CALMER: A NOVEL METHOD FOR STABILIZING PRETERM INFANT BRAIN BLOOD FLOW DURING ACUTE PAINFUL PROCEDURES.

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INTRODUCTION / AIM

Preterm infants in the NICU experience multiple painful procedures. Skin-to-skin holding by parents reduces acute pain indices in preterm infants; however, parents may not be available during all procedures. To address this gap, we invented CALMER, a medical device which fits directly into an infant incubator and which simulates putative pain-mitigating components of skin-to-skin holding including touch, heart beat sounds and breathing motion (PCT Utility Patent #CA2015051002). Both the heart and breathing rates are adjustable so as to match each infant's parent's resting physiological readings. Aim: To evaluate the effect of CALMER treatment on preterm infant brain blood oxygen levels during routine blood collection.

METHODS

In this randomized controlled pilot study, 14 preterm infants (mean birth weight 1428g, SD 353, gestational age 30 weeks, SD 2) were assigned to receive either standard treatment (facilitated tucking—a strategy whereby a NICU research nurse provided gentle but firm physical containment of each infant's limbs, n=8) or CALMER treatment (n=6). CALMER treatment was given for 15 minutes continuously before the blood collection as this is the minimum time shown to be effective for reducing pain during maternal skin-to-skin holding. Both treatments were then applied throughout the blood collection. Brain blood oxygen levels were assessed using near-infrared spectroscopy (Portalite, Artinis Medical: Netherlands) placed on the frontal aspect of each infant's head. Differences between groups in changes in total hemoglobin concentration [tHb] across 3, one-minute phases of blood collection (Baseline, Heel lance, Recovery) were examined.

RESULTS

Compared to the Controls, infants in the CALMER group showed more stable (less change) in their cerebral blood oxygen level ([tHb]) in response to the heel lance: mean percent change of -57% (SE 43) CALMER group; -933% (SE 948) Controls.

Those infants in the CALMER group also had greater stabilization of mean [tHb] during the Recovery phase of the blood collection: mean percent change from baseline of -27% (SE 42) CALMER group versus -151% (SE 160) the Controls.

DISCUSSION / CONCLUSIONS

Calmer shows promise as a method for stabilizing brain blood oxygen levels in preterm infants during acute painful procedures. A larger, nationally funded trial is underway using multimodal assessment strategies to evaluate Calmer more thoroughly.
OTHER AUTHORS

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