Emergence Agitation in Children: A Critical Review

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In 2013, H.S. Na et al. conducted a research study entitled “Emergence agitation in children undergoing adenotonsillectomy: a comparison of sevoflurane vs sevoflurane-remifentanil administration”. Emergence agitation (EA) is a common occurrence in children emerging from anesthesia, and is primarily attributed to the administration of volatile anesthetics, such as sevoflurane. Multiple studies have been conducted to examine this phenomenon. This study evaluated whether limiting sevoflurane concentration by combining remifentanil with sevoflurane reduces the incidence of EA. The investigators hypothesized that the decreased sevoflurane concentration would in fact reduce EA. The results of this study show “the incidence of EA was lower in children undergoing adenotonsillectomy who received a lower concentration of sevoflurane combined with remifentanil than in those given a higher concentration of sevoflurane without remifentanil” (Na et al., 2013).

The authors of this study were focused on determining if a decreased sevoflurane concentration reduces EA in children. Randomized control trial was employed in which the participants were separated into two different groups: sevoflurane group (control group) and sevoflurane with remifentanil group. Groups were assigned randomly using a sealed envelope method. The staff anesthesiologist providing care in the operating room was not blinded, however, both the anesthesiologist in the recovery room as well as the otorhinolaryngologist performing the procedures were both blinded. A review of previous literature showed that this is one of multiple studies examining EA in children, however remains one of the first examining the use of remifentanil to decrease sevoflurane concentration. Eighty-four subjects were included in the sample size- tables were provided which included age, gender, weight, operation time, anesthesia time, PACU time, awake time, and extubation time for each individual. Specific dosages for anesthetic medications is provided, along with EA scales in such a way that the study is replicable.
The investigators of this study remained focused on the research problem throughout the study and write up. A relevant literature review was completed and included within the article, followed with support that this study will provide additional information that has not yet been studied. Informed consent from parents or legal guardians and approval from the Institutional Review Board of Seoul National University of Budang Hospital were obtained, while specific ethical concerns were not addressed nor denied. Exclusion criteria were included: history of sleep apnea, developmental delay, psychological disorder, and other neurological disorders. The authors neglected to address confounding variables, such as children with surgical history, and whether or not they were controlled.

An alpha level of 0.05 was utilized and appropriate to the study, and all p values less than 0.05 were considered statistically significant. EA onset, duration, scores, and sevoflurane concentration were analyzed using the Mann-Whitney U-test while differences in the incidence of EA between the two groups were compared using the chi-square test. Tables were utilized to display results and related to prior studies. Authors addressed limitations including difficulty in assessing postoperative pain score in preschool-aged children, the pain scale overlaps with some components of the EA scale, and the depth of anesthesia was not measured objectively. Finally, a statement was made at the end of the article declaring there was “no external funding and no competing interests declared” (Na et al., 2013).

In conclusion, this article was well written, organized and applicable to anesthesia practice. Investigators suggest future studies should determine the effect of remifentanil on postoperative EA as well as the relationship between the dose of sevoflurane and EA. The information in this article not only educates anesthesia practitioners, but also provides support for its application into practice.
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