APPLICATION OF MULTIMODAL SPONTANEOUS ANALYSIS IN THE ASSESSMENT OF NEWBORNS IN THE SECOND OR THIRD DAY OF LIFE

Summary

Introduction: Numerous studies indicate that disturbed spontaneous movement may be an early indicator of developmental difficulties. Early detection of abnormalities in a child's development gives a chance to start early treatment in order to achieve the best quality of life and functioning. Computer-aided diagnostics of infant movement is a field that has been developing intensively in the last decade. This study proposes a computer-assisted assessment of spontaneous movements of newborns in a video image.

Aim: The aim of the study was to assess the spontaneous movements of newborns in the second or third day of life on the basis of mathematical and IT analysis of video recordings using the multimodal movement analysis.

Material and metods: The participants of the study were a group of 81 newborns, 2 or 3 days old, with a normal pregnancy and childbirth interview. An original tool under the working name Multimodal Analysis of Spontaneous Movements was used for the quantitative assessment. Basic kinetic parameters such as speed and acceleration of the wrists and ankles were measured. Numerical values have been determined for the novel indicators describing the direction and trajectory of motion: FMS-Factor of Movement's Shape, FMA-Factor of Movement's Area, CMA-v-Center of Movement's Area-vertical, CMA-h-Center of Movement's Area-horizontal. The Prechtl's General Movement Assessment was used to assess the qualitative spontaneous activity of the newborn. The obtained data underwent statistical analysis.

Results: A numerical record of kinetic parameters and indicators describing the direction and trajectory of limb movement was obtained. Newborns presenting writhing movements (N) and poor repertoire (PR) were selected. There were statistically significant differences in the aspect of average speed, acceleration, FMS, FMA, CMA-v and CMA-h for wrists and ankles in the symmetry of movements between the right and left sides and divided into groups PR (poor repertoire) and N (normal) according to Prechtl's methods. There were no statistically significant differences in spontaneous movements in terms of birth weight, sex, delivery method (natural, caesarean section) and maternal age.

Conclusion: Multimodal Analysis of Spontaneous Movements allowed for a measurable and comparable assessment of spontaneous movements of newborns. It enabled the mathematical and IT analysis of movements and the objectification of observations, giving a real possibility of a numerical description of the movement. The tool requires further research and testing, but today it can be said that its use value can be helpful in the early diagnosis of newborns.