Patient Controlled Sedation and Changes of EEG During Dental Treatment

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Purpose: The demand for sedation in dental practice is increasing due to fear and anxiety in dental clinic. Patient controlled sedation can reduce the risk for the patient’s depression of cardiovascular function, respiratory depression, and airway obstruction as the injection of medication can be controlled by the patient. However, proper bolus dose and lock-out time in sedation has not been widely documented. Hence, the aim of the study is to produce an adequate protocol by evaluating the patients’ EEG.

Method: The study was approved by the Institutional Review Board(IRB). Healthy adult participants were recruited, and randomly divided into two groups: 30 participants with propofol and 30 participants with midazolam. In each group, participants were categorized into three subgroups: 10 participants of low bolus dose and short lock-out time, 10 participants with middle bolus dose and short lock-out time, and 10 participants with high bolus dose and long lock-out time. Patient controlled sedation was performed using a basic patient monitoring and respiration monitoring such as EEG and CO2. The clinical research procedure was conducted in two steps. First, the participants were required to push the demand button without dental scaling. Subsequently, participants pushed the demand button with dental scaling. During sedation, we evaluated the patients’ vital signs, degree of operators’ satisfaction and EEG level.

Results: Total 60 people participated in this study. Adequate sedation was carried out in both midazolam and propofol group. In propofol groups, those with high bolus dose injected patients showed 50% failure of scaling due to patient’s agitated reaction during the treatment.

Temporary hypoventilation occurred in high propofol dose group. The low dose did not progress to deep sedation stage and frequently pressed the button. Midazolam group had more outstanding outcome than propofol group in practitioner’s evaluation. Both groups showed increased beta wave powers in EEG findings during conscious sedation. And in case of unconsciousness both groups showed increased upper alpha wave powers in EEG findings. Among 6 groups, midazolam low bolus dose(0.002mg/Kg) and short lock-out time (1 min) group presented the most effective dental sedation state.
Conclusion: When performing dental treatment under patient controlled sedation, midazolam is better than propofol. Furthermore, setting midazolam bolus dose as 0.002mg/Kg and lock-out time as 1 minute were found to retain good sedation state for the patients, and high satisfaction for the practitioners.