Emergence Delirium in Pediatric Anesthesia

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Introduction

Emergence delirium has been a rising phenomenon since its recognition in the 1960s. It is often described as a disturbance in cognitive physiological processes during post-anesthetic recovery that can manifest in the form of altered mental state such as confusion and hallucinations, as well as uncontrollable movements (Sikich & Lerman, 2004). The agent used for induction of anesthesia is one of the more determining risk factors of emergence delirium, as data has shown that volatile anesthetics such as sevoflurane and desflurane lead to a higher risk of postoperative delirium than the use of propofol and remifentanil in total intravenous anesthesia (TIVA) (Moore & Anghelescu, 2017).

Emergence delirium is commonly seen in pediatric cases in which patients of preschool age are at the highest risk for developing pediatric delirium. Pediatric reactions to post anesthesia delirium can be of imminent danger as it increases the likelihood of the child causing injury to themselves, including the area that was surgically repaired, in addition to the hospital staff. The Pediatric Anesthesia Emergence Delirium Scale (PAED) is a tool that allows for quantitative measuring in this specific patient population. This scale utilizes a list of behaviors that must be examined during the patient's recovery from anesthesia. It is the hope that with this method of closer examination of pediatric delirium, solutions can arise for the most effective prevention and treatment methods of this hysteric postoperative state that will allow for better surgical and anesthetic outcomes in the pediatric population.

This literature review is to examine how different anesthetic plans affect the rate of emergence delirium in pediatrics. What is the incidence of emergence delirium in pediatrics who have undergone total intravenous anesthesia compared to those who were administered inhalational anesthetics?

Review of Literature

Emergence delirium can be used to describe a state of mental abnormalities that results from the administration of anesthesia. This state of psychomotor agitation typically occurs during the post-anesthesia phase, in which the patient is transitioning from unconsciousness to full wakefulness. As it relates to pediatrics, emergence delirium is most commonly seen in children of preschool age, in the early stages of arousal after anesthesia (Moore & Anghelescu, 2017). There are many risk factors that are likely to contribute to this delirium, including, but not limited to, the age of the patient, their medical history, including any preexisting anxiety, the procedure that is being performed, and the type of anesthetic administered. (Moore & Anghelescu, 2017). Increasing numbers of pediatric delirium can be dangerous as it is strongly associated with factors such as and increased demand of care, requiring longer hospital stays, which in turn lead to increased hospital costs (Meyburg et al., 2018).

Dexmedetomidine is an alpha 2 agonist that causes sedation in those in which it has been administered. Rather than a cloudy consciousness that is noted after the administration of other drugs such as benzodiazepines, dexmedetomidine produces a "cooperative" sedation state. In various investigations of anesthesia methods, it was found that TIVA with propofol is associated with a much lower incidence of emergence delirium than using sevoflurane based methods. The use of opioids such as remifentanil have also been shown to minimize the incidence of emergence delirium. This is due to the fact that uncontrolled pain can be a precipitating factor to this phenomenon. Therefore, a TIVA based anesthesia method using propofol and remifentanil can be assumed to be the most efficacious in the prevention of pediatric emergence delirium.

The Pediatric Anesthesia Delirium Scale is a tool that is commonly used to evaluate the incidence of emergence delirium in PACU. This scale consists of five scale items that describe the behavior of the child upon emergence from anesthesia. These scale items include behaviors such as eye contact, purposeful actions, awareness of their surroundings, restlessness, and inconsolability. Furthermore, the FLACC scale is used to record postop pain, while the time from the patients' arrival to PACU up until they achieved an Aldrete score above 9 is utilized to evaluate recovery time.

Ultimately, it is the expectation that both combinations of sevoflurane and dexmedetomidine, as well as a propofol and remifentanil infusion will both result in a decrease in emergence delirium. Dexmedetomidine results in unfavorable conditions intraoperatively such as post-operative nausea & vomiting, bradycardia, and hypotension, so it is hypothesized that the best anesthetic method for optimal emergence conditions would be total intravenous anesthesia using a propofol and remifentanil infusion.

Appendix 1: Paediatric Anesthesia Emergence Delirium Score

Behavior	Not at all	Just a bit	Quite a bit	Very much	Extremely
Makes eye contact with care giver	4	3	2	1	0
Purposeful actions	4	3	2	1	0
Aware of surroundings	4	3	2	1	0
Restless	0	1	2	3	4
Inconsolable	0	1	2	3	4

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