

Point-of-care hemoglobin analysis vs laboratory assay in preterm infants in NICU: cost effectiveness and neuroprotective implications

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Objective. Haemoglobin levels assessment is a crucial part of neonatal intensive care practice, the painful experience of heel prick and venepuncture blood sampling may badly affect neonatal health and future cognitive development. To date the reliability of haemoglobin levels obtained by point-of-care testing (POCT) analysis if compared to standard blood cell count remains controversial.

Materials and Methods. A retrospective study conducted on all inborn premature infants (gestational age < 32 weeks) admitted to NICU at the IRCCS Istituto Giannina Gaslini during the period January 2019-December 2021.

We considered blood samplings taken within the first 28 days of life recording the laboratory haemoglobin levels (Hblab) (reference method), the point-of-care haemoglobin levels (Hb-POCT) (alternative method) and the type of puncture (arterial, venous, and capillary). A Bland-Altman analysis was per-

formed to evaluate the Hb agreement, it determines the bias (mean difference between the reference and alternative materials) and limits of agreement (LOA – lower: l-LOA, upper: u-LOA) of measures. An acceptable limit of agreement was 1 g/dl according to the existing literature.

Results. We considered 845 blood samplings from 189 enrolled patients. The comparison between the reference and the alternative method showed a good agreement for the capillary sampling technique with l-LOA of -0.717 (-0.776, -0.659) and u-LOA of 0.549 (0.490, 0.607), these results were not detectable among the other techniques, with LOAs over ± 1 g/dl threshold (venous < arterial).

Conclusions. The possibility of considering capillary POCT haemoglobin levels as reliable may reduce clinical-related costs and painful experiences in NICU, with positive effects on neonatal quality of life and neurodevelopment.