TITLE: THE ELECTRONIC AUSCULTATION WITH THE COMPUTER ANALYSIS OF HEART SOUNDS IN NEWBORNS

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INTRODUCTION

Heart murmurs are common in infants. Being able to distinguish a murmur associated with heart disease from a benign etiology is important for diagnosis Usage of an electronic stethoscope in combination with combination of digital recording of cardiac sounds and computer analysis significantly expands the possibilities of auscultation in the diagnostics of structural heart anomalies.
Purpose. The current research is aiming at studying the structure of echocardiographic symptoms in clinically healthy newborns in comparison with the electronic auscultation analysis data

MATERIALS AND METHODS

The total sample includes of 195 healthy term newborns were examined, in which prenatally no structural features in the heart and large vessels were have been found.
No pathological changes have been identified using traditional auscultation after birth. During the first 5 days of life, doppler echocardiography, differential pulse-oximetry, electronic auscultation have been performed. The analysis of the received phonocardiograms has been carried out with the developed computer program "Hearttone-D" with the analysis of 17 parameters of tone I and II and 16 parameters of intervals between tones at five standard listening points.

CLINICAL CASES AND SUMMARY RESULTS

During the Doppler echocardiography study, all children have had a functional oval window. In 5 children (2.6%) the small size defects in the interventricular membrane were have been found. Signs of the patent ductus arteriosus (PDA) during the observation period were have been found identified in 54 (27.6%) newborns.
For the computer analysis, 27 phonocardiographs of newborns with PDA and 28 neonatal phonocadiograms of newborns with closed ductus arteriosus were selected. The inclusion criterion was the size of a functioning oval window of 2.5-3.0 mm, the absence of any structural anomalies, the quality of recording of the phonocardiograph. The largest statistically significant difference between the parameters was has been observed at the II auscultation point (the maximum amplitude of tone I, the average value of tone II, the average amplitude module in the first interval, the mean amplitude module in the last quarter of the second interval, the width of the second interval).

CONCLUSIONS

Phonocardiogram monitoring on newborns is one of the most important and challenging tasks in the heart assessment in the early ages of life. The presence of clinically undetectable PDA is detected by electronic auscultation. The highest statistical significance is characterized by parameters registered in the II point of auscultation. Indicators characterizing the shape of the tones and the intervals between them for interpretation of phonocardiagrams have been proposed.