARTO™ System to map incisional atrial tachycardia and atrial flutter in 6 patients weighted more than 10 kilos.


Experience of 3D mapping in infants is limited.
Navigation mapping in such category of patients is perspective to reduce fluoroscopy time.

Assess the efficiency and safety of navigation mapping in RFA of atrial tachycardias in children.
30 RFA with CARTO system were performed to 23 children with atrial ectopic tachycardias during 2006 – 2014 years.

The patients’ age was 5.0 years (IQR: 3.58-6.0), ranging from 7 months to 7 years old.

7 patients were less than 15 kilos.

The minimal age of the child who was performed CARTO was 7 months, the minimal weight – 7.4 kg.
As minimal size of the 3D mapping catheter is 7 Fr (NaviStarTM), it is necessary to make a preliminary echo of femoral vessels.
23 patients in all

Atrial ectopic tachycardias
n = 21

Atrial incisional tachycardia
n = 1

Ventricular ectopic tachycardia
n = 1

right atrial n = 18
- Triangle of Koch n = 11
  - Isthmus n = 3
  - RA appendage n = 2
  - Crista terminalis n = 2

left atrial n = 3
- upper left pulmonary vein n = 2
- LA posterior wall n = 1

ventricular tachycardia – RV outflow tract
In two cases the approach to left atrium was performed by transseptal puncture, in one case – through patent foreman ovale.
Carto-ablation of incisional tachycardia

Scar at RA free wall. RF application – cavotricuspid isthmus. Isthmus dependent AF.
Tachycardia terminated.
Fluoroscopy time – 2 min.
Patient T., 5 years old, persistent form of tachycardia.

Ectopy location - upper left pulmonary vein.

Fluoroscopy time – 30 min.
Right atrium. Earliest activation in Koch’s triangle.
RFA set: 50° C and 25 W/.
Fluoro: 5 min.
Electroanatomic RA CARTO reconstruction in a 7-month-old patient.

Zone of early activation (indicated red) – in the area of RA auricle. RFA series was applied (50C – 25 W). Fluoroscopy time – 6 min.
4 yol, RA appendage, 3 recurrence
EFFICACY
Success rate of CARTO ablation considering recurrences and retreatments was 91.3%.
The only failure factor was parahisian location.

RECURRENTIES
In 6 patients (6/23; 26.1%), 4 of which were performed repeated effective procedures.
Two patients shown ectopic activity lesser than 10% with normal average heart rate.

COMPLICATIONS
There were no complications.
As a result of navigation mapping usage we discovered decrease of fluoroscopy time in 2.3 times ($p<0.001$).

**Time of fluoroscopy**

- **With CARTO**
  - 2 - 31 min
  - $(12.5 \pm 8.3)$

- **Without CARTO**
  - 5 - 100 min
  - $(28.1 \pm 23.5)$
Conclusion:

- RFA with 3D mapping is effective and safe in children overweighting 7 kilos.

- Use of 3D mapping reduce radiation exposure.

- In small children it is recommended to assess femoral vessels before procedure.