

Sedation, Analgesia, and Neuromuscular Blockade of the Critically Ill Adult: Revised Clinical Practice Guidelines for 2002

The critically ill and injured patient is invariably anxious, confused, uncomfortable, and in pain from immobility, wounds, and indwelling tubes and is generally distressed by the adverse environs of the intensive care unit. The restlessness associated with critical illness must nearly always, by necessity, be quelled with sedation and analgesia. Clinicians must sometimes use neuromuscular blockade as a last resort. The knowledge and practice of using sedatives, analgesics, and neuromuscular receptor blocking agents originated in and migrated out of the operating theater and postanesthesia recovery units. However, critical care clinicians have discovered that the sustained use of these agents in intensive care units has consequences that are different from those seen in the immediate perioperative period.

The Society of Critical Care Medicine (SCCM) and the American College of Critical Care Medicine (ACCM) systematically reviewed, developed, and, in 1995, published clinical practice guidelines (CPGs) for sedation, analgesia, and neuromuscular blockade in the critically ill patient.^{1,2} These CPGs are the most popular and requested of the SCCM and ACCM documents because of the complexities involved in achieving appropriate levels of sedation and analgesia without inducing complications. Recommendations stemming from the 1995 CPGs, although evidence based, were limited because of the lack of prospective randomized trials comparing agents. Since that time, new evidence has emerged and ACCM believes that the CPGs require updating. ACCM and SCCM have joined forces with the American Society of Health-System Pharmacists (ASHP) to develop new CPGs on the sustained use of sedatives, analgesics, and neuromuscular blocking agents in the Critically ill adult.^{3,4} The quality of care can be improved by implementing the best known and tested standards, measuring the consequences of what we do, and reducing variability found in practice through the use of protocols. CPGs, in tandem with protocol development, can serve as educational tools, improve outcomes, and reduce costs.^{5,6} Evidence suggests that, in real practice, recommendations such as these are often not followed.⁷

“Clinical practice guidelines” are defined by the Institute of Medicine as “systematically developed statements to assist the practitioner and patient in decisions about appropriate health care for specific clinical circumstances.”⁸ Clinicians need to differentiate CPGs from a summary or review article.^{9–11} CPGs are vitally different from review articles and greatly valued for several reasons. Ideally, CPGs are created by a multidisciplinary task force of clinicians, including physicians, nurses, and pharmacists, as well as other health care professionals, under the auspices of the recommendations developed by critical evaluation of the graded scientific literature. CPGs are typi-

cally more comprehensive and far-reaching in scope than review articles and serve as virtual guiding lights by providing a useful construct of available evidence and expert decision-making against which individual decisions by clinicians and programs can be evaluated.¹²

A comprehensive literature search was performed to develop the CPGs. Published studies identified through a MEDLINE search (Sedation and Analgesia 1994–2001; Neuromuscular blocking agents 1994–2001) were reviewed, as were the reference lists of the retrieved documents and abstracts from meetings of professional associations. The literature was critically evaluated for research design, patient selection, medication dose, administration route, combination treatment, test measures, statistics, and results.

The medical literature ranged in quality from prospective randomized trials and retrospective observations to expert opinions (Table 1). Pertinent references were assigned a score to account for variance in quality. The recommendations of SCCM, ACCM, and ASHP (Joint Task Force) were graded according to the strength and quality of the scientific evidence (Table 2). A substantial effort was made by the Joint Task Force to adhere to the methodology for developing scientifically sound CPGs as prescribed by the American Medical Association, the Institute of Medicine, and the Canadian Medical Association.^{13–17} The 2002 clinical practice guidelines state the rationale, benefits, and harms of the recommendations, describe the expected health outcomes, and cite and rank the evidence. These CPGs will be reviewed and updated in three to five years.

There are major additions, besides the updating of the science, to the 2001 CPGs being issued by the Joint Task Force,^{3,4} compared with the 1995 guidelines. These guidelines are the

Table 1.
Categories of Literature Evaluation^a

Level	Type of Evidence
1	Results from a single PRCT ^b or from a meta-analysis of PRCTs
2	Results from a single PRCT or from a meta-analysis of PRCTs, in which the confidence interval for the treatment effect overlaps the minimal clinically important benefit
3	Results from nonrandomized, concurrent, cohort studies
4	Results from nonrandomized, historical, cohort studies
5	Results from case series
6	Recommendation based on expert opinion

^aAfter the authors have identified and classified their respective studies, they grade the articles on the basis of the results of the review.

^bPRCT = prospective, randomized, controlled trial.

