



BIS™
Brain Monitoring System for Critical Care



COVIDIEN

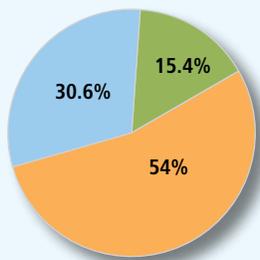
positive results for life™



An objective measure to help you maintain sedation that is just right.

You face many challenges in your mission to optimize the comfort, safety and quality of care for your critically ill patients. Sedation scales and daily wake-ups are subjective and intermittent and may not be sufficient to assure optimal sedation. Over-sedation and under-sedation may occur and can contribute to a broad range of complications.¹⁻⁵

BIS™ technology backs you up by providing additional objective insight to help you better assess patient status and make more informed decisions about titration of sedative drugs. The BIS™ monitoring system can help you meet your patient's needs during continuous or intermittent sedation, with or without neuromuscular blockade.



More than 69% of patients in an ICU were found to be inappropriately sedated⁵

- On target
- Under-sedated
- Over-sedated

ICU SEDATION: A BIMODAL CHALLENGE

Complications of over-sedation^{6,7}

- Increased time on mechanical ventilation
- Increased length of stay in ICU and/or hospital
- Additional cost of care
- Need for additional diagnostic testing
- Increased risk of delirium
- Decreased wound healing and GI motility
- Impaired reliability of neurological examinations

Complications of under-sedation⁶

- Fear, anxiety and agitation
- Unpleasant recall
- Medical device removal
- Additional costs
- Increased nursing time



“The combination of observational tools and neurofunction monitors can provide different and complementary data that will ensure a greater understanding of the patient’s response to sedation than would either tool alone.”

— DaiWai Olson, RN, PhDc, CCRN

HOW BIS™ TECHNOLOGY WORKS

- Raw EEG data are obtained through a sensor placed on the patient’s forehead
- The BIS™ system processes the EEG information, and calculates a number between 0 and 100 that provides a direct measure of the patient’s level of consciousness and response to sedation
- A BIS™ value of 100 indicates the patient is fully awake
- A BIS value of 0 indicates the absence of brain activity

USING BIS TECHNOLOGY TO GUIDE ICU SEDATION CARE

- Sedatives may be titrated to a variety of BIS values, depending on the goals for each patient
- Publications demonstrate that BIS values may be used as a measure of hypnotic drug effect in the ICU^{6, 8, 9, 10}
- Movement may occur regardless of BIS values
- Natural sleep cycles may affect the hypnotic level

BIS™ VALUE RANGE AND CLINICAL STATES

| | | |
|-----------------|-----|---|
| BIS Index Range | 100 | Awake – Responds to normal voice |
| | 80 | Light/Moderate Sedation – May respond to loud commands or mild prodding/shaking |
| | 60 | General Anesthesia – Low probability of explicit recall – Unresponsive to verbal stimulus |
| | 40 | Deep Hypnotic State |
| | 20 | Burst Suppression |
| | 0 | Flatline EEG |

This chart reflects a general association between clinical state and BIS values. Ranges are based on results from a multi-center study of BIS monitoring involving the administration of specific anesthetic agents. BIS values and ranges assume that the EEG is free of artifacts that can affect its performance. Titration of anesthetics to BIS ranges should be dependent upon the individual goals established for each patient. These goals and associated BIS ranges may vary over time and in the context of patient status and treatment plan.

BIS™ technology solutions to meet your needs.



**FULLY FEATURED
STAND-ALONE SOLUTION
BIS™ VISTA MONITORING SYSTEM**



BISx with Patient Interface Cable

**Leading OEM
multiparameter
monitors**

**BIS SYSTEM
FULLY INTEGRATED
SEAMLESS SOLUTION**

“With BIS, we achieved a significant reduction in time on ventilators, ICU and hospital length of stay, and the use of costly infusional sedative agents. As a result, it is now a required part of our routine monitoring of ventilated, sedated patients and an essential element for those requiring neuromuscular paralytic agents.”

—David Kaufman, M.D.

“BIS provides a more accurate assessment than subjective tools, and is part of our integrated approach to assessing and titrating sedation. We routinely use BIS in patients treated with barbiturate coma and neuromuscular blockade and have recently found several applications during therapeutic hypothermia.”

—Richard Riker, M.D.

1. Fraser GL, Riker RR. Comfort without coma: changing sedation practices. *Crit Care Med.* 2007;35(2):635-637.
2. Weinert CR, Calvin AD. Epidemiology of sedation and sedation adequacy for mechanically ventilated patients in a medical and surgical intensive care unit. *Crit Care Med.* 2007;35(2):393-401.
3. Payen JF, Chanques G, Mantz J, et al. Current practices in sedation and analgesia for mechanically ventilated critically ill patients: a prospective multicenter patient-based study. *Anesthesiology.* 2007;106(4):687-695.
4. Tobias JD, Grindstaff R. Bispectral index monitoring during the administration of neuromuscular blocking agents in the pediatric intensive care unit patient. *J Intensive Care Med.* 2005;20(4):233-237.
5. Kaplan L, Bailey H. Bispectral Index (BIS) monitoring of ICU patients on continuous infusions of sedatives and paralytics reduces sedative drug utilization. *Crit Care.* 2000;4(suppl 1):S110.
6. Olson DM, Graffagnino C, King K, Lynch JR. Toward solving the sedation-assessment conundrum: bi-spectral index monitoring and sedation interruption. *Crit Care Nurs Clin North Am.* 2005;17(3):257-267.
7. Ouimet S, Kavanagh BP, Gottfried SB, Skrobik Y. Incidence, risk factors and consequences of ICU delirium. *Intensive Care Med.* 2007;33(1):66-73.
8. Simmons LE, Riker RR, Prato BS, Fraser GL. Assessing sedation during intensive care unit mechanical ventilation with the Bispectral Index and the Sedation-Agitation Scale. *Crit Care Med.* 1999;27(8):1499-1504.
9. Olson DM, Chioffi SM, Macy GE, Meek LG, Cook HA. Potential benefits of bispectral index monitoring in critical care. A case study. *Crit Care Nurse.* 2003;23(4):45-52.
10. Arbour R. Impact of bispectral index monitoring on sedation and outcomes in critically ill adults: a case series. *Crit Care Nurs Clin North Am.* 2006;18(2):227-241.



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