

Sucrose 24 or glucose 30 % for procedural analgesia in neonates: a statement following the Lancet paper on perceived (in) effectiveness

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Oral administration of sucrose 24 %, glucose 30 % or mother's milk in combination with a pacifier shortly before a painful procedure (e.g. blood sampling, nasogastric tube placement, immunization/vaccination) has to be performed, has been validated as an effective tool for procedural analgesia in neonates [1,2]. Consequently, the use of sucrose 24% or glucose 30% has been integrated in most of the (Belgian) maternity wards, neonatal (intensive) care units and outpatient paediatric clinics. It became the most frequently applied intervention for procedural analgesia in neonates and, to a more limited extent, in infants. This should be combined with the use of a pacifier and the sweet solution should be administered on the tongue shortly (2 min) before the initiation of the procedure. When compared with local analgesia/EMLA or systemic paracetamol or morphine, glucose/sucrose results in the most prominent decrease in pain scores [1,2]. Perhaps this is a good place to also refer to contributions of Belgian caregivers and researchers to further evaluate these techniques [3,4,5]. More moderate positive results were obtained during immunization in infancy (2-6 months), resulting in the guidelines to use sweet solution with a pacifier (or other facility to maintain suctioning) only up to the age of 4, max 6 months.

All these studies used neonatal pain scores to quantify pain expression, assuming that this also reflects differences in nociception. In the preverbal setting, the golden standard of pain assessment, i.e. verbal rapport of the Individual patient, cannot be applied. The neonate is unable to say and can only show ('express') his/her distress or pain. Consequently, it is up to the caregiver to recognize ('read') these signs or to look for the absence of signs of comfort. To read these signs in a structured way, several sedation or pain scales have been developed and validated. In general, all currently clinical available tools focus on aspects of pain behavior or expression (e.g. motor activity, facial expression, motor tone, vital signs), not necessary reflecting pain perception or nociception [5,6].

This methodology-related conflict between different methods to assess pain in neonates has recently been illustrated in the paper of Slater et al. on sucrose during heel lancing in neonates [7]. In a randomized controlled setting (sucrose vs aqual), the authors reconfirmed the significant decrease in Premature Infant Pain Profile (PIPP) scores when sucrose was applied. However, when more sophisticated assessment tools (spinal nociceptive reflex withdrawal activity or cortical evoked response, i.e. specific brain activity evoked by one time-locked heel lance with electroencephalography as identified by principal component analysis) were applied, no differences between both groups could be unveiled. We are aware that this study has been criticized on its sample size (insufficiently powered) and methods (EEG evaluated limited to 0.5 sec before up to 1 sec after the heel lance) but at least, it re-illustrates that pain expression (as assessed by pain scores) is not equal to nociception [7,8]. At least, the behavioural effect of sucrose can likely be explained by a pain modulation effect, and hereby provides evidence for the presence of pain modulating systems in neonates.

In essence, caregivers responsible for neonates and infants are left with the knowledge that early pain experience is one of the covariates of interindividual variability in neurodevelopmental outcome, e.g. pain thresholds, pain or stress-related behavior and physiological responses in later life [6,9] while Slater et al. illustrated that sucrose or glucose are indeed no perfect analgesics, and likely in part effective through distraction, in part through endogenous opioid release [7,8]. The scientific committee of the Paediatric Acute Pain Group, Belgian Pediatric Society felt it therefore appropriated to put these findings in their perspective, although this statement is not always supported by evidence.

Firstly, avoid procedural pain when possible or at least, use the most appropriated technique. It has been repeatedly documented that venipuncture is tolerated much better and results in much lesser pain scores when compared to heel lancing.

Secondly, sucrose 24 %, glucose 30 % or mother's milk, all respectively combined with a pacifier are at the most effective analgo-distractive techniques currently available for procedural pain relief in neonates. The sweet solution should be administered on the tongue shortly (2 min) before the initiation of the procedure. The illustration that this might not be as effective as anticipated, should only enforce us to avoid procedural pain as much as possible.

Finally, do not overestimate the analgesic effect of these compounds, and do not misuse these compounds to perform 'minor' surgical interventions when more appropriated analgesodatives (local or systemic) are needed.

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