Skin conductance measurements as pain assessment during retinopathy of prematurity screening

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Objective
Our aim for this study was to measure skin conductance (SC) as an indicator for pain and stress during retinopathy of prematurity (ROP) screening and find out which interventions are most hurtful during examination.

Background
To assess pain in newborn infants submitted to intensive care is important in order to give adequate pain relief. Pain is often assessed by behaviour assessment. This method can be subjective. There is an ongoing search for more objective methods. Screening for retinopathy of prematurity (ROP) is one of many possibly painful interventions in an extremely preterm infants’ first months of life. As an indicator of pain skin conductance (SC) measurements have detected increased sweating in extremely preterm infants\(^1\).

Design and methods
Thirty SC measurements were performed in sixteen different infants <32 weeks GA (mean GA 26\(^+4\) weeks) and birth weight (BW) <1250 grams (mean BW 819 grams) at a postnatal age of >32 weeks. Spontaneous SC was measured before, during and after eye examinations for ROP screening and compared to responses of heart rate, saturation, behavioural state by Neonatal Pain Agitation and Sedation Scale (N-PASS) and near infrared spectroscopy (NIRS).

Results
SC changes were seen in a large part of the study group, there were no significant differences in response between female or male infants and neither between clinical or polyclinical patients. All infants >28 weeks GA showed changes in SC. In infants <25 weeks GA 50% had increased SC during fundoscopy or RetCam. Apgar-scores of <7 after 5 minutes and higher ROP stages do not seem to affect the painful response to eye examination; SC changes were also seen in infants with ROP stage 1 and 2. Infants undergoing RetCam examination showed a higher number of peaks per second than infants undergoing fundoscopy. N-PASS values showed significant changes during ROP screening in every infant irrespective of type of ROP examination. Heart rate changes were only significant in few infants whereas desaturations were seen more often. No significant changes in NIRS were observed.

Conclusions
Preliminary results show that SC seems to be an adequate tool to measure procedural pain during ROP examinations but with a more differentiated response to the type of ROP examination when compared to N-PASS. However, SC seems to be less sensitive than N-PASS in detecting pain or stress during ROP examinations in previously extremely preterm infants. Further studies are necessary in combination with sensitive behavioural pain scales.

Reference: