

A Comparison Of Patient State Index And Bispectral Index Values During The Perioperative Period.

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Introduction

The patient state index (PSI), a quantitative electroencephalographic index, has been recently introduced into clinical practice as a monitor for assessing consciousness during sedation and general anesthesia. We designed this observational study to compare the sensitivity and specificity of the PSI with that of the bispectral index (BIS) with respect to their ability to predict the loss of consciousness and emergence from anesthesia, as well as to assess changes in IV (propofol) and inhaled (desflurane) anesthetics during the maintenance period.

Methods

Twenty consenting patients scheduled for elective laparoscopic surgical procedures were enrolled in this prospective clinical study. Anesthesia was induced with propofol 2 mg/kg IV and fentanyl 1 micro g/kg IV, and tracheal intubation was facilitated with cisatracurium 0.3 mg/kg IV. Desflurane 4% in combination with nitrous oxide 60% in oxygen was administered for the maintenance of anesthesia. Comparative PSI and BIS values were obtained at specific time intervals during the induction, maintenance, and emergence periods. The changes in these indices were recorded after the administration of propofol (20 mg IV) or with 2% increases or decreases in the inspired concentration of desflurane during the maintenance period.

Results

With logistic regression models, both the BIS and PSI were found to be effective as predictors of unconsciousness (i.e., failed to respond to verbal stimuli) ($P < 0.01$). The PSI also correlated with the BIS during both the induction of ($r = 0.78$) and emergence from ($r = 0.73$) general anesthesia. However, the area under the receiver operating characteristic curve for detection of consciousness indicated a better performance with the PSI (0.95 ± 0.04) than the BIS (0.79 ± 0.04). During the maintenance period, the PSI values were comparable to the BIS in response to changes in propofol and desflurane but displayed greater interpatient variability. Finally, the PSI (versus BIS) values were less interfered with by the electrocautery unit during surgery (16% versus 65%, respectively).

Conclusion

In conclusion, the PSI may prove to be a viable alternative to the BIS for evaluating consciousness during the induction of and emergence from general anesthesia, as well as for titrating the administration of propofol and desflurane during the maintenance period. However, further studies with the PSA device are needed to determine its role in anesthesia. *Implications:* The patient state index could be a useful alternative to the bispectral index for assessing level of consciousness during the induction of and emergence from anesthesia, as well as for titrating IV and volatile anesthetics during surgery.