

ORIGINAL RESEARCH COMMUNICATION

Albumin synthesis in premature neonates is stimulated by parenterally administered amino acids during the first days of life^{1,2,3}

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Background: We recently showed that parenteral administration of amino acids to premature infants immediately after birth is safe and results in a positive nitrogen balance and increased whole-body protein synthesis. However, we did not determine organ-specific effects; albumin, produced by the liver, is an important protein, but its concentration is often low in premature neonates during the first few days after birth.

Objective: The objective of the study was to test the hypothesis that the fractional and absolute albumin synthesis rates would increase with the administration of amino acids after birth, even at low nonprotein energy intake.

Design: Premature infants (<1500 g birth weight), who were on ventilation, received from birth onward either glucose only (control group, $n = 7$) or glucose and 2.4 g amino acid \cdot $\text{kg}^{-1} \cdot$ d^{-1} (intervention group, $n = 8$). On postnatal day 2, all infants received a primed continuous infusion of [$1\text{-}^{13}\text{C}$]leucine, and mass spectrometry techniques were used to determine the incorporation of the leucine into albumin. Results are expressed as medians and 25th and 75th percentiles.

Results: Albumin fractional synthesis rates in the intervention group were significantly higher than those in the control group [22.9% (17.6–28.0%)/d and 12.6% (11.0–19.4%)/d, respectively; $P = 0.029$]. Likewise, the albumin absolute synthesis rates in the intervention group were significantly higher than those in the control group [228 (187–289) $\text{mg} \cdot$ $\text{kg}^{-1} \cdot$ d^{-1} and 168 (118–203) $\text{mg} \cdot$ $\text{kg}^{-1} \cdot$ d^{-1} , respectively; $P = 0.030$].

Conclusion: Amino acid administration increases albumin synthesis rates in premature neonates even at a low energy intake.

Key Words: Albumin • stable isotopes • synthesis rates • amino acids • parenteral nutrition • metabolism • premature infants • intensive care units • neonates

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