

Postoperative Pain: To Diversify Is to Satisfy

John C. Rowlingson, MD

Department of Anesthesiology, University of Virginia School of Medicine, Charlottesville, Virginia

Isn't it amazing, given the interest of the public, and the inclusion of pain management in the curriculum of an expanding number of medical specialties, that pain still is not managed effectively? Despite the proliferation of drugs, devices, and techniques, pain management remains a compelling issue in health care. Accordingly, the authors of this supplement met in December 2003, with an educational grant from Endo Pharmaceuticals, to plan this publication.

Apfelbaum et al. (1) focused attention on this reality in patients with postoperative pain. Eighty percent of postsurgical patients responding to a telephone survey reported that their pain was of moderate to severe intensity. The consequences of this undertreatment are far reaching: not only is patient satisfaction adversely affected but quality of life is greatly diminished (for the patient and those around him or her), as is the quality of the patient's clinical and functional recovery. The Joint Commission on Accreditation of Healthcare Organizations values patient satisfaction and outcome as vital statistics enough to declare that "pain is the fifth vital sign" (2). This principle, which encourages repeated assessment of pain and active treatment, conflicts severely with inadequately managed pain. These criteria raise the bar on acceptable standards for postoperative pain control. Furthermore, the clinical relevance of pain management is now brokered through so much more than the patient's visual analogue scale score at rest. How the patient fares when actively participating in standardized postoperative rehabilitation regimens is taken as the more accurate index of the quality of treatment. Postoperative pain management must therefore be dynamic (3).

What accounts for the deficits in pain management? Can they be explained by a lack of knowledge or experience, unavailability of informed personnel and/or modern equipment, a lack of genuine interest on the part of health care professionals, or are they

result of yet another mandated health system burden (that is as likely to be overlooked as dealt with)? This supplement issue on pain management does not address all of these disturbing questions, but it does provide contemporary information on the management of postoperative pain that broaches the potential knowledge deficit. Of prime importance is to avail oneself of the opportunity to incorporate new information into daily practice. Each article in this supplement offers useful material that will foster improved management of postoperative pain.

As one reads each article, notice should be taken as to how a particular modality meets the goals and demands of acute pain management. The primary emphasis of acute pain treatment must be to decrease the pain as much as possible (ideally, to zero). This must be achieved, however, with reasonable cost, safety for the patient, and exclusive of drug- and treatment-related side effects. Given the enormous individual variation in need (both real and perceived) and patient response, it is obvious that an informed, flexible attitude is necessary to choose among the options available to achieve the best possible clinical result time after time.

Patient-controlled analgesia (PCA) is the original advanced pain therapy. The classic concept was that small doses of IV opioids, given frequently, will have a more consistent and enduring effect on postoperative pain than large, single doses that volley the patient between intense pain and drug-induced stupor. Grass (4) presents a broader, more enlightened concept of PCA, noting that any drug by any route that the patient controls is PCA (therefore, patient-controlled epidural analgesia and patient-controlled regional analgesia are included). There is an excellent presentation of the rationale for the PCA concept based on an intellectual and clinical evolution. Grass (4) offers practical guidelines for the clinical use of PCA, highlights the side effects and their management, reminds the reader of the potential for adverse events, provides contemporary monitoring recommendations, and delineates honestly and accurately the limitations of the technique. Though some of this information may be basic for many, the educational

Financial support for preparing this editorial was provided by an unrestricted educational grant from Endo Pharmaceuticals, Chadds Ford, Pennsylvania.

Accepted for publication June 22, 2005.

Address correspondence and reprint requests to John C. Rowlingson, MD, Department of Anesthesiology, University of Virginia School of Medicine, P.O. Box 800710, Charlottesville, VA 22908-0710. Address electronic mail to jcr3t@virginia.edu.

reinforcement is worthwhile, and the contemporary references are supportive.

