

# Sedation and Analgesia in Unconscious Palliative Care Patients: Can Bispectral Index monitoring add to our understanding?

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**Reference:** Barbato, Michael; Barclay, Greg; Potter, Jan; Yeo, Wilf. Journal of Palliative Care 31.1 (First Quarter 2015): 57-59.

**Abstract :** To the best of our knowledge, the palliative care unit at Port Kembla Hospital in Warrawong, New South Wales, Australia, is the only one currently evaluating the contribution that Bispectral Index (BIS)-like technology makes to the management of unconscious palliative care patients. We are trialing the BIS monitor with forty eligible subjects who, with their immediate family members, give us informed consent to use it from the onset of unconsciousness until death.

**Objective:** BIS index correlates strongly with measures of sedation and awareness. It is a validated form of consciousness monitoring in anesthesia and intensive care settings. BIS values range from 100 (fully awake) to 0 (brain dead). A pilot study found that BIS values rise to levels approaching awareness at times of pain and returned to baseline levels of breakthrough medication. This study is assessing the use of BIS technology for monitoring a patient's level of distress and response to treatment. A pilot study found that a rise in BIS is associated with pain or distress is often associated with verbal and non-verbal markers (ex. Moaning). This study analyzes BIS data before and after breakthrough medication to assess the correlation between these physical observations and changes to BIS levels. To assess the reliability of BIS monitoring data in comparison to standard observational measures of sedation and comfort of 40 eligible subjects. **Methods:** Mean BIS and EMG of activity of frontalis muscle activity was collected at the start of the study and the hour prior to death. **Results:** This paper presented preliminary findings of 17 subjects. 16 of the 17 subjects were started on subcutaneous infusions of analgesia and midazolam (mean 24h dose: 14mg, range 5 to 30mg) days before they became unconscious because of difficulty swallowing. 1 patient was stated to have received palliative sedation. Mean BIS and EMG values for all subjects at commencement of study were 54 (range 25 to 70, SD 12) and 37 (range 28-44; SD 5), respectively. One hour prior to death, mean BIS and EMG values were 53 (range 35 to 71, SD 14) and 35 (range 29-47, SD 6). BIS values increased intermittently for most subjects and these increases were often accompanied by visible signs of discomfort. Occasionally there were no clear signs for the rise. In many subjects there was a sudden and significant rise in BIS values (levels associated with almost full awareness) in many subjects prior to death, which may indicate a paradoxical increase in awareness immediately before death.

**Strengths:** Novel use of available technology used in anesthesia in palliative care setting

## **Weaknesses:**

- BIS index was developed from EEG records of healthy adult volunteers. Generalizability to palliative care population is questionable.
- Caution is recommended in interpreting values when EMG levels exceed 50 decibels and signal quality is less than 80%. BIS levels tend to be greater than 70 when EMG levels approach 50 decibels. Not clear if it is indicative of patient discomfort.
- Proposed study involves 40 eligible subjects but eligibility criteria are not provided in this preliminary report.
- Subject characteristics are not provided including diagnoses. Ex. Malignancies of brain may affect EEG data.
- Not clear as to why 16 subjects were started on subcutaneous midazolam infusions before becoming unconscious for difficulty swallowing.
- Large range in BIS scores at commencement of study and one hour prior to death (ex. 25 to 70 for a mean of 54). Values between 40 to 70 are associated with unconsciousness, palliative sedation, anesthesia and sleep. Commencement of study is not defined. Report states that 16 subjects were conscious prior to starting subcutaneous infusions; therefore the BIS scores should be greater than 70 if not sedated. Does not specify at what level BIS levels approach when there are the presumed pain episodes.
- Not clear how significant results are as descriptive analysis of results provided.
- Does not provide information about standardized observational measures used to assess sedation and comfort.
- Practical implementation likely limited by cost of equipment and personnel required.

## **Relevance to Palliative Care**

- Practice in palliative care is to limit interventions including monitoring (ex. vitals) and tailor interventions based on patient's comfort. However technology is advancing and use is more widely accepted and adopted in many areas of medicine.
  - Use of technology may distract from attending to patient's comfort and cause unnecessary distress to family.

- Interesting concept that we may be under (or over) recognizing symptoms. May help differentiate between behavior associated with cognitive impairment and pain.
- Potentially BIS technology can be used to enhance understanding of experience and efficacy of treatments at the end of life.
- Can be used to evaluate the current tools used to assess pain and sedation.