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The Expanding Role of Multimodal Analgesia in Acute Perioperative Pain Management

Edward R. Mariano, MD, MAS (Clinical Research)[a,b,*], Brett Miller, MD[a,b], Francis V. Salinas, MD[c]

[a]Anesthesiology and Perioperative Care Service, Veterans Affairs Palo Alto Health Care System, 3801 Miranda Avenue (112A), Palo Alto, CA 94304, USA; [b]Department of Anesthesiology, Perioperative and Pain Medicine, Stanford University School of Medicine, 300 Pasteur Drive, Room H3580, Stanford, CA 94305, USA; [c]Department of Anesthesiology, Virginia Mason Medical Center, 1100 Ninth Avenue, Seattle, WA 98101, USA

Keywords

• Multimodal analgesia • Regional anesthesia • Total knee replacement
• Acute pain management • Postoperative pain

Key points

- Management of acute perioperative pain featuring multimodal analgesia offers many benefits for the patient, health care team, anesthesiology practice, and hospital. Essential elements of a multimodal analgesic regimen include systemic medications and local anesthetics, in the form of regional anesthesia techniques, local infiltration analgesia, or both.
- Opioid analgesics will continue to play an important role in postoperative pain management, but use should be minimized to avoid untoward side effects, especially in patients with complicated comorbidities.
- Nonopioid systemic analgesics such as nonsteroidal anti-inflammatory drugs and acetaminophen should be included in any multimodal analgesic regimen unless contraindicated.
- Regional anesthesia techniques offer unique benefits in target-specific analgesia and opioid sparing, but specialized training and other resources may be necessary, especially if advanced techniques such as ultrasound guidance and continuous peripheral nerve blockade are to be used.

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*Corresponding author. *E-mail address*: emariano@stanford.edu

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- Careful coordination and effective communication among all members of the health care team are necessary to minimize the potential complications of each technique and maximize the value added to the surgical experience.

INTRODUCTION

Among Medicare beneficiaries in the United States from 1991 to 2010, the volume of primary total knee arthroplasty (TKA) procedures increased by 161.5%, with revision TKA procedures increasing by 105.9% [1]. By 2030, projected estimates for primary and revision TKA will be 3.48 million and 268,200 per year, respectively [2]. The average hospitalization cost for a patient undergoing TKA is $13,200 (not including the cost of professional fees) [3], which adds up to billions of dollars spent on the perioperative care of TKA patients annually [4]. Although many surgical procedures and patient populations may benefit from standardized clinical pathways [5,6], the joint-replacement population has been extensively studied and serves as a good example of multidisciplinary cooperation in patient care [7]. The use of integrated multimodal analgesic pathways for joint-replacement patients, incorporating regional anesthesia techniques, has been shown to shorten time to recovery and reduce postoperative adverse events [8]; in particular, continuous peripheral nerve blocks may reduce time to achievement of discharge eligibility for TKA patients [9,10], with potential cost savings [4].

ELEMENTS OF MULTIMODAL ANALGESIA

The biopsychosocial pain experience comprises a multitude of ascending and descending pathways within a complex network of extracellular and intracellular messaging systems. Multimodal analgesia is designed to approach more than 1 target at a time, exploiting additive and perhaps synergistic effects, thereby maximizing analgesic efficacy while simultaneously minimizing the adverse side effects of any single analgesic agent [11,12]. Designing a multimodal analgesic regimen begins with first evaluating the patient scheduled for surgery. Although elements of the regimen are standardized, the most effective clinical analgesic pathways will offer options for individualization based on each patient's comorbidities, preoperative analgesics and other concurrent therapies, and prior pain experiences associated with surgery.

Opioid analgesics

As arguably one of the most ancient pharmaceutical classes [13], it is no surprise that opioids remain entrenched within postsurgical pain therapy. Opioids are ubiquitous in pain management; hence the efficacy of new or alternative treatments is often compared in terms of morphine dosage equivalents. However, as a result of their undesirable side effects (eg, respiratory depression, lethargy, constipation, nausea, vomiting), opioids clearly are not the cure-all for