That we as anesthesiologists be very familiar with the drugs used in PCA therapy becomes crucial as we necessarily assume a greater role in the management of postoperative pain. We are more likely than other pain medicine physicians to apply what Grass says: "...for PCA to be successful, the demand dose should produce appreciable analgesia with a single demand." This principle becomes essential when providing care to patients who come to the operating room already receiving chronic opioids (5). Although the routine use of basal rates in opioid-naïve patients is not supported by evidence, in the opioid-tolerant patient, more than 80% of the total daily opioid dose should be provided in the basal rate, as endorsed by Grass, as compared with no more than 50% in the opioid-naïve patient.

A significant factor raised by Grass is assessing whether the patient actually wants the control imparted by PCA. This fundamental point is overlooked in the generic provision of what can be a very versatile therapy. Moreover, we are reminded that the benefits of PCA can be mitigated by fear, confusion, lack of understanding, and learned helplessness, such that others (nurses, family members), assume control and bypass an inherent safety feature of *patient-controlled analgesia*.

As anesthesiologists, we are all about safety. Grass (4) lists patient- and disease-related risk factors as well as those associated with the technique and the equipment for PCA that compel the clinician to work with his/her institution to create a safe system for PCA use. This is especially true as research continues to define the optimal contents of the PCA infusion, including identifying the most effective combination of drugs. To this end, Grass (4) advises that health care professionals must form a coalition with device manufacturers, pharmacists, and hospitals to create standardization of PCA therapy that maximizes safety and promotes its widest clinical application. PCA will remain a valuable therapy for years to come.

For anesthesiologists the most common form of postoperative pain intervention is epidural analgesia. Viscusi (6) states in his brief summary of this topic that literature review reveals only a 33% improvement in analgesia over IV opioids, yet consistently rates epidural analgesia as superior. The reasons for this modest benefit rating include breaks in service resulting from staff actions and equipment malfunctions, the need for patient re-evaluation and treatment alteration, drug-related side effects and/or physiologic effects, such as hypotension or numbness, that limit increasing the therapy, and the need for other medically necessary treatments such as thromboprophylaxis. As Viscusi (6) points out, the academic evaluation of epidural analgesia is impaired by differences in timing of the epidural administration, the duration of treatment, the anatomic location of the catheter in

relationship to the incision, and the composition of the infusion.

The brevity of the epidural analgesia discussion belies an enormous literature on the topic. The "emerging technique" presented is a liposomal encapsulated sustained release morphine preparation that has been approved by the Food and Drug Administration for lumbar epidural injection (DepoDur). Viscusi (6) tabulates the benefits of this therapeutic modality: a single (preoperative) injection; no need for dose adjustments, as consistent analgesia is provided for up to 48 h; less need for ancillary analgesic therapy; no pump, pole, or catheter to interfere with patient movement; no hypotension or local anesthetic side effects; and no interference with concurrent anticoagulant therapy. What is not presented is a vast array of clinical studies that document the clinical utility of this new treatment or the incidence of side effects. How DepoDur stacks up compared to more conventional treatment and what specific patients are optimal for this treatment is not yet well characterized, but the potential contribution of this modality is exciting.

A derivation of epidural analgesia is intrathecal (IT) drug delivery for postoperative analgesia. It is clear that an appreciation for the anatomy, physiology, and pharmacology of the spinal cord has greatly expanded since 1979, when the discovery of the opioid receptors there fostered perispinal application of opioid drugs. The original concept was to use a "topical," localized application of an opioid to provide profound analgesia because of its proximity to the receptors while requiring only small doses such that the side effects would be minimal. As a result of venous uptake providing drug access to the systemic circulation and cerebrospinal fluid migration, typical opioid side effects still occur. As noted by Rathmell et al. (7), the primary risk factors for the most concerning side effect, respiratory depression, are patient age over 65 yr, large doses of IT opioid or the use of any dose in an opioid-naïve patient, and the concurrent use of other sedative drugs. The exact incidence of this concerning opioid side effect is difficult to determine, given the various definitions of respiratory depression used in clinical studies.