Table 2.
Grades of Recommendations

Grade	Type of Evidence
A	Methods strong, results consistent, PRCTs ^a , no heterogeneity
B	Methods strong, results inconsistent, PRCTs, heterogeneity present
C	Methods weak, observational studies

^aPRCT = prospective, randomized, controlled trial.

most comprehensive documents in the fields of sedation, analgesia, and neuromuscular blockade of the critically ill patient. Graded recommendations are provided and summarized in list form for efficient review at the end of each document. Clear one-page algorithms are also included in each document for sedation, analgesia, and neuromuscular blockade. There is a special focus on appropriate goals for treatment and an absolute insistence on monitoring the level of sedation, pain relief, and the degree of neuromuscular blockade or weakness to better titrate pharmacologic therapy. Moreover, tapering high-dose opioids or sedatives after prolonged treatment (more than a week) is now formally recommended to avoid withdrawal symptoms. Sleep deprivation, its contribution to states of agitation and delirium, and therapeutic approaches to relieve insomnia in critically ill patients are given new and special attention. *Use of neuromuscular blockade remains a last resort* and should always be preceded by adequate sedation. It should always be discontinued as soon as possible to avoid complications. Both documents address cost-effectiveness for their respective modalities.^{3,4}

The CPGs issued for 2002 are comprehensive and based on available evidence. This field is still constrained by a dearth of high-quality, randomized, prospective trials comparing agents, monitoring techniques, and scoring scales. Critical care clinicians have a clarion mandate to understand these CPGs, to integrate this information in a manner that is appropriate for their practice setting, and to establish protocols to reduce practice variability and the complications that usually accompany variation. Once this information is applied at the bedside, there is a final obligation to measure the effects of its implementation and the ensuing consequences. The recommendations in these documents may not be appropriate for use in all clinical situations. Decisions to follow these recommendations must be based on professional judgment, level of care, individual patient circumstances, and available resources.

References

1. Shapiro BA, Warren J, Egol AB, et al. Practice parameters for intravenous analgesia and sedation for adult patients in the intensive care unit: an executive summary. *Crit Care Med.* 1995; 23:1596–600.
2. Shapiro BA, Warren J, Egol AB, et al. Practice parameters for sustained neuromuscular blockade in the adult critically ill patient: an executive summary. *Crit Care Med.* 1995; 23:1601–5.
3. Society of Critical Care Medicine and American Society of Health-System Pharmacists. Clinical practice guidelines for the sustained use of sedatives and analgesics in the critically ill adult. *Am J Health-Syst Pharm.* 2002; 59:150–78.
4. Society of Critical Care Medicine and American Society of Health-System Pharmacists. Clinical practice guidelines for sustained neuromuscular blockade in the adult critically ill patient. *Am J Health-Syst Pharm.* 2002; 59:179–95.
5. Price J, Ekleberry A, Grover A, et al. Evaluation of clinical practice guidelines on outcome of infection in patients in the surgical intensive care unit. *Crit Care Med.* 1999; 27:2118–24.
6. Luce J. Reducing the use of mechanical ventilation. *N Engl J Med.* 1996; 335:1916–7.
7. Rhoney DH, Murry KR. A national survey of the use of sedating and neuromuscular blocking agents in the intensive care unit. *Crit Care Med.* 1998; 26:A24. Abstract.
8. Institute of Medicine. Clinical practice guidelines: directions for a new program. Washington, DC: National Academy Press, 1990; 38.
9. Ostermann ME, Keenan SP, Seiferling RA, et al. Sedation in the intensive care unit: a systematic review. *JAMA.* 2000; 283:1451–9.
10. Lerch C, Park GR. Sedation and analgesia. *Br Med Bull.* 1999; 55:76–95.
11. Elliot JM, Bion JF. The use of neuromuscular blocking drugs in intensive care practice. *Acta Anaesthesiol Scand Suppl.* 1995; 106:70–82.
12. Wright J, Bibby J, Hughes J. Evidence-based practice. Guiding lights. *Health Serv J.* 1999; 109:30–1.
13. Institute of Medicine Committee to Advise the Public Health Service on Clinical Practice Guidelines. Clinical practice guidelines: directions of a new program. Washington, DC: National Academy Press; 1990.
14. Attributes to guide the development and evaluation of practice parameters. Chicago, IL: American Medical Association; 1990.
15. Quality of care program: the guidelines for Canadian clinical practice guidelines. Ottawa, Ontario: Canadian Medical Association; 1993.
16. Shaneyfelt TM, Mayo-Smith MF, Rothwangl J. Are guidelines following guidelines? The methodological quality of clinical practice guidelines in the peer-reviewed medical literature. *JAMA.* 1999; 281:1900–5.
17. Cook D, Giacomini M. The trials and tribulations of clinical practice guidelines. *JAMA.* 1999; 281:1950–1.

Developed through the Task Force of the American College of Critical Care Medicine (ACCM) of the Society of Critical Care Medicine (SCCM), in collaboration with the American Society of Health-System Pharmacists (ASHP), and in alliance with the American College of Chest Physicians. No external funding was provided.

Copyright © 2002, American Society of Health-System Pharmacists, Inc. and Society of Critical Care Medicine. All rights reserved.

The bibliographic citation for this document is as follows: Society of Critical Care Medicine and American Society of Health-System Pharmacists. Sedation, analgesia, and neuromuscular blockade of the critically ill adult: revised clinical practice guidelines for 2002. *Am J Health-Syst Pharm.* 2002; 59:147–9.