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Suitable dental sedation monitored by electroencephalographic density spectral array: A case report and review of literature

Children often cannot cooperate with dentists, making pediatric dental treatment challenging. It is a common practice to use sedation in pediatric dentistry. In addition to oral sedation, practitioners are using new-generation agents in various route with good success.[1] The level of sedation may be deep sedation or even general anesthesia, in accordance with practitioner's preference. However, how to manage the accurate level of sedation is still a challenge for dentists and anesthesiologists. We reported a case undergoing oversedation during dental procedure with delayed emergence and tried to solve the problem with improved intraoperative monitoring.

An otherwise healthy 5-year-old boy was diagnosed with dental caries and pulpitis. He was unable to receive dental procedures under local anesthesia. Therefore, intravenous sedation with target control infusion (TCI) of propofol during the procedure was planned. He was pre-medicated with midazolam 15 mcg orally 30 min before the placement of the intravenous catheter installation. High flow nasal cannula was implemented with FiO2 1.0 and at flow rate of 15 L/min. Propofol infusion was administered via TCI pump (Kataria model) with the initial effect site concentration (Cet) set at 3 mcg/ml. However, patient was still irritable occasionally with Cet at 3.5 mcg/ml during the procedure when stimulated. Therefore, we titrated Cet to 4 mcg/ml for maintenance. Patient was unconscious during the procedure with stable vital signs. The procedure was completed in 3 h without any complication. TCI pump was turned off 10 min before the completion of the procedure. However, the patient was in deep sleep and cannot be waked up by painful stimulus for 1 h post-procedure. After he waked up, his parents took him home despite drowsy consciousness.

Pediatric patients have unique pharmacokinetic-pharmacodynamic (PK-PD) profile since childhood is a period of multiple physiologic maturations. For example, children are more resistant to propofol than adults so larger dose is needed to achieve effect. In addition, interindividual variability of the PK-PD profile in each child have been observed.[2] Inaccurate level of sedation may cause complications, such as iatrogenic trauma when undersedated or hypopnea when oversedated. A promising monitoring of electroencephalographic density spectral array (DSA) was used in recent years to address this problem. Compared with processed electroencephalogram (EEG) monitorings, such as bispectral index monitor, DSA provides EEG information without delay in detecting subtle changes in the depth of hypnosis.[3] That is, DSA can guide practitioners to adjust level of sedation in real-time. In contrast, processed EEG monitoring focus on distinguishing between the awake and the unconsciousness states.[4] The technique of electroencephalographic DSA can be skilled by dentists and anesthesiologists. Most important of all, it can be used in both children and adults. It can also be used in almost all types of sedation, including oral sedatives, inhalation anesthetics and intravenous anesthetics.[5] We conclude that with the use of electroencephalographic DSA, anesthesiologists can perform more accurate sedation, and dentists can also perform safer procedures under light or moderate

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sedation alone on patients. Staffs should be familiar with this promising monitoring technique.

Declaration of competing interest

The authors have no conflicts of interest relevant to this article.

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