Understanding the neuropharmacology of the spinal cord gives us the incredible opportunity to base clinical management on identified mechanisms of pain transmission, drug site, and mechanisms of action. What we do not know yet (and Rathmell does not discuss) is whether single-drug therapy is better than combination therapy for achieving the goals of pain management: enhanced efficacy with minimal side effects. Thus, extensive research continues with adjuncts such as clonidine, neostigmine, and adenosine. The discussion of drug-by-drug mechanisms of action included by Rathmell et al. reminds us of why we are treating patients as we are and what each drug is

intended to provide. In view of our growing awareness about tissue toxicity of medications, we must respect the potential safety issues with approved and off-label uses of perispinal drugs (8,9). We do not want to compromise the versatility of perispinal opioids ranging from walking labor epidurals to surgical anesthesia because these drugs provide better quality surgical blocks, rapid neurologic recovery, and early discharge with more comfort, as detailed by Rathmell et al.

What if we did not have to use opioids at all in postoperative pain management? Could we prevent nausea, vomiting, constipation, urinary retention, respiratory depression, and/or sedation, especially as these consequences clearly downgrade patient satisfaction and can result in unanticipated admission? This question becomes extremely pertinent when White (10) reminds us that there are more painful and more extensive surgical procedures being performed on an ambulatory basis. The use of PCA and continuous perispinal analgesic techniques are restricted in this growing population of patients. Yet, these patients demand (and deserve) effective analgesia with techniques that spare opioids, enhance outcome, and are safe and manageable at home. White advocates for "balanced analgesia"—a generic term that promotes the coordinated application of a number of treatment modalities in a program that aims to maximize pain reduction and minimize treatment-related side effects. He tabulates, but does not critique, the tools available; local anesthetic infiltration of incisions and single-shot or continuous peripheral nerve blocks, nonsteroidal antiinflammatory drugs, selective cyclooxygenase (COX)-II inhibitors, acetaminophen, ketamine, α -2 agonists, and nonpharmacologic techniques, such as electroanalgesia. This extensive cascade of options is superbly documented by a generous, contemporary bibliography. Surprisingly, there is no inclusion of Lidoderm and other topical analgesic treatments, acupuncture, or pain psychology (11–13).

That said, White's article provides some significant caveats. As with the perispinal application of medications, we should be cautious about the off-label uses of non-opioid drugs, i.e., preoperative gabapentin (14). We must respect the reality that non-opioid treatments, no matter how zealously applied, in patients who come to the operating room arena receiving stable doses of opioids, can benefit from balanced analgesia provided that the basal opioid needs are also met. The non-opioid treatments reduce postoperative pain but cannot restore an opioid deficit in patients on chronic therapy. In support of the use of opioid-sparing therapy, White documents that both pre- and postoperative administration of selective COX-II inhibitor drugs improves the quality of recovery and enhances patient satisfaction. These are laudable goals but the evidence that these selective drugs have significant advantages over the more informed use of

nonselective drugs is minimal. Moreover, White's article cannot answer the question as to whether the data about the chronic use of the selective drugs contributing to heart disease have any relevance to the anticipated 3–7 day use in the perioperative period.

What is not included in any of the discussions in these articles is the impending nature (for some, really a continuation of responsibility already taken) of our greatly expanded involvement in postoperative pain management, such as for patients taking home more advanced pain management therapy (15). I think a shift in ideology will occur as the non-opioid treatments enumerated by White are more routinely deployed. We will need to "maintain an available status" more routinely and expect to be called to assist with management issues in patients away from the hospital. We will need to be innovative in our use of all available modalities for postoperative pain management, as the diversity offered thereby will enhance the effectiveness of treatment. Another unintentional consequence of this model of pain care will be the transfer of new responsibilities to the patient and his or her caregivers. This begs the question as to whether "we" will need to more thoroughly assess the quality of this component of the patient's postoperative care system. Will pain psychologists have an expanded role in evaluating this important aspect of complete patient care (13)?

