Differences in the End Tidal Anesthetic Concentrations from the Anesthesia Summary Report and from Stored Values in EPIC Anesthesia Management System

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BACKGROUND
With recent findings that have shown inhalational anesthetics (IA) may be associated with adverse neurodevelopmental outcomes (1), it is important to quantify the actual exposure to these drugs in pediatric patients.

• In some retrospective epidemiology studies, the concentration of IA was extracted from the anesthesia record at 5-15 minute intervals.
• The EPIC anesthesia information management systems (AIMS) automatically records the concentration of IA, vital signs, and parameters of ventilation, as well as other important information and provides the option to present the data in 1, 5 and 15 minute intervals (Figure 1-A, B and C).

The purpose of the study was to determine which value should be used in future studies where quantification of exposure to IA is important.

METHODS
• In this IRB approved retrospective study, we randomly selected a sample of 15 out of 71 children less than 5 years old who had undergone adenotonsillectomy during a 3 month period from June 1 to August 30, 2012.
• We extracted sevoflurane concentration data at 1, 5, and 15 minute intervals.
• We calculated mean values of 1 minute data and compared the mean value with the value in the summary data record when the 5 and 15 minute options for presentation were chosen.

RESULTS
• The mean end-tidal sevoflurane concentration was 2.86 +/- 0.56%, 2.86 +/- 0.61% and 2.25 +/- 0.73%, respectively when data from the 1, 5, and 15 minute options were chosen (Figure 2-A).
• The peak end-tidal sevoflurane concentration was 5.85 +/- 0.53%, 5.10 +/- 0.70%, and 3.85 +/- 1.33% when the same time options were chosen (Figure 2-B).

DISCUSSION
Data recorded in EPIC AIMS consists of snap shots at different points. The 5 minute and 15 minute end-tidal sevoflurane concentrations represent the concentration only at that time point and not the mean concentration during the preceding 5 or 15 minute intervals. When the gas concentration is changing during the uptake and washout phases, the 5 and 15 minute values do not accurately reflect the true concentration. If it is necessary to quantify the exposure to volatile agents during a short case, the mean of the concentrations at the shortest time interval should be used, or the data should be extracted directly from the physiologic monitor.
Clearly, data from handwritten records will be inaccurate and cannot be used to quantify exposure.

REFERENCES