

Brain Wave Monitors

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Many patients are concerned about being awake while under anesthesia. There now are monitoring devices that may help the anesthesiologist make sure that you are not awake. These monitors attach to your head using simple stick-on patches to help conduct the electrical signals produced by the brain into the device, much like an EKG patches do for the heart. BIS[®] is a brand of monitor in the general class of “brain wave” monitors that look at the electroencephalograph (EEG) in a special way. BIS[®] is one brand in this class of monitors just like Xerox[®] is one brand of photocopiers.

The brain creates electrical waves as it works. There are four classes of brain waves (alpha, beta, theta, delta) that are studied by neurologists, but it is difficult to analyze them in real time for people who lack special training. We know that anesthetics change the pattern of the brain waves with the extreme case being elimination (or nearly so) of the waves during drug-induced comas used in treating brain injuries. What these brain wave monitors try to do is apply a complex mathematical calculation to the waves detected and convert the different combinations of brain wave activity to a single number that would help tell the anesthesiologist whether or not the patient was “asleep” or not.

Do these devices work? Unfortunately, the answer is both “yes” and “no”. Yes, they do convert the complex EEG signals into a single number that does seem to relate to the risk of having memories during the anesthetic in high-risk patients. These patients include: patients undergoing cardiac surgery, trauma patients, unstable emergency patients, patients with severe lung disease, Cesarean section patients, patients with a history of high doses of certain medications, and those with a history of having intra-operative recall. However, no, it is not clear that these devices should be used for everyone. There are several clinical signs of awareness and these devices do not correlate with this perfectly, so “treating the numbers” instead of the patient is not recommended. It is not clear whether or not these devices are accurate at extremes of age; the very young and the very old. For some patients, the anesthesiologist intends

for them to have some recall, such as when you have a spinal or epidural anesthetic with mild sedation, or a procedure done under local anesthesia with some sedation for relaxation.

Lastly, and while we hate to mention money, the reality is that there are only so many dollars to spend. Each of these devices uses a disposable sensor that can add to the health care bill. If used on patients indiscriminately, those dollars really add up and you, the patient, pay for that through increased co-pays and insurance rates. It is a better investment of your health care dollar to make sure that there is enough flu vaccine for everyone than to insist that brain function monitors be used on every anesthetic. Your anesthesiologist can discuss with you if the use of this type of device will benefit you as an individual.