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SOCIETY FOR NEUROSCIENCE
IN ANESTHESIOLOGY AND CRITICAL CARE

ARTICLE OF THE MONTH

Opioid Alternatives in Spine Surgery: A Narrative Review

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Welcome to the SNACC Article of the month for May 2022. This month our commentary is provided by Dr. Shobana Rajan. Dr. Rajan has been practicing neuroanesthesiology for about 16 years. Her experience includes working in India at Apollo hospitals as well as in the USA at the Cleveland Clinic. Recently, she moved to UT health Houston McGovern Medical School and is currently appointed as Associate Professor and Director of Neuroanesthesia Education. Her prior experiences include working as Vice Chair of Resident Education at Allegheny General Hospital. She has been actively involved with both research and education in neuroanesthesiology. On the research front, she has several publications on awake craniotomy, dexmedetomidine, multimodal analgesia for spine surgery, etc. On the education front, she has been active in the area of creating online learning management systems for resident education and online interactive quizzing. She is a board member at the Society for Neuroanesthesiology and Critical Care where she chairs the trainee engagement committee, whose vision is opening minds to neuroanesthesia. She is part of the team that publishes quizzes, creates podcasts, etc., at SNACC. She is also an active member of the Society for Education in Anesthesia. In addition, she is a council member for the International Council on Perioperative Neuroscience Training (ICPNT) which hopes to unify and standardize neuroanesthesia fellowships worldwide. She is the editor of two problem-based anesthesiology books and has authored several book chapters.

We are happy to welcome you all back to the SNACC Article of the Month for May.

As always, we encourage our readers' input on this topic on the SNACC [Twitter](#) feed, or on [Facebook](#).

Nina Schlömerkemper, MD, Shilpa Rao, MD; Amie Hoefnagel, MD; and Oana Maties, MD

Commentary

Review by Arun George, Shobana Rajan

Opioid Alternatives in Spine Surgery: A Narrative Review

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This article ardently describes various opioid sparing multimodal analgesic regimens for spine surgery. While there can be no regimen where one size fits all in spine surgery, these opioid alternative options are discussed in a structured manner. Opioids have been associated with multiple well known side effects including nausea, vomiting, pruritus, urinary retention, gastrointestinal disturbances, altered mental status, hyperalgesia, and tolerance leading to subsequent dependence with persistent opioid usage. Hence the role of alternative multimodal analgesic strategies with non-opioid medications targeting different receptors are useful to combat perioperative pain.

Four authors (S.R., J.D., R.A., A.K.) independently searched PubMed, Web of Sciences, and Scopus for articles published after January 1990, focusing on medical subject headings (MeSH) and the following keywords: non-opioid analgesia for spine surgery, epidural analgesia for spine surgery, intrathecal analgesia for spine surgery, neuraxial analgesia for spine surgery, ketamine, dexmedetomidine, non-steroidal anti-inflammatory drugs (NSAIDs), regional analgesia for spine surgery, and liposomal bupivacaine in spine surgery.

After exclusion of nonrandomized studies, case reports, and any studies which utilized opioid-based analgesia exclusively, 67 manuscripts reporting prospective studies or retrospective studies with propensity matching were identified. These form the basis of the evidence for nonopioid analgesic regimens for spine surgery presented in this narrative review (Fig.1).

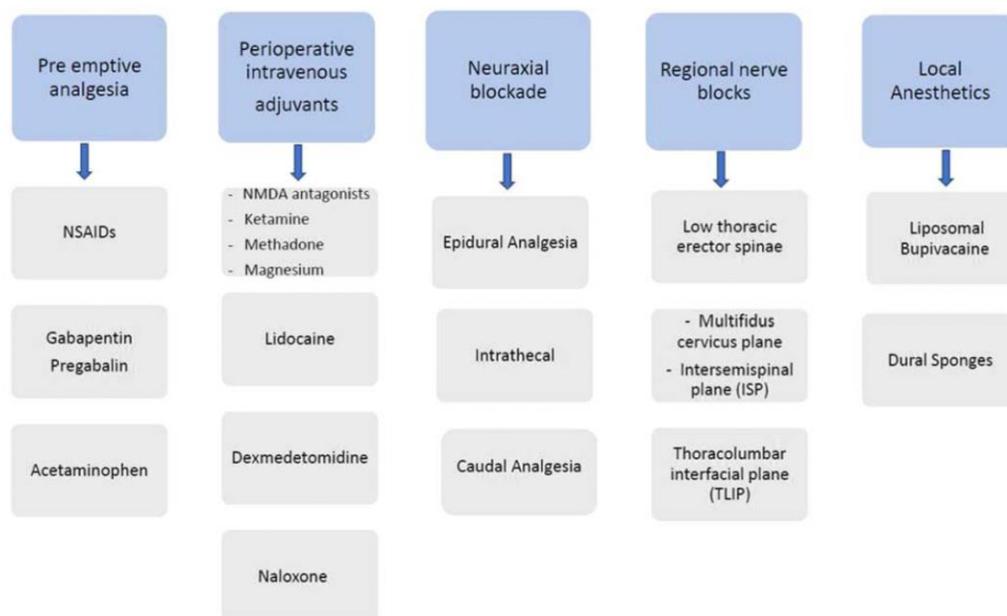


FIGURE 1. Overview of opioid alternatives in spine surgery. NMDA indicates N-methyl-D-aspartate; NSAID, nonsteroidal anti-inflammatory drug.

Pre-emptive analgesia is administered before the onset of pain to prevent central sensitization. These medications include acetaminophen, Cox-2 inhibitors and gabapentinoids. A recent meta-analysis involving gabapentoids was not very encouraging as it did not show any meaningful reduction in pain but showed that it alleviated side effects such as dizziness in the postoperative period. Acetaminophen, which is a COX-2 inhibitor with minimal side effects remains favored and is regularly used to reduce opioid consumption. It was found that NSAID's like ketorolac were best avoided due to its deleterious effects on spinal fusion however the result of a meta-analysis found that ketorolac used to an extent lesser than 2 days or a dose not exceeding 120mg/day prevented this side effect.

The perioperative intravenous adjuvant group consists of NMDA antagonists, lidocaine and dexmedetomidine. Ketamine which has been in the limelight for some time now is somewhat controversial. While some studies show a beneficial effect in terms of pain management with ketamine, there are some who would argue this effectively such as a recent double blind randomized control study by Maheshwari et al which did not show any benefit of using ketamine. IV methadone, another NMDA antagonist useful in patients with opioid addiction has been associated with postoperative respiratory depression and requires appropriate monitoring. Dexmedetomidine has been extensively studied and has shown to be effective in reducing intraoperative opioid requirements but was not found to be significant in opioid sparing postoperatively.

A few studies have shown that neuraxial blockade in the form of patient controlled epidural analgesia (PCEA) has a favorable effect in reducing overall opioid requirements. Regional blocks,

especially erector spinae block is gaining popularity with two recent studies demonstrating reduced 24-hour opioid requirements and increased patient satisfaction.

These studies are clearly a call to rethink the concept of systemic multimodal analgesia with goals to reduce opioids perioperatively and to accelerate recovery after major spine surgery. Strategies should be patient specific and include identification of risk factors for pain, multimodal analgesia and minimizing opioids in the perioperative period.