

The Response of the Patient State Index (PSI) to Different Anesthetic Types.

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Background

Many of the early publications on depth of anesthesia monitors described propofol and total intravenous techniques. This may give the impression that EEG monitors are only valid for intravenous anesthetics. We performed a prospective study with both total intravenous anesthesia or volatile agent based techniques to determine the performance of the PSI at various anesthetic endpoints.

Methods

After IRB approval, male and female patients undergoing general anesthesia were enrolled. All patients received a combination propofol, alfentanil, nitrous oxide anesthetic or a balanced anesthetic with volatile agent (isoflurane, sevoflurane or desflurane) and opioid as required. PSI was obtained starting at baseline with EEG electrodes applied with electrode gel and Ag/AgCl electrodes (PSArray2 configuration) and data was acquired by a PSA4000 (Physiometrix Inc) and continuously recorded to a computer drive. PSI values were compared between anesthetic groups at each of the prospectively determined major anesthetic endpoints. Comparison of PSI values was performed with Student's t-test for two samples assuming equal variance, $p < 0.05$ was considered significant.

Results

108 patients (27 male, 81 female), mean age 45 years were enrolled. There were 57 patients in the propofol, alfentanil, nitrous oxide group and 51 in the volatile agent group (25 desflurane, 24 sevoflurane, 5 isoflurane and 1 mixed agent). Most of the anesthetic endpoints were not different between groups except for the following: 1 minute after intubation ($p=0.004$), at incision ($p=0.004$), 5 minutes after incision ($p=0.016$), and 10 minutes after incision ($p=0.022$). The mean and 95% CI of PSI at each anesthetic endpoint is shown in the figure.

Discussion

Different medications have different effect on the brain and subsequent EEG effects. A universal measure of sedation and anesthesia effect should ideally be independent of the anesthetic agents. We found that the PSI was a consistent predictor of anesthetic sedation regardless of the type of anesthesia used in this study.

Figure 1

