Low Sevoflurane Concentration Anesthesia Technique for Young Children Undergoing Adenoidectomy or Adenotonsillectomy

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Background:
• There are concerns that inhalation anesthetics have a dose-related effect on the developing brain (1-2). In the absence of clear-cut evidence proving a neurotoxic effect from inhalation anesthetics, it may be prudent to reduce anesthetic gas exposure by utilizing alternative anesthetics in order to reduce exposure to neuro-apoptotic.
• Some anesthesiologists at the Texas Children’s Hospital (TCH) have used dexmedetomidine and remifentanil to this end in the high-risk pediatric population.
• Anesthetic gas exposures are quantified in MAC-hours, defined by the minimum alveolar concentration that prevents movement from a noxious stimulus in 50% of subjects (MAC) for 1 hour (3).

Method:
• IRB approved retrospective study
• Chart review of children less than 5 years old who had undergone adenoidectomy or tonsillectomy with/without adenoidectomy from June 1, 2012 to March 30, 2013
• Two groups:
  ❖ Standard sevoflurane concentration anesthesia (SSCA)
  ❖ Low sevoflurane concentration anesthesia (LSCA) with dexmedetomidine and remifentanil.
• Thirty patients (15 for adenoidectomy and 15 for tonsillectomy) in each anesthesia group were randomly chosen from the primary data pool of each anesthesia group.
• Data were collected from the automated anesthesia records. The recorded end-tidal sevoflurane concentration at 1 minute intervals was extracted from medical records along with the duration of the procedure.
• The MAC-hour exposure was calculated using the age-related MAC and duration of exposure.
• Student T-test was used to detect any significant differences between the two groups and Chi square was used for categorical value. P < 0.05 was considered statistically significant.

Result:
• There were no significant differences in age, weight, ASA status and surgery time between LSCA and SSCA group.
• Anesthesia time was shorter in LSCA group comparing to SSCA group.
• The mean sevoflurane concentration, peak sevoflurane concentration and MAC-hours in LSCA group were significantly lower than SSCA (Table 1).

Conclusion:
• LSCA technique can effectively decrease the dose of sevoflurane used for adenoidectomy and/or tonsillectomy.
• A future prospective randomized clinical trial is required to confirm the safety and efficacy of the LSCA technique.

Reference: