

**PERSONALIZE
ANESTHESIA**
NOT TOO DEEP.
NOT TOO LIGHT.
JUST RIGHT.



Bispectral Index™ (BIS™)
Brain Function Monitoring

Medtronic
Further, Together

HELPING YOU OPTIMIZE ANESTHESIA DELIVERY FOR EACH PATIENT

Reducing risks for your patients. We understand the challenges.

Each patient is unique, they depend on you for the ideal level of anesthesia to protect them throughout procedures and expedite a smooth recovery.

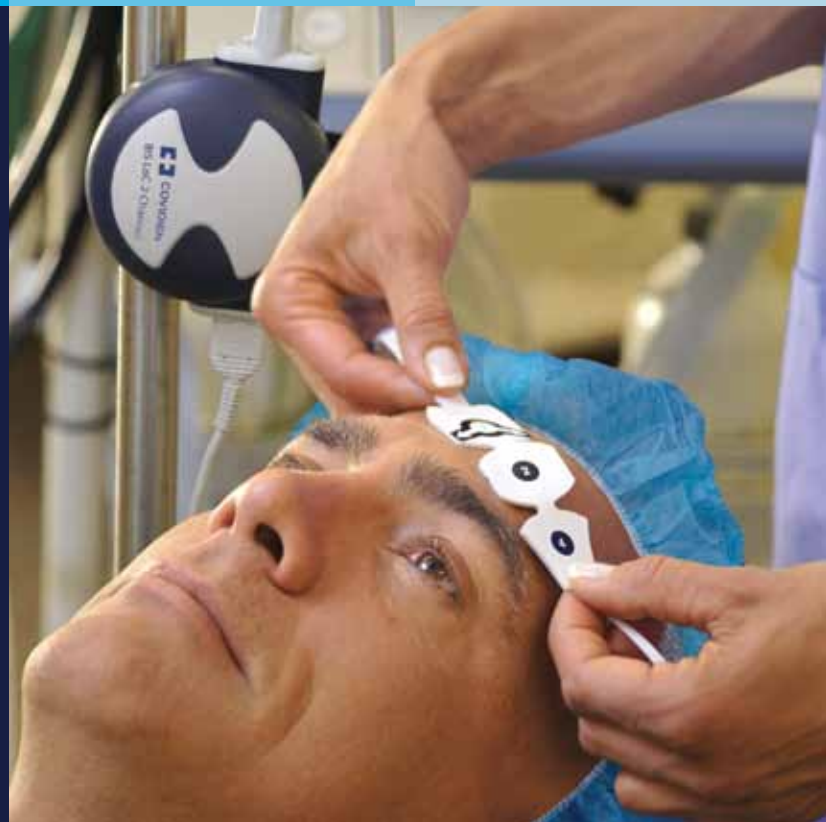
You depend on your training and experience to sense responsiveness and maintain optimal anesthesia levels. We remain committed to helping

you precisely tailor each anesthetic dose as new information surfaces about anesthesia's impact on postoperative complications.

Combined with your experience, BIS™ monitoring — a proven, objective measure of the patient's depth of consciousness — lets you confidently monitor and deliver safe, optimal anesthesia for each patient.



BIS™ brain monitoring collects EEG information obtained through **A SENSOR PLACED ON THE PATIENT'S FOREHEAD**

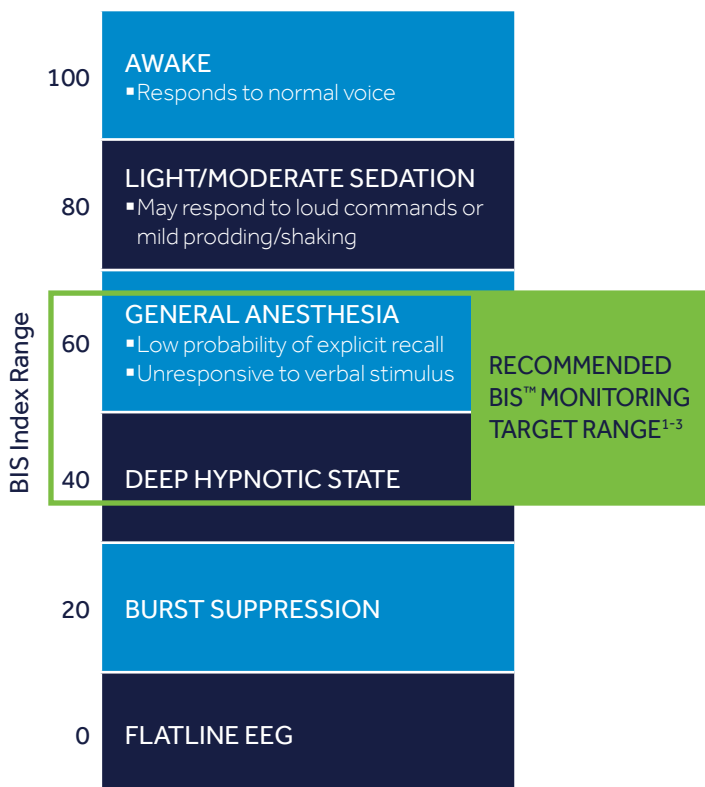


ESSENTIAL DATA. CONTINUOUS INSIGHT.

BIS™ monitoring may help you confidently personalize anesthetic depth for each patient, eliminating uncertainty with reliable, data-driven insight. Throughout the procedure, BIS™ technology consistently collects and processes complex EEG input providing easy-to-interpret data that helps you monitor and titrate drug dosage to maintain the optimal balance for your patient.

BIS™ Index Range and Clinical States

The BIS™ system processes EEG information and calculates a number between 0 and 100. There is a direct correlation between this range and measurement of the patient's level of consciousness.



HYPNOSIS

BALANCED ANESTHESIA

ANALGESIA

IMMOBILITY





INNOVATIVE APPROACH TO OPTIMAL ANESTHESIA DELIVERY

The common use of short-acting anesthetic agents requires new approaches in monitoring patients to ensure good outcomes.

Each patient has unique sensitivity to anesthesia.

Patients with increased sensitivity run the risk of receiving excess dosage, leading to longer recovery and increased potential of postoperative nausea and vomiting.^{1,4}

Patients with increased resistance may be at risk of unintended awareness during surgery.⁵ And peer-reviewed, published data associates the levels and type of anesthesia as risk factors for postoperative delirium.^{6,7}

Achieving and maintaining the right anesthetic effect gives you the peace of mind that each patient is receiving the safe dosage for the best possible outcome.

PROVEN BENEFITS

BIS™ brain monitoring is the most widely studied consciousness monitoring system available. Multiple clinical studies demonstrate benefits to adjusting anesthetic dosing and administration to maintain BIS™ monitoring values in the range of 40-60.¹⁻³

Patient-specific Drug Titration

Studies show that BIS™ monitoring:

- Allowed a 50% reduction in propofol administration during hypothermic cardiopulmonary bypass²
- Significantly reduced end-tidal desflurane concentration compared with standard anesthesia monitoring practice⁴
- Decreased titration of isoflurane and contributed to faster emergence of elderly patients undergoing elective knee or hip replacement surgery⁸
- Can provide further information to guide drug administration and predict responsiveness for asleep-awake craniotomy surgical procedures, where titratable anesthesia is preferred to facilitate more predictable intraoperative wake-up⁹



IN A CLINICAL REVIEW

on the prevention of intraoperative awareness with explicit recall (AWR), authors Michael Avidan and Dr. George Mashour summarized:

"Intravenous anesthetics such as propofol have a wider variability in dosing... and currently lack a metric for real-time monitoring."¹⁰

"The prospective studies incorporating BIS™ system-based protocols provide proof of principle that a brain monitor can be effective in decreasing the incidence of AWR."^{3,11-15}

PROVEN OUTCOMES

Improved Outcomes. Faster Recovery and Discharge.

Personalize anesthetic administration:

- Improves patient outcomes and satisfaction
- May allow faster recovery and discharge by minimizing side effects and postoperative complications

Studies show that patients whose anesthetic dosing was guided by BIS™ monitoring experienced:

- Faster extubation^{1,4}
- Faster emergence¹
- Better orientation at the Post Anesthesia Care Unit (PACU)¹
- Faster discharge^{1,4}

Lowered Incidence of Awareness

With TIVA procedures, the incidence of awareness can be 5 to 10 times greater than with inhaled anesthetics.³ All the more reason that BIS™ monitoring is important: It may help reduce the incidence of awareness during TIVA procedures and during inhaled anesthesia.⁵

Using BIS™ monitoring in TIVA, inhaled and balanced anesthesia leads to 80% less incidence of awareness compared to routine care.^{3,11,12}

Awareness Prevention Guarantee

If one of your patients experiences a case of anesthesia awareness while using BIS™ technology, and the electronic record shows the index value was below 60 at that time, Medtronic will reimburse the hospital for that case according to terms of the partnership agreement your hospital has with Medtronic.

Reducing the Risk of Postoperative Delirium

Postoperative delirium is common. Across all surgical procedures requiring anesthesia, 37-46% of patients are affected by postoperative delirium.¹⁶ Risk increases up to 87% depending on the age of patients and the type of surgery.¹⁶ Up to 21% of patients experience emergence delirium after anesthesia and surgery.¹⁷

Monitoring the depth of anesthetic dosing with brain function monitoring may decrease the rate of postoperative delirium in certain patients.^{18,19}



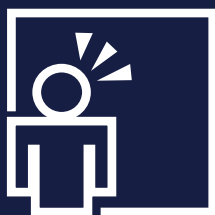
BIS™ MONITORING RELIABLE, PROVEN SUCCESS

Anesthesia-related complications and side effects can be costly, requiring longer lengths of stay for patients and longer times in the operating and recovery rooms. Effective use of BIS™ brain monitoring, with both intravenous and volatile anesthetics, may result in cost efficiencies and reduced labor burden²⁰ realized from:

- Reduced primary anesthetic use with the ability to more effectively optimize dosage
- Fewer postoperative complications due to reduced adverse anesthesia side effects
- Faster patient recovery and discharge with quicker emergence and orientation of patients in the PACU

BIS™ monitoring may contribute to the overall success of the surgical procedure, providing:

- Improved patient satisfaction through better anesthesia outcomes
- Enhanced operational efficiencies by moving patients through to discharge faster



POSTOPERATIVE DELIRIUM IN OLDER ADULTS

Best Practice Statement from the American Geriatrics Society.

"The anesthesia practitioner may use processed electroencephalographic monitors of anesthetic depth during IV sedation or general anesthesia of older patients to reduce postoperative delirium."²¹

CONFIDENCE. PEACE OF MIND.

Clinically-proven BIS™ technology gives you:

- Peace of mind that you are personalizing sedation to your patient's individual needs

The BIS™ brain monitoring products are quick to deploy and easy to operate. A full range of EMR-compatible products, from standalone to fully-integrated systems, provide convenient flexibility and the right solutions to a diverse range of needs.

Talk to your Medtronic representative to learn more, or visit [medtronic.com/covidien/products/brain-monitoring/bis-tiva](https://www.medtronic.com/covidien/products/brain-monitoring/bis-tiva).



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