

CORRELATION OF VOIDING PATTERN WITH THE VIDEO –EEG IN HEALTHY PRETERM NEONATES

Hypothesis / aims of study

Whether the brains of preterm neonates participating the control voiding during quiet sleep was still unknown. The development of voiding control in newborn, especially in preterm is also unclear. Recently, it has been reported that video-EEG has shown a very good advantage to evaluate the brain activity and effects of environmental factors on the EEG. Video-EEG has been used widely used in monitoring the activities of newborn with brain damage. However, the correlation between voiding pattern and brain activity recorded by video-EEG has not been reported. The purpose of present study is to investigate the relationship between voiding pattern and brain activity that recorded by video-EEG in healthy preterm newborn.

Study design, materials and methods

Forty-seven healthy preterm neonates (16 female) whose conceptional age (CA) was 34.10±1.81 weeks (mean ± standard deviation) was classified as 3 groups: Group I (31 weeks ≤ CA < 33 weeks; n=13), Group II (33 weeks ≤ CA < 35 weeks; n=14) and Group III (35 weeks ≤ CA < 37 weeks; n=20). Video-EEG data from eight cortical regions were recorded from 8:00 am to 12:00 am. Meanwhile, the 4h free voiding parameters including voiding frequency (VF), voiding volume (VV), post-voiding residual volume (PRV) and status at voiding (awake/sleep) were recorded according to our previous studies. The difference of brain activities. Between groups was analyzed by means of the nonparametric Kruskal-Wallis test. An ANOVO test was used to compare the average CA, VF, VV, PRV and birth weight (BW) among three groups. Whenever differences were significant at the $P < 0.05$, a post hoc Bonferroni test was used to check for differences between two groups. The data were analyzed using the statistical software of Statistic Package for SPSS 17.0.

Results

Voiding was recorded 146 times. Awake voiding pattern was seen in 51.37%, intermittent voiding pattern (urination ≥ 2 every 10 minutes) in 15.07% (22/146) of all voiding. There was no significant difference in voiding time and VV/BW between the three groups ($P > 0.05$). But voiding time in sleeping preterm neonates of group III was significantly less than that of the other two groups ($P < 0.05$). PRV/BW of group I was significantly larger than that of group II and group III. The electrode pair Fp1-T3 and Fp2-T4 amplitude showed a significant difference in group II and group III during quite sleep voiding, 5 second before and after voiding ($P < 0.05$). The electrode pair C3-O1 and C4-O2 amplitude showed a significant difference in group I during quite sleep voiding, 5 second before and after voiding ($P < 0.05$). The EEG frequency showed no significant difference in the three groups during quiet sleep voiding, 5 second before and after voiding ($P > 0.05$).

Concluding message

We found that the brain has played a role, even in the very early of newborn, in control of voiding function. With the age increasing, the central region and occipital area of the brain in preterm neonates played an important part in voiding.

References

1. Wen JG, Yang L, Xing L, Wang YL, Jin CN, Zhang Q. A study on voiding pattern of newborns with hypoxic ischemic encephalopathy. *Urology*. 2012 Jul;80(1):196-9.
2. Chen Y, Wen JG, Li Y, Li YD, Li ZZ, Kontinen YT. Twelve-hour daytime observation of voiding pattern in newborns <4 weeks of age. *Acta Paediatr*. 2012 Jun;101(6):583-6.

Disclosures

Funding: none **Clinical Trial:** Yes **Public Registry:** No **RCT:** Yes **Subjects:** HUMAN **Ethics Committee:** The Ethics Committee of the First Affiliated Hospital of Zhengzhou University **Helsinki:** Yes **Informed Consent:** Yes