HYPERBILIRUBINEMIA AND PHOTOTHERAPY IN NEWBORNS AFFECT CARDIOVASCULAR AUTONOMIC CONTROL

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Background Neonatal jaundice and its phototherapeutic treatment can lead to side effects involving activation of autonomic control mechanisms.

Aim To investigate the autonomic nervous system changes in icteric neonates using heart rate variability (HRV) and to assess the effect of phototherapy on HRV as an indicator of autonomic nervous control of cardiovascular system.

Methods HRV recordings of 20 icteric full-term neonates before, during and after the phototherapy and of 20 healthy controls were analysed. Besides traditional time and frequency domain measures, HRV complexity parameters including normalised complexity index (NCI), normalised unpredictability index (NUPI), pattern classification (0V%, 1V%, 2LV%, 2UV%) and multiscale irreversibility indices (P%, G%, E) were evaluated. All measures were derived from data segments of 1000 RR intervals.

Results The analysis revealed higher values of 1V% and 2LV%, lower P% and reduced percentage of irreversible HRV recordings in the group of neonates with hyperbilirubinemia. While mean heart rate was increased during and after the phototherapy, HRV magnitude was not changed. Nonlinear analysis showed a decrease of complexity, unpredictability and pattern classification measures 2LV% and 2UV%. In contrast, 0V%, P% and the percentage of irreversible recordings were increased during and after the phototherapy.

Conclusion The results suggest a shifted autonomic balance in icteric neonates compared to the controls and its further alterations during phototherapy. As the nonlinear HRV parameters are independent of the linear methods, they can provide new information about the cardiac regulatory mechanisms and their changes in neonates.

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