

EDITORIAL

Near infrared spectroscopy and preterm infants—ready for routine use?

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Noninvasive monitoring of preterm infants in the neonatal intensive care unit (NICU) is becoming a paramount part of modern care. This applies all the more with the 'minimal handling' approach being desirable for the most vulnerable neonates.¹ Invasive monitoring is possible, however limited, compared with pediatric and adult intensive care units. The limitations are mostly attributed to the technical issues related to the size of the NICU patients.^{2–4}

Apart from the heart rate, respiratory rate, blood pressure (BP) and different methods of continuous CO₂ assessment (for example, end-tidal CO₂ and transcutaneous CO₂), the mainstay of noninvasive continuous monitoring in NICUs is currently pulse oximetry. The heart rate and respiratory rate are very crude signs of well-being and changes in these parameters are related to acute deteriorations rather than allowing us to tailor the care for better short-term and long-term outcomes. Unfortunately, BP is not helping us very much either, as noninvasive BP accuracy is problematic⁵ and not continuous while invasive BP measurement in the stable infant should be avoided (as cannulation of the arterial line has its own complications).⁶ In addition, the BP is not a measure of organ and/or systemic perfusion, and there is no clear threshold value that is significantly predictive of a poor outcome.⁷ Since the introduction of pulse oximetry to NICUs all over the world in the early 80's, it has become the standard for avoiding side effects of hypo- and/or hyperoxia.⁸ There continues an interesting ongoing debate as to what saturations should be applied to an individual baby even after large randomized trials have been conducted and published.^{9,10}

Indeed, it would make much more sense to look, in more detail, at organ perfusion and cardiac output rather than oxygen saturations in the peripheral circulation and/or BP in the systemic circulation when tailoring our care for the tiniest infants to avoid adverse outcomes. There has been a lot of work done in recent years on functional echocardiography in preterm infants. Although some of the results are promising, the nature of the assessment is not continuous, is prone to repeatability issues and requires a lot of expertise and training.^{11,12}

So, it seems reasonable to suggest that measuring oxygen delivery and consumption of specific organs, most importantly the brain, might in fact be the best option of all. Thanks to near infrared spectroscopy (NIRS) and the development of user-friendly hardware this could now become a reality. NIRS evaluates cerebral blood flow and oxygenation, and possesses most of the features required for modern intensive care monitoring. The first neonatal application of NIRS occurred decades ago (at the same time as pulse oximetry), and since then there has been a tremendous body of research conducted. Undeniably, there has been considerable progress in this area and recently many exciting interventional trials have been performed with promising results.^{13,14} Although the body of evidence is growing, NIRS application in preterm infants remains mostly on an experimental level. The lack of practical implementation can be explained by

the lack of standardization, usage of various algorithms and wide-ranging values. In this issue, Korcek *et al.*¹⁵ have demonstrated that it should be entirely possible to see NIRS being used in certain patients routinely, but neonatologists must have a clear understanding of what are the advantages and disadvantages.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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