BIS monitoring: Account for Unaccounted

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My opinion

Avidan et al (1) documented data related to intra-operative awareness with the perspective of understanding the utility of BIS protocol versus ETAC protocol as objective markers for prevented/suppressed awareness. However, their conclusion should not be misinterpreted by the readers to believe that BIS which was developed for monitoring intra-operative awareness may not be useful as against ETAC. Moreover, the editorial comments by Crosby (2) further mystify the objective monitoring of intra-operative awareness secondary to questionable accuracies of both BIS and ETAC techniques. However, it is my understanding that though BIS may be effected by the various stimuli unrelated to the level of anesthetic requirements of the brain (3), these confounding factors actually make the BIS useful for intra-operative monitoring of brain. It is high time to realize that till the time when the BIS and cerebral tissue oximeter are combined together as one to provide the details of the concurrent changes in the awareness as well as cerebral hypoperfusion, BIS itself can detect gross changes in cerebral hypoperfusion (4) as well as changes in awareness. The only limitation with BIS is that muscle relaxant in itself falsely lowers BIS (5) partly secondary to closed eyes inducing changes in EEG and hence its use in ICU patients on neuromuscular blockade without any propofol/benzodiazepenes may be falsely re-assuring; this re-confirms that good neuromuscular blockade intraoperatively and hence subsequently lowered BIS should not prompt the anesthesia provider to lower the anesthetics supplements. In the same context, instead of management with fluids and vasopressors, the titration of the hemodynamics by changing the ETAC to below the recommended levels for prevention of awareness may be counter-productive because the resistance of the human brains to medications is fast changing secondary to outpatient exposure to plethora of the sedative-hypnotics-opioids-recreational drugs and the ETAC guided by MAC (based on the end-point of patient’s immobility rather than the awareness) may be underestimating patient’s anesthetic requirements anyway. In summary, it is time to re-explore the utility of BIS as a monitor of not only awareness under anesthesia, and when interpreting BIS and subsequently changing the management based on BIS, the anesthesia and intensive care physicians should re-focus on taking into account the effects of neuromuscular blockade and unintentional iatrogenic syncope.

Reference(s)

3. Dahaba AA. Different conditions that could result in the bispectral index indicating an incorrect hypnotic state. Anesth Analg. 2005 Sep;101(3):765-73.

Abbreviations

BIS: Bispectral Index
ETAC: End-Tidal-Anesthetic-Concentration
MAC: Minimum Alveolar Concentration
ICU: Intensive Care Unit
EEG: Electro-encephalogram
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