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ECHOCARDIOGRAPHIC EVALUATION OF VENTRICULAR SEPTAL DEFECT WITH HIGH PULMONARY HYPERTENSION IN CHILDREN

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Abstract. *Ventricular septal defect (VSD) is one of the most common congenital heart disease in children. When it is associated with high pulmonary hypertension (PH), the heart and lung experience increased pressure and workload, making early and accurate evaluation very important. Echocardiography is the main non-invasive method used to assess the defect.*

This study focuses on the echocardiographic features of VSD with PH in children and explains how these feelings help diagnosis, treatment planning and follow-up.

Key words. *Ventricular septal defect, pulmonary hypertension, echocardiography, ventricular function, pediatric cardiology.*

Introduction. Ventricular septal defect (VSD) accounts for nearly one-third of all congenital heart disease in children. Large or uncorrected defects may cause abnormal blood flow between the ventricles, leading to increased pulmonary pressure, right heart enlargement, and eventually heart failure if not managed properly [1,3].

Echocardiography remains the first and most valuable imaging tool in the setting, as it provides real-time information on the size and location of the defect, estimates pressure gradients, and evaluates how the right ventricle adapts to the increased workload [4,5].

Materials and Methods. This study was conducted at the department of medical radiology, Tashkent state medical institute, from 2022 to 2024. Thirty-two children aged 3 months to 12 years with diagnosed VSD and evidence of pulmonary hypertension were included.

All patients underwent echocardiographic examination using the Aplio 500 ultrasound machine with pediatric probes. Standard two-dimensional, M-mode, and Doppler imaging were performed to measure the VSD size and location, shunt direction, tricuspid regurgitation velocity (for estimating pulmonary artery pressure), and right ventricular function using tricuspid annular plane systolic excursion (TAPSE) and right ventricular fractional area change (RVFAC).

Interventricular septal motion was assessed as an indicator of right ventricular pressure overload.

Result and Discussion. Echocardiography successfully identified the type and size in all patients. Larger defects were consistently associated with higher pulmonary artery pressure and more pronounced flattening of the ventricular septum.

In children with severe pulmonary hypertension, right ventricular dilatation and reduced systolic function were observed. TAPSE and RVFAC values were significantly lower in these patients, indicating early right ventricular dysfunction [6–8].

Doppler echocardiography provided reliable, non-invasive estimation of pulmonary pressures and proved valuable for monitoring response to medical management and postoperative outcomes.

The findings highlight the importance of routine echocardiographic evaluation in children with VSD and PH to guide timely intervention and prevent irreversible pulmonary vascular disease [9,10].

Conclusion. Echocardiography remains the essential tool for evaluating ventricular septal defects with pulmonary hypertension in pediatric patients. It provides detailed information on defect size, shunt direction, and right ventricular performance, enabling accurate diagnosis and timely treatment planning.

Regular echocardiographic follow-up is important for assessing disease progression and guiding ongoing management to improve clinical outcomes.

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