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PERMISSIVE HYPERCAPNIA RESULTS IN A DECREASED FUNCTIONAL VESSEL DENSITY IN THE SKIN OF EXTREMELY LOW BIRTH WEIGHT INFANTS

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Background: Due to the increasing number of extremely low birth weight infants (ELBI) long term ventilation and its aftermath has become an important issue. One of the newer concepts for gentle ventilation is permissive hypercapnia. We were interested in the effects of the higher pCO₂-levels on the microcirculation of ELBIs.

Methods: Data were collected from 12 infants, who were randomized either to treatment with permissive hypercapnia or normocapnia. Inclusion criteria were a birth weight between 400g and 1000g, a gestational age from 23rd to 28th+6 weeks, intubation during the first 24 hours of life and no malformations. The pCO₂ target range was increased stepwise and was 15mmHg higher in the intervention group. Skin microvascular parameters were assessed noninvasively with SDF on the right arm every 24h during the first week of life and on the 14th day.

Result: pCO₂ (AUC: 639 ± 62 vs 744 ± 62) differed significantly between the two groups (p=0,04). Functional vessel density (FVD) was significantly lower in the intervention group on the 14th day of life (395 ± 43 vs 281 ± 67 cm/cm²; p=0.04). The proportion of small vessels increased in the control group whereas they decreased slightly in the intervention group, but did not reach stat. sig. Increasing target pCO₂ lead to a temporary hyperdynamic flow in both groups.

Conclusions: pCO₂-levels influence significantly the microcirculation in preterm infants. Elevation of pCO₂-levels leads to a decrease in FVD, presumably due to shunting and vasoconstriction and might cause temporarily hyperdynamic flow.

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EXCESSIVELY HIGH BILIRUBIN AND EXCHANGE TRANSFUSION IN VERY LOW BIRTH WEIGHT INFANTS

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Objective: To evaluate the distribution of peak serum bilirubin levels in very low birth weight (VLBW) infants and the performance of exchange transfusion in infants with excessively high bilirubin levels.

Methods: A population based observational study using data collected by the Israel National VLBW Infant Database. The study sample comprised 13,499 infants of 24 to 33 weeks gestation. Two definitions of excessively high peak bilirubin levels which might be considered as threshold levels for performance of exchange transfusion were used. Firstly, a bilirubin level of ≥ 15 mg/dL for all infants (PSB-15), and secondly, incremental bilirubin levels ranging from 12-17 mg/dL according to gestational age (PSB-GA). Multivariable logistic regression analyses were performed to examine the factors associated with performance of exchange transfusion.

Results: Four hundreds sixty eight (3.5%) and 1035 infants (7.7%) infants in the PSB-15 and in the PSB-GA groups respectively had peak serum bilirubin levels above thresholds for exchange transfusion. Exchange transfusion's were performed in only 66 (14.1%) of these infants in the PSB-15 group and 91 (8.8%) in the PSB-GA group. In both groups performance of exchange transfusion was significantly associated with peak serum bilirubin levels, with an odds ratio of 1.38 for each mg/dL increase above the threshold level.

Conclusion: Exchange transfusion was performed in only 9-14% of VLBW infants with excessively high bilirubin levels. This may be related to an absence of definitive guidelines or the possible belief that the risks of exchange transfusion outweigh the potential risk of bilirubin induced neurological injuries.