All of these articles conclude with the view that "more research is needed" to assess, scientifically, the impact of a technique, a drug or drug combination, and/or a device on postoperative pain management. The necessary goals of quality pain management, earlier resumption of normal body functions, participation in activities of daily living, and complete recovery, must be maintained with high priority. Thus, all authors advocate for the ancillary inclusion of opioid-sparing techniques and a rapid treatment response to side effects. All authors champion the use of multimodal approaches to pain (to diversify is, indeed, to satisfy). They imply that continuous education of staff and patients will be vital. To this end, the authors have provided sufficient bibliographies to assist those interested in respecting the necessary historical references as a background for the more abundant contemporary citations that guide current therapy.

These articles update their topics in relationship to postoperative pain management more than they provide a futuristic view. They do not tell us when to use a particular modality. One can envision, though, the demands on the anesthesiologist for self-education and subsequent sharing of what one knows with patients and families. We still need more data on the risks and benefits of most therapies, especially as they are more broadly used and as we continue to be innovative in their clinical applications. Our care needs to be coupled with an eye towards medical economics, and this reality is not dealt with here.

Perhaps we will be smarter in the future. If we create health dollar savings by the care we provide, there should be a mechanism by which some of the savings are recycled to fund outcomes research. This may be best left to economists and administrators. What is left to us are these articles that serve as a new platform on which clinical practice will be based and from which future research should be launched.

References

1. Apfelbaum JL, Chen C, Mehta SS, Gan TJ. Postoperative pain experience: Results from a national survey suggest postoperative pain continues to be undermanaged. *Anesth Analg* 2003; 97:534–40.
2. Joint Commission on Accreditation of Healthcare Organizations. *Hospital Accreditation Standards*, 2001.
3. Ready LB. Acute postoperative pain. In: Miller RD, ed. *Anesthesia*. Philadelphia: Churchill Livingstone, 2000:2323–2350.
4. Grass JA. Patient-controlled analgesia. *Anesth Analg* 2005; 101(Suppl):S44–S56.
5. Mitra S, Sinatra RS. Perioperative management of acute pain in the opioid-dependent patient. *Anesthesiology* 2004;101:212–27.
6. Viscusi ER. Emerging techniques in the management of acute pain: epidural analgesia. *Anesth Analg* 2005;101(Suppl): S23–S29.
7. Rathmell JP, Lair TR, Nauman B. The role of intrathecal drugs in the treatment of acute pain. *Anesth Analg* 2005;101(Suppl): S30–S43.
8. Zaric D, Christiansen C, Pace NL, Punjasawadwong Y. Transient neurologic symptoms after spinal anesthesia with lidocaine versus other local anesthetics: a systematic review of randomized, controlled trials. *Anesth Analg* 2005;100:1811–6.
9. Yaksh TL, Allen JW. Preclinical insights into the implementation of intrathecal midazolam: a cautionary tale. *Anesth Analg* 2004; 98:1509–11.
10. White PF. The changing role of non-opioid analgesic techniques in the management of postoperative pain. *Anesth Analg* 2005; 101(Suppl):S5–S22.
11. Galer BS, Gammaitoni AR. Analgesic pharmacology. In: Wallace MS, Staats PS, eds. *Pain medicine and management: just the facts*. New York: McGraw-Hill, 2005:37–45.
12. Kotani N, Hashimoto H, Sato Y, et al. Preoperative intradermal acupuncture reduces postoperative pain, nausea and vomiting, analgesic requirement, and sympathoadrenal responses. *Anesthesiology* 2001;95:349–56.
13. Sinatra RS. Acute pain management and acute pain services. In: Cousins MJ, Bridenbaugh PO, eds. *Neural blockade in clinical anesthesia and management of pain*, 3rd ed. Philadelphia: Lippincott-Raven, 1998:793–836.
14. Dahl JB, Mathiesen O, Moiniche S. “Protective premedication”: an option with gabapentin and related drugs? *Acta Anaesthesiol Scand* 2004;48:1130–6.
15. Ilfeld BM, Enneking FK. Continuous peripheral nerve blocks at home: a review. *Anesth Analg* 2005;100:1822–33.