

by Kate Grip Denon

UNDER THE KNIFE

Will you wake up?

A new tool is meant to ensure patients don't gain consciousness during surgery.

Is it working?

N

o one in the operating room could tell that Carol Wehrer, of Reston, Va., had woken up. She could hear the cheesy clapping of disco music and then one of the surgeons said, “Cut deeper and pull harder.” He was referring to her eye as if it were the wishbone in a Thanksgiving turkey.

Wehrer panicked. Inside her head she was screaming in futility, echoes in a canyon on the moon. The doctors kept going about their business, sawing and tugging, and she could hear and feel all of it. Wehrer noticed instruments being placed on her chest, as she drifted in and out of a dream-like state. Wehrer tried moving her hand, but didn’t want to move too much and cause something to go wrong with the operation. “All I could think was, ‘I must have made the wrong choices with my life, because I guess this is hell.’”

Wehrer isn’t certain whether she ended up passing out or if she was given more drugs to put her under, but she remembers waking up after the surgery and immediately trying to crawl off the gurney in an attempt to escape. “I just started screaming, ‘I was awake, I was awake.’”

The experience still haunts her. “I’m still manifesting physical trauma to this day through panic attacks and cold sweats—my brain won’t ever let me lose control ever again,” Wehrer says.

Because of her experience Wehrer founded the Anesthesia Awareness Campaign, Inc. and became a proponent of brain activity monitoring, or brain function monitoring, a technique used to monitor how well anesthesia is working and a patient’s level of awareness. Brain activity monitoring wasn’t around when Wehrer had her surgery, and more than anything, she wishes it had been. “Part of the reason I started this campaign is to do everything I can to make brain activity monitoring a standard of care,” she says. “No one should have to go through what I did.”

Anesthesia is meant to stop patients from feeling pain. And for most patients it does. But along with anesthesia use, there is always a chance of waking up.

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UNDER THE KNIFE *Continued*

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Who’s at risk?

The chances of waking up during surgery are slim. “It’s generally accepted as one to two people per 1,000, but there is some data that suggests it is less frequent,” says Dr. Daniel J. Cole, of the Mayo Clinic in Phoenix, and member of the task force on Intraoperative Awareness and Brain Function Monitors of the American Society of Anesthesiologists. But for patients and doctors, even one person becoming aware during surgery is too much, making the arrival of brain activity monitoring all the more appealing.

Introduced in the mid-1990s, brain activity monitoring, aka the bispectral index, uses brainwaves to determine the level of sedation. According to Dr. Girish P. Joshi, MBBS, FFARCSI, professor of anesthesiology and pain management at University of Texas Southwestern, the technique takes electrical currents from the brain and converts them into an index from 0 to 100. “If the number is between 40 and 60, the chances of awareness are negligible, or less likely,” says Joshi, who was also involved in the initial studies of brain activity monitoring.

Determining when to use brain activity monitoring has as much to do with the patient as with what surgery is being performed. According to Cole, patients who tend to be at a higher risk for experiencing awareness during surgery are patients who have a history of narcotics use, have a previous experience of unintended awareness during an operation, or are undergoing trauma or emergency operations such as heart surgery or a Caesarean section. “The benefit of this monitor is greater in these higher risk patients and surgeries,” Cole says.

Is the index accurate?

That’s the question on most everyone’s mind, and there’s no clear answer. According to Cole, there has been a reduction in awareness by approximately 80 percent. On the flip side, a recent study published in the *New England Journal of Medicine* showed that brain-monitoring devices were no more effective at lowering the risk of anesthesia awareness than older methods.

