Toward Solving the Sedation-Assessment Conundrum: Neurofunction Monitoring

DaiWai M. Olson, PhD, RN, CCRN, FNCS[a,*],
Kyloni Phillips, MSN, APRN, ACNP-BC, CNRN[a], Carmelo Graffagnino, MD, FNCS[b]

KEYWORDS

• Sedation assessment • Cerebral function monitoring • Neurofunction monitoring
• Neurocritical care nursing

KEY POINTS

- Sedation is required to facilitate a safe environment, medical care, nursing care, and to help blunt the patient from unpleasant experiences.
- Sedation interferes with the ability of nurses and physicians to obtain a comprehensive neurologic examination.
- In conflict with the purpose of sedation, intermittent observational (subjective) sedation assessment requires that the patient be stimulated to a point of arousal.
- Neurofunction monitors are an adjunct to sedation assessment by providing continuous data regarding the patient's state of arousal without requiring stimulation.
- A more balanced approach to sedation assessment may help alleviate the unwanted effects of stopping sedation in order to obtain a neurologic examination.

INTRODUCTION

The sedation-assessment conundrum[1] describes 2 vital but opposing forces that exist when assessing critically ill patients with neurologic illness or injury. The need for sedation is in opposition to the need for a sedation-free neurologic examination (neuroexamination). Sedation may be required to facilitate ventilatory and hemodynamic stability or to maintain a safe environment for the patient and staff.[2,3] However, sedation blunts the neurologic response. Therefore, the administration of sedatives must be interrupted in order to obtain a comprehensive neuroexamination.

This article is an update of an article previously published in *Critical Care Nursing Clinics*, Volume 17, Issue 3, September 2005.
Disclosure: The authors have nothing to disclose.
[a] Department of Neurology and Neurotherapeutics, University of Texas Southwestern, 5323 Harry Hines Boulevard, Dallas, TX 75390-8897, USA; [b] Department of Neurology, Duke University, 2100 Erwin Road, Durham, NC 27705, USA
* Corresponding author.
E-mail address: DaiWai.Olson@UTSouthwestern.edu

Crit Care Nurs Clin N Am 28 (2016) 205–216
http://dx.doi.org/10.1016/j.cnc.2016.02.007 **ccnursing.theclinics.com**
0899-5885/16/$ – see front matter

Determining the best practice for optimizing sedation continues to be a subject of debate.[4,5] Stopping sedation altogether, especially abruptly, may cause worsening of the injury and is controversial.[6] In the perfect setting, all patients would receive no more and no less sedation than is required to meet their needs at any moment. Traditional methods of sedation assessment rely largely on intermittent assessments designed to determine the minimum level of stimulus required to elicit a response.[7] Neurofunction monitors have been shown to provide additional information beyond what is obtained through a subjective neuroexamination.

DEFINING THE SEDATION-ASSESSMENT CONUNDRUM

Much of what clinicians (well-intentioned health care practitioners) do in the name of good medical assessment carries the risk of defeating good medical management. For example, consider a patient with a large left hemispheric stroke who is unable to protect her own airway. The patient is orally intubated and receives continuous intravenous (IV) sedation to facilitate mechanical ventilation. However, she is also subjected to serial neuroexaminations to trend her functional status. Knowing that sedation may blunt neurologic function, and because even a small change in her level of neurologic function could result in a profound need for medical intervention, the neuroexamination is performed without sedation.

Without sedation, the patient may be confused, combative, and have long periods of ventilator noncompliance. This situation places the patient at higher risk of injury from device self-removal, hypertension, and increased intracranial pressure (ICP). This situation also places the staff at risk of physical harm from a combative patient. However, with adequate sedation it is inappropriate to assume that any change in neurologic functioning is or is not related to a reversible neurologic condition (eg, seizure, cerebral edema, cerebral ischemia). Hence, the staff face a conundrum: how best can the risks of inadequate sedation be minimized without sacrificing the ability to obtain a comprehensive neuroexamination?

SEDATION

The reasons for sedation have remained fairly well defined for more than a decade: to prevent injury, facilitate care, and blunt psychological stress.[8] When sedation is indicated, practitioners must then determine a target for the depth of sedation. A key aspect of the guidelines for sedation management is the need to set, and regularly redefine, that target. In the intensive care unit (ICU) setting, there are a variety of reasons why clinicians might choose to chemically sedate a patient.

The first reason is that the patient, if left without adequate sedation, may cause injury to the patient or to others. This situation may include removal of medically necessary monitoring or support devices as well as causing injury to the staff members caring for them while they are in a state of agitation or delirium. Another major reason for sedating a patient is to facilitate the medical goals set for the patient; for example, maintaining hemodynamic stability, increasing ventilatory compliance, and controlling ICP.[9] Critically ill patients who have dangerous neurologic instability from minimal stimulation can have lasting harmful effects if exposed to extremely painful noxious stimuli for an extended period. Proper sedation is the only answer in preventing iatrogenic induction of a harmful metabolic crisis in response to the stimulus put upon a critically ill undersedated patient.

The third reason for sedating a patient is for humanitarian intentions. Adequate sedation of critically ill patients also becomes paramount when an individual is inflicted with a barrage of noxious stimuli and invasive procedures, such as the insertion of ICP