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Correlation of early aEEG parameters with short and long-term neurological outcome in preterm infants

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Introduction & Aim: Recently, several studies have reported a correlation of early aEEG parameters with short and long-term neurological outcome in preterm infants. The aim of this study was to assess characteristics of aEEG in preterm infants with adverse neurologic outcome such as intra-ventricular hemorrhage, periventricular leukomalacia or death and to evaluate whether aEEG in the early days of life has predictive value of short-term neurologic outcome in preterm infants.

Methods: This prospective observational study included infants born at less than 32 weeks of gestational age or less than 1500 gm of birth weight who admitted the neonatal intensive care unit of Pusan National University Hospital between December 2016 and November 2017. aEEG were monitored at 12~14 hours (day 1), 46~48 hours (day 2), 70~72 hours (day 3) and 1 week of life (day 7). The aEEG recordings were analyzed using criteria described by Burdjalov et al. Brain ultrasonography was performed before 3 days of life first and then mostly once a week, depending on the clinical course of the patient, until discharged. Based on brain ultrasonography, infants were divided into two groups, which are favorable outcome group and adverse outcome group respectively. We compared characteristics of aEEG between both groups.

Results: 44 infants were enrolled. A total of 176 aEEG tracing were analyzed. 27 infants and 17 infants were identified in favorable outcome group and adverse outcome group, respectively. Infants in favorable outcome group showed high scores in almost all components including continuity, cycling amplitude of the lower border, and the bandwidth span and amplitude of lower border. The scores of all components were decreased significantly in day 2 compared to day 1 in adverse group, while the scores was increased as the days went by in favorable group. And total score of day 2 has highest AUC and less than 3 of total score has predictive value of 70.6% of sensitivity and 81.5% of specificity for adverse outcome.

Conclusion: We evaluated the differences in aEEG during the first week of life in preterm infants between favorable group and adverse group. We demonstrated that preterm infants with lower score of aEEG especially during the second day of life than first day of life or with scores less than 3 during the second day of life are more likely to have short term adverse outcome.

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