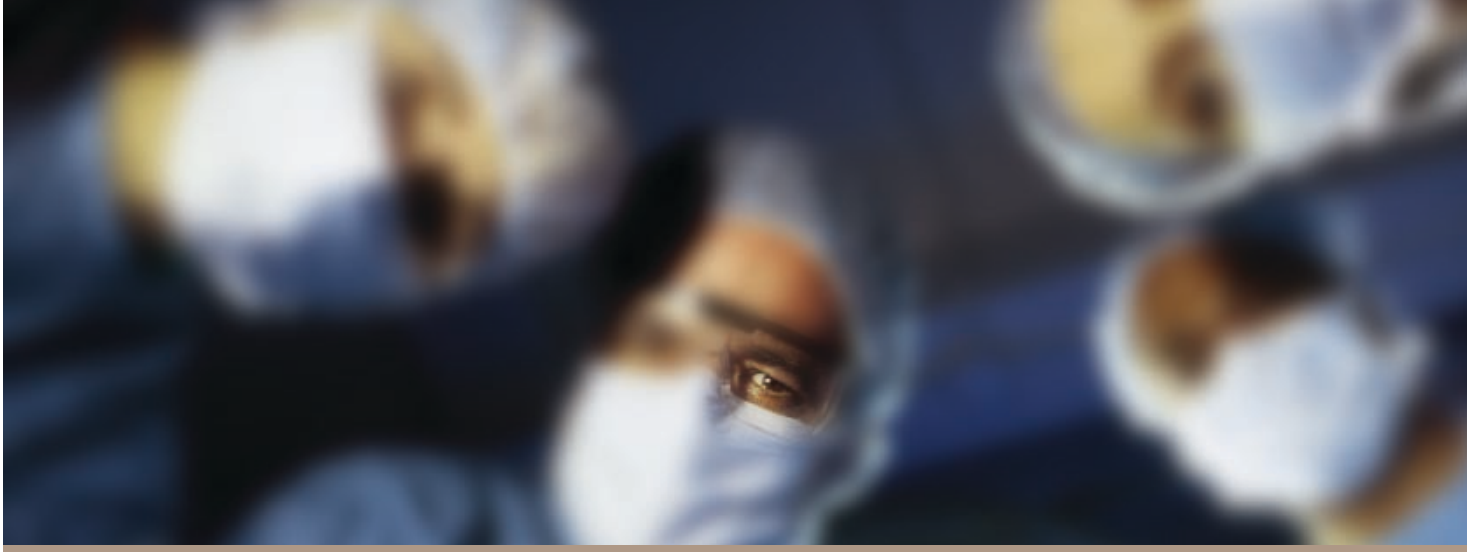
“Older” methods include monitoring the amount of anesthetic gas in the air exhaled by the patient. When the amount of exhaled air goes below a certain threshold, the anesthesiologist can increase the amount of anesthesia to keep the patient unaware. Other indicators are blood pressure and heart rate—a spike in these could mean the patient is becoming aware. “Before brain activity monitoring there was no way to check awareness,” says Tom McKibban, CRNA, MS, spokesperson and former president of the American Association of Nurse Anesthetists.

While the results on brain activity monitoring are mixed, most experts agree it can’t guarantee complete unawareness. “Medicine is not black and white,” Joshi says. “It can’t tell us a method will work in 100 percent of patients—it can tell us the majority, but there are always outliers.”

Absolute or not, the usage of brain activity monitoring has increased over the last few years. In a 2005 survey, 64 percent of doctors queried by the American Society of Anesthesiologists didn’t use the technique, while a similar survey two years later found 22 percent of those queried didn’t use the technique.

Most physicians and anesthesiologists find it a useful tool to help minimize a patient’s awareness. According to McKibban, brain activity monitoring allows him to fine tune anesthesia. “As a result, my patients can now wake up faster and in less pain, and experience a faster recovery process because I end up using less anesthesia.”





Per Chance a Dream

Doctors act quickly if they notice signs that a person is coming awake during surgery, but just because someone moves doesn't mean he or she is awake. It could be an unconscious twitch. Upon seeing movement, the anesthesiologist could increase the dose of anesthesia, or give the patient Valium to help him or her reach a deeper level of sedation.

For the patient, becoming aware can take on several forms. In Wehrer's case, she had complete sensation and alertness, but mobility and alertness can vary in patients. "When a patient has awareness under anesthesia, they may or may not be paralyzed," McKibban says. "The aware patient may hear conversation, smell, etc., but they may not have pain depending on the anesthetic technique being used."

Many patients also might mistake becoming aware with having a dream. According to McKibban, many times what a patient is remembering is waking up at the end of the procedure, not during. To help determine whether it was a dream or reality, McKibban conducts a post-operative interview with the patient and asks things like, What was the last thing you remember before going to sleep? What do you remember before going to sleep and waking up? What was the worst thing about the operation? After the initial interview, McKibban contacts the patient again about a week after the procedure, and then again 60 to 120 days after that. "Memories don't always happen immediately, so it is important to keep following up," he says.

If awareness has been identified, getting in touch with a mental health professional is crucial. "We need to determine the depth of the impact," Cole says. "This can lead to post-traumatic stress and we need to ensure that each patient gets the proper treatment."

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Understanding Anesthesia

While brain activity monitoring arrived on the scene about a decade ago, nothing new seems to be on the immediate horizon. "There are six or seven products on the market that use some derivative of brain electrical activity as a monitor of anesthetic depth," Cole says. "There are no fundamentally different monitors close to being developed that I am aware of."

New technologies or not, the most important thing patients facing an operation with anesthesia need to understand, according to McKibban, is knowing what you're getting in to. "It's so important to know what kind of anesthesia you're getting," McKibban says. "Is it local with heavy sedation or general?" Some anesthetics will knock the patient completely out, while other operations require a level of awareness. "You don't want to think you'll be completely out, when in fact you're not," he says. It's up to the anesthesia professional to explain what you're getting into. It's also a good idea to ask your doctors what they plan to do in the event of awareness. "That can actually take away a lot of the trauma, just understanding the risks and knowing 'this is the plan' if you wake up." 