

Is The Patient State Analyzer With The Psarray2 A Cost-Effective Alternative To The Bispectral Index Monitor During The Perioperative Period?

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New disposable electrodes, the PSArray and XP sensor, have been developed for the patient state analyzer (PSA) and the bispectral index (BIS) monitors, respectively. We designed this clinical study to compare the sensitivity and specificity of the patient state index (PSI) with the BIS during the perioperative period when the new electrode sensors were used.

Twenty-two consenting patients scheduled for elective laparoscopic procedures were enrolled in this prospective study. The elapsed time to apply electrodes and obtain a baseline index value was recorded, as were the comparative PSI and BIS values at specific time intervals during the induction, maintenance, and emergence periods in patients who were administered a standardized general anesthetic. In addition, the changes in these indices were recorded after a bolus dose of propofol (20 mg IV) or a 2% increase or decrease in the inspired concentration of desflurane during the maintenance period.

The total elapsed time to obtain an index value was similar with both devices (66 +/- 32 s versus 72 +/- 41 s for the PSA and BIS, respectively). By using logistic regression models, both the BIS and PSI were found to be equally effective as predictors of unconsciousness (i.e., failure to respond to verbal stimuli). The PSI also correlated with the BIS during both the induction of (R = 0.85) and the emergence from (R = 0.74) general anesthesia. The area under the receiver operating characteristic curve for detection of consciousness also indicated a similar performance with the PSI (0.98 +/- 0.05) and the BIS (0.97 +/- 0.05). During the maintenance period, the PSI values tended to be lower than the BIS value; however, the responses to changes in propofol and desflurane were similar. Finally, the PSI (versus BIS) values showed less interference from the electrocautery unit during the operation (31% versus 73%, respectively). Although the list price of the PSArray(2) disposable electrode strip (USD \$24.95) was higher than that of the BIS XP sensor (USD \$17.50), the average sale price (USD \$14.95) was identical for both electrode systems.

Therefore, we conclude that the PSA monitor with the PSArray(2) is a cost-effective alternative to the BIS monitor with the XP sensor for evaluating consciousness during the induction of and emergence from general anesthesia, as well as for titrating propofol and desflurane during the maintenance period.