

The Distribution of Effect-Site Sevoflurane Concentrations at Wake-up

Background: There is acceptance of the concept of using real-time calculated effect-site concentrations to guide delivery of *iv* anaesthetic agents. As part of a broader interest in rational use of inhaled anaesthetics we have been investigating use of effect-site concentrations of inhaled anaesthetics. We have previously described our local system which, *inter-alia*, provides real-time estimates of effect-site concentrations and forward predictions of end-tidal and effect-site concentrations of volatile anaesthetics. We have recently installed in our ORs a number of GE-Navigator units which provide, along with interaction models, effect-site concentrations for a range of drugs including volatile agents.

The purpose of this study was to compare the distribution of effect-site sevoflurane concentration (Ce) at the point of first response to command by combining data from two studies.

Methods: Both studies had National Ethics Committee approval. Our previous study (Study A) was designed to explore the influence of different types of surgery on Ce-sevo at awakening and used a locally developed prediction system. In that study we found no difference between groups and all data is pooled for the present analysis. Study B was designed to investigate the point of awakening as predicted by GE-Navigator in a wide variety of clinical settings. In both studies an investigator noted the time at which patients first responded to a command to eye-open. This end-point is based on the definition of "MAC-awake" and corresponds to OASS =4/5. The Ce-sevo at the time of this end-point was retrieved from each system.

Results: The demographics of patients in the two studies were very similar. The 60 subjects in Study A woke at an age-adjusted Ce-sevo of 0.530 (sd 0.227) vol%, very similar to those in Study B (N=112): Ce-sevo of 0.527 (0.254) vol %. (unpaired 2-tailed t-test $p = 0.93$, 95%CI of difference -0.074 to 0.081). The figure shows the frequency distribution for the pooled data. The interquartile range is 0.37 to 0.75 vol%.

Comments: We found very similar patterns of Ce-sevo at awakening determined using two different technologies suggesting data from studies with these systems are robust. The distribution of Ce-sevo at awakening is wide.

Figure: Cumulative frequency plot of proportion responding against calculated effect-site sevoflurane concentration (Ce sevo). The sigmoid dose-response line of best fit is also shown.

