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## Morpho-functional myocardial status in preterm infants with hemodynamically significant patent ductus arteriosus

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Purpose: to improve the diagnosis of hemodynamically significant patent ductus arteriosus (HSDA) in prematurely born infants.

Methods. The study involved examination of 165 newborns at gestational age (GA) of 24-37 weeks. The study implied determination of indices of systolic, diastolic ventricular functions. Doppler imaging was conducted in the first day of life and in 24-48 hours, in newborns with HSDA daily until stabilization of the patient's condition or surgical correction.The newborns were divided into the groups: Group 1 (n=34) included infants with an extremely low body weight, GA 24-29 weeks. Group 2 (n=37) involved newborns with very low birth weight, GA 30-34 weeks, Group 3 (n=36) comprised patients with low body GA 31-35 weeks; Group 4 (n=58) included infants at GA 35-37 weeks.

Results. Diagnosis of HSDA was established according to the criteria of Sehgal A, McNamara PJ. (2009) and additional criteria: IR ACA and/or MCA>0.8, «diastolic steal» syndrome in the renal and/or mesenteric arteries or IR renal and/or mesenteric arteries>0.85 and/or reverse blood flow in the abdominal aorta, an increase in the linear size of the left ventricle (LV) and/or atrium by 10% or more from the initial size with hypertrophy of the interventricular septum and posterior LV wall; cardiothoracal index>60%, FiO2≥40%. HSDA was established in 52.9% ($p<0.05$) of Group 1 infants, all of them revealed disturbance of diastolic function of LV and RV. Tissue Doppler imaging (TDI) showed a decrease in the velocity of fibrous rings, cm/sec (LV lateral TDI S=5.74±0.87 (p1/4≤0.05), E'=6.32±1.14, A'=6.89±1.15 (p1/4≤0.05); septal TDI S=4.97±0.55 (p1/4≤0.05), E'=6,06±1.13, A'=6.42±1.06 (p1/4≤0.05), RV TDI S=6.70±1.15 (p1/4≤0.05), E'=7.01±1.12, A'=7.14±1.20 (p1/4≤0.05). Newborns in severe condition with HSDA of Group 1 have demonstrated hypokinetic type of central hemodynamics (systolic index 1.8±0.6 l/min×m2, (p≤0.01)), Tei index LV=0.36±0.10 and RV=0.34±0.10 (p≤0.05) and SS genotype polymorphism of SOD2 T58C (x2=6.258, p=0.044), GG and AG genotypes of polymorphism ADRB1 Ser49Gly (x2=6.627, p=0.036).

Conclusion. The use of target Doppler imaging in preterm infants with HSDA is useful in assessing the global function of the myocardium. We consider it expedient to conduct further research to confirm our results and determine their clinical significance.