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CATHETER TREATMENT OF ARRHYTHMIAS IN YOUNG CHILDREN.

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**Abstract.** In this article we analyzed our own experience of catheter interventions for tachyarrhythmias in children under the age of 5 years. The studied group consisted of 23 consecutive patients who underwent 24 catheter interventions. Of these, there were 7 (29.2%) electrophysiological studies (EPS), and 17 (70.8%) catheter ablations, 15 (88.2%) of which were successful. No complications were observed.

**Key words:** children, tachyarrhythmia, ablation.

**Background.** In contrast to older children in whom paroxysmal tachycardia is generally not life-threatening, tachyarrhythmia can be a significant cause of morbidity and mortality in infants and small children. In the absence of the effect of antiarrhythmic therapy tachyarrhythmias in young children require interventional treatment. Sometimes this treatment is used in the first months of life [1]. This is quite a small contingent of rather severe clinically ill patients. On average, 1,000 catheter ablation procedures account for one child less than 5 years old [2].

The complexity of the catheter treatment of arrhythmias in young children due to the technical features associated with the small size of the heart and blood vessels. Thereby there is a high probability of the damage of the normal conductive pathways, coronary arteries and valve structures and the heart wall perforation [3]. Furthermore, there is a need to adapt for young children the tools, designed and produced originally for adults.

Up to 20% of young children requiring of catheter ablations have associated congenital heart disease, what means conduction pathways and intracardiac anatomy features [4]. Younger patients tend to have more severe clinical status before the procedure compared to older age groups. This is due to the fact that in these patients ablation is indicated only after failure of medications, in the presence of life-threatening arrhythmias and severe heart failure [5]. But even in children with body weight less than 15 kg in the experienced clinics catheter ablation shows its efficacy and safety [6].

Very important factor to select a treatment strategy in the young children is the considering the opinion of the parents.

**Objective.** The purpose of this study wasto analyzeourownexperience in the catheter treatment and diagnostics of tachyarrhythmias in children under the age of 5 years.

**Material and methods.** The studied group consisted of 23 consecutive patients less than 5 years old, who were treated at the Ukrainian Children’s Cardiac Center in the period from 12.2012 to 12.2014. There were 14 boys (58.3%). 24 catheter procedures were performed – 7 (29.2%) EP studies and 17 (70.8%) catheter ablations, 15 (88.2%) of which have been successful. The average age at the time of the intervention was 30,7 ± 15,2 months (1 year 3 months to 4 years 6 months). Minimum patient’s weight was 9.75 kg. Follow-up was 2 months to 2 years.

The indication for catheter intervention was the presence of hemodynamically significant episodes of the tachycardia despite an adequate antiarrhythmic therapy or frequent unregistered tachycardia paroxysms.

Procedures were performed under general (intravenous or endotracheal) anesthesia. During ablation we used one or two 6F (if body weight was less than 20 kg) or 7F non-irrigated 4 mm tip catheters. Radiofrequency application settings do not exceed 35 W, 55°C, 40 seconds.

**Results and discussion.** One patient with WPW syndrome was previously operated for an abnormal origin of the circumflex artery from the right branch of the pulmonary artery. Three patients had patent foramen ovale (PFO). Two patients with accessory pathways have Ebstein's anomaly (with no previous cardiac surgery). The significant decrease of the left ventricular contractility was observed only in one case - in the patient with WPW syndrome and frequent paroxysms of supraventricular tachycardia (EF = 30%). In this case attempts to terminate clinically significant tachycardia with antiarrhythmic therapy (amiodarone, propafenone, sotalol, propranolol, metoprolol) were failed. After elimination of the arrhythmia by catheter ablation contractility of the left ventricle was recovered.

In 5 (29.2%) patients we eliminated postero-septal atrioventricular accessory pathways (AP), in one of them we needed to perform two procedures to obtain the effect. In 3 (17.7%) patients AP in right anterior and right antero-septal area were ablated, and in 1 (5.9%) left-sided AP was ablated through the PFO. In 1 (5.9%) patient ventricular tachycardia from right ventricular outflow tract was terminated. In 3 (17.7%) patients by a modification of the AV slow path conduction was treated atrio-ventricular nodal reciprocating tachycardia (AVNRT). In 2 (11.8%) patients we ablated focuses of the atrial tachycardia (within the sinus node area and inferior-lateral parts of the right atrium).

In 2 (11.8%) patients (with AP in the right anterior-septal area and with AVNRT) was not possible to completely eliminate the arrhythmia. However, on the adequate antiarrhythmic therapy postoperatively in both patients we had no episodes of tachycardia.

During 3 (42.9%) EP studies tachycardia was not induced. In 4 (57.1%) other EP studies a concealed left-sided AP was revealed, and catheter ablation was not performed because of low body weight and PFO absence. These patients were given an effective antiarrhythmic therapy.

There were no complications.

**Conclusions.**

1. Catheter treatment of arrhythmias in young children in a specialized cardiac center is enough effective and safe.

2. In most cases, even if the elimination of the tachycardia was incomplete, catheter ablation can help to achieve the rhythm control by means of the antiarrhythmic therapy.

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