CEREBRAL TISSUE OXYGEN EXTRACTION AS AN ADDITIONAL EARLY INDICATOR OF FATAL CIRCULATORY FAILURE IN PRETERM INFANTS WITH SEPSIS OR NEC

M.E. van der Laan, E.M.W. Kooi, E.A. Verhagen, A.F. Bos

Department of Pediatrics, Division of Neonatology, Beatrix Children's Hospital, University Medical Center Groningen, Groningen, The Netherlands

Background: Current diagnostic possibilities are insufficient to detect low systemic blood flow in preterm infants. Near-infrared spectroscopy (NIRS) is a non-invasive method by which fractional cerebral tissue oxygen extraction (FTOEc), an indicator of cerebral perfusion, is calculated.

Objective: To determine the prognostic value of FTOEc in addition to clinical signs of circulatory failure in the prediction of mortality in preterm infants with sepsis/NEC.

Design/methods: Preterm infants with culture-proven sepsis or NEC were included. Mean values of FTOEc and a circulatory failure score (CFS) were calculated for each infant for every 12hr-period in the 36hrs following clinical presentation. The CFS was composed of five indicators of circulatory failure: tachycardia, hypotension, metabolic acidosis, raised serum lactate, and oliguria. It could range from 0-5 (no to all indicators present). The prognostic value of FTOEc as well as CFS for the prediction of mortality was determined using ROC-analyses and likelihood ratios (LR).

Results: Twenty infants were included; eleven had sepsis, nine had NEC. Gestational age was 28.0 weeks median [range:25.0-35.0], birthweight 1155 grams [560-2690], postnatal age 15 days (0-72). Four infants died, all within 31hrs of clinical presentation. $CFS \geq 2$ was not a significant predictor of mortality at any timepoint. $FTOEc \geq 0.37$ was, with the highest predictive value after 24hrs ($LR^+ : 12.0$ (95%CI 1.6-36)). The combination of $FTOEc \geq 0.37$ and $CFS \geq 2$ led to a better prediction of mortality in the first 12hrs after onset than both indicators separately.

Conclusion: Adding FTOEc-monitoring to current diagnostic possibilities improves the early prediction of fatal circulatory failure in preterm infants with sepsis/NEC.