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Anesthesia Awareness and the Bispectral Index

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ABSTRACT

Background Awareness during anesthesia is a serious complication with potential long-term psychological consequences. Use of the bispectral index (BIS), developed from a processed electroencephalogram, has been reported to decrease the incidence of anesthesia awareness when the BIS value is maintained below 60. In this trial, we sought to determine whether a BIS-based protocol is better than a protocol based on a measurement of end-tidal anesthetic gas (ETAG) for decreasing anesthesia awareness in patients at high risk for this complication.

Methods We randomly assigned 2000 patients to BIS-guided anesthesia (target BIS range, 40 to 60) or ETAG-guided anesthesia (target ETAG range, 0.7 to 1.3 minimum alveolar concentration [MAC]). Postoperatively, patients were assessed for anesthesia awareness at three intervals (0 to 24 hours, 24 to 72 hours, and 30 days after extubation).

Results We assessed 967 and 974 patients from the BIS and ETAG groups, respectively. Two cases of definite anesthesia awareness occurred in each group (absolute difference, 0%; 95% confidence interval [CI], –0.56 to 0.57%). The BIS value was greater than 60 in one case of definite anesthesia awareness, and the ETAG concentrations were less than 0.7 MAC in three cases. For all patients, the mean (±SD) time-averaged ETAG concentration was 0.81±0.25 MAC in the BIS group and 0.82±0.23 MAC in the ETAG group (P=0.10; 95% CI for the difference between the BIS and ETAG groups, –0.04 to 0.01 MAC).

Conclusions We did not reproduce the results of previous studies that reported a lower incidence of anesthesia awareness with BIS monitoring, and the use of the BIS protocol was not associated with reduced administration of volatile anesthetic gases. Anesthesia awareness occurred even when BIS values and ETAG concentrations were within the target ranges. Our findings do not support routine BIS monitoring as part of standard practice. (ClinicalTrials.gov number, NCT00281489 [ClinicalTrials.gov] .)

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