

Assessment of pulmonary valve pulse wave velocity in children and teenagers

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Introduction. Echocardiographic diagnosis in childhood and adolescence has a number of features, primarily due to the need to assess virtually all dimensions in accordance with the weight of the child, as well as the morphogenesis of individual heart structures in different periods of life.

The data on the maximum values of velocity on the pulmonary valve (PV) presented in the literature are often not true. The recorded rates exceed the recommended values even in the absence of pathology of the cardiovascular system, and in the presence of defects of the septum (ASD, VSD) or restless behavior of the child are even greater.

Methods. In order to clarify the situation, we made an attempt to revise the maximum normal speed indicators (V_{max}) for PV in childhood. All studies were performed on an ultrasonic device Medison AccuvixV10 by an experienced physician with more than 10 years of experience.

Results. A retrospective analysis of the protocols of 2030 echocardiographic studies was performed, which was performed for children aged 2 weeks to 16 years. Children with ASD, VSD, PDA were not included in the study. The results of the V_{max} estimation on the PW-mode, taking into account the body weight of the children surveyed, were as follows:

3,3-9,9 kg - $1,06 \pm 0,27$ m/s; 10.0-14.9 kg - $1,07 \pm 0,25$ m/s; 15.0-19.9 kg - $1,02 \pm 0,31$ m/s; 20.0-24.9 kg - $1,0 \pm 0,29$ m/s; 25,0-29,0 kg - $1,0 \pm 0,26$ m/s; 30.0-39.9 kg - $1,0 \pm 0,25$ m/s; 40.0-60.0 kg - $1,0 \pm 0,3$ m/s.

The correlation analysis made it possible to reveal only a weak negative connection of V_{max} to a PV with age ($r = -0.15$, $p < 0.95$), and a moderate positive correlation V_{max} on a PV with V_{max} on aortic valve ($r = 0.43$; $p < 0,05$). In the latter case, the explanation may serve as a hyperkinetic type of hemodynamics, more often observed in childhood. In general, for the group, the average values of V_{max} for PV were 1.03 ± 0.25 m/s.

Conclusions. The maximum normative speed indicators for PV in childhood should be revised, and set at a minimum within 0.78-1.38 m/s (for $M \pm 2\sigma$), and this is only for the PV. For the trunk of LA speeds can be somewhat larger.