

Age, Sex and Residence Features of Children with CHD and Different Toxic Metals Content in Cardiovascular Tissue

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INTRODUCTION: There are about 30 metals and metalloids that are potentially toxic to humans. Some of them, according to the experimental data, able to penetrate the placental barrier and violent cardiogenesis.

METHODS: We had determined content of toxic metals (TM) in 107 biosubstrates of heart and great vessels of 55 patients with CHD: 34 boys and 21 girls (males in 1.6 times more often than females); 2 fetuses, 6 newborns, 24 children of 1-12 months, 15 pts. – 1-5 years, 8 pts. – older 5-17 years; 39 patients were resident of industrial regions and 16 – agricultural. All patients were examined by the spectral analysis of TM content in heart and great vessels tissue by methods of the atomic emission spectrometry in the inductively coupled plasma and atomic absorption spectrometry with electrothermal atomization. **RESULTS:** the presence of 13 toxic metals and metalloids (Al, Ba, Li, Ni, Sb, As, Sr, Pb, Zr, Sn, Ti, Ag, W) was documented in the tissues of the heart and great vessels of patients with CHD, while in each age group their number was different (8 to 11). The greatest quantity of toxic metals in pathological concentrations (Ba, Ni, Li, Sb) was found in fetuses and newborns in comparison to children older than one year of age. Was surveyed that 97.1 % of boys had toxic substances pathological concentrations in cardiovascular tissue that significantly higher than girls – 71,0 %, $p < 0.05$. The most often in the tissues of the heart and great vessels was documented excess of barium permissible concentration - in 75.8 % of boys, that is significant more often, than girls (47.6 %), $p = 0.035$. Residents from industrial regions had more toxic metals and higher average concentration of strontium, zirconium, tungsten, silver and tin in cardiovascular tissue in comparison with children from agricultural, $p \leq 0.05$. Only patients that lived in industrial regions had pathological concentration of arsenic and antimony.

CONCLUSIONS: Our results confirmed pathological possible impact of toxic substances on cardiogenesis violation and a higher risk of cardiovascular malformation developing in males and residents of the industrial region.