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Skin conduction monitor and pain scores values in infants: Role of genetic polymorphisms

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Purpose:

Skin conductance monitoring (SCM) was suggested previously as an indicator of the occurrence and severity of pain in the pediatric population. There has also been much interest in the A118G polymorphism of the morphine opioid receptor (MOR) and G1947A polymorphisms of the catechol-*O*-methyltransferase (COMT) with regards to its association with inter-individual differences in post-operative pain scores. The objective of our study was firstly, to determine the ability of SCM to predict the severity of acute post-operative pain in infants and secondly, to investigate the effect of MOR (A118G) and COMT (G1947A) polymorphisms on post operative pain scores and SCM values in the infant population.

Methods:

Following IRB approval and written informed parental consent, infants from 6 - 12 months of age scheduled for elective general, orthopedic urology and plastic surgery were included in the study. All study participants received general anesthesia. Pain scores were recorded in the post-anesthesia care unit (PACU) by a blinded observer using the 'neonatal facial coding system'. SCM included measurements of frequency of electro dermal responses (EDR) and mean values of all conductance peaks in a given time frame and the basal level. 16 out of 31 infants were screened for MOR A118G and COMT G1947A polymorphisms.

Results:

A total of 31 infants (ASA 1-2) participated in the study (mean age was 8.9 months (\pm 1.9, range 6 - 12 months). The peak conductance values were found to be statistically significant predictors of pain (table 1). With every 0.1 unit increase in peak value, the odds of worse pain are 5% greater. Six out of 16 infants i.e. 37% of the genotyped patients were carriers for both analyzed mutations. The results of genotyping of two SNPs in MOR(A118G) and COMT (G1947A) demonstrate that the heterozygote carriers of MOR118G allele (but not COMT 1947A allele) are characterized by a lower basal SCM during the intermediate postoperative period when compared with carriers of two wild-type alleles.

Table 1: Odds ratio for peak values and worsening pain scores

PACU parameters	Odds ratio	CI	P-value
EDR	0.94	0.81 , 1.09	0.4
Mean of Peaks	1.05	1.00, 1.13	0.03
Basal level	1	0.99, 1	0.36

Conclusions:

Our study reveals that the peak conductance value may be a better indicator of worsening pain scores in infants and may be a valuable tool to predict acute post-operative pain in the infant population. Further studies on a bigger sample size are needed to fully investigate the effect MORA118G and COMT G1947A polymorphisms on the post operative pain scores and skin conductance values in the infant population.

References:

1. Hullett B et al. Anesthesiology 2009; 111:513-7.
2. Grunau RVE, Craig KD. Pain 1987; 28:395-41