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EMPIRICAL MODE DECOMPOSITION TO ASSESS COUPLING BETWEEN INFANTS CRY SIGNALS AND PAIN EXPRESSION QUANTIFIED BY A PAIN SCORE

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Introduction: Coupling between fundamental frequency variation and intensity contour during crying reflects the degree of maturation of the central nervous system. We recently described the use of Empirical Mode Decomposition (EMD) to quantify coupling during infant cries [1]. We subsequently wanted to evaluate if there is an association between the extent of (de)coupling and quantitative pain expression.

Methods: To assess decoupling during crying in healthy term neonates during procedural pain, 47 newborns were videotaped and crying was recorded during venous blood sampling [2]. Acoustic analysis was performed and coupling between pitch frequency and the amplitude (energy) of the cry while pain expression was quantified based on the Modified Behavioral Pain Scale (MBPS). The relation between acoustic properties and the MBPS were explored.

Results: The correlation between pitch frequency and amplitude of the cry was strong (0.69 ± 0.1 , range 0.41-0.83). On the other hand, the correlation between the coupling of the cry sounds and MBPS shows positive trend ($r=0.38$, $p = 0.008$).

Conclusions: This study shows that pitch frequency and amplitude in neonates are significantly coupled, as it has already been reported, but not quantified. In addition, the acoustic properties of the neonates' cry signal relate to the MBPS. Although significant, this correlation only to a limited extent explains the interindividual variability in coupling observed.

[1]: Mijovic B, et al. Methods of information in Medicine 2010 (In press)

[2]: Silva M, et al. Early Hum Develop 2010;86:35-40.

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PERI-OPERATIVE ASSESSMENT AND MANAGEMENT OF PAIN IN CHILDREN

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Aim: To review peri-operative assessment of pain, documentation practices, management interventions, psychological preparation and follow-up in children.

Methods: A retrospective audit at the Homerton university hospital over a 12 month period from 1st Feb 2008 - 31st Jan 2009. All children operated on as elective day cases were included in the cohort. Patients who were transferred out postoperatively and those admitted post trauma were excluded.

Results: Total of 132 children were included in the audit. 107 (81%) had their pain assessed, of which 59 (44%) had it documented. 39 children had nerve blocks, 27 of which were caudals, 7 had penile block, 2 were given rectus sheath block while 3 received ilio-inguinal block. 33% of the patients who received nerve blocks required intra-operative opioids while 25% needed it postoperatively. 85% of blocks provided good pain relief. 25 patients, all under the age of five underwent lower abdominal surgeries. 22 were given caudal blocks while one received a penile block. One from the above group received both intra and post-op opioid.

Conclusions: Majority of patients' pain is being managed appropriately. Caudal blocks appear to be adequate for analgesia for sub-umbilical surgeries. Training of junior doctors in procedural skills does not necessary impact on efficient delivery of care as shown in our cohort of successful caudal epidurals. Most of these were performed by a junior doctor under supervision from a senior consultant anaesthetist. Pain is not being assessed and documented as per recommendation by the Association of Paediatric Anaesthetists.