

Editorial Commentary: The Evolution of Regional Anesthesia in Arthroscopic Rotator Cuff Repair: From Throbbing Shoulders to Paralyzed Diaphragms



Evan M. Miller, M.D., Danielle Rider, B.S., and Brian R. Waterman, M.D., Associate Editor

Abstract: Rotator cuff repair may result in significant postoperative pain. Although opioids were once the gold standard, addiction and other side effects are of significant concern. Nonsteroidal anti-inflammatory drugs reduce pain, sleep disturbance, and need for opioids, but they may impair soft tissue healing. The use of gabapentinoids is equivocal. Intralesional analgesia carries a risk of glenohumeral chondrolysis. Cryotherapy is beneficial, but it is often not covered by insurance companies. Suprascapular nerve block addresses innervation of only 70% versus interscalene block, but the latter has a higher incidence of unintended, temporary motor and sensory deficits of the upper extremity and hemidiaphragmatic paresis, despite similar pain scores. Although neurodeficits and diaphragmatic hemiparesis resolve by 3 weeks, temporary complications affect length of hospital stay, initiation of physical therapy, and patient satisfaction. These variables contribute to the challenge of postoperative pain control amid a growing wave of modalities aimed at improving the extent and duration of patient-focused analgesia, especially the application of continuous block infusions.

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Perioperative and postoperative analgesia following arthroscopic rotator cuff repair has undergone a clear paradigm shift in light of the opioid epidemic. Despite surgical intervention transitioning from open to arthroscopic repair and from inpatient to ambulatory outpatient facilities, postoperative pain control remains a challenge, especially during the first 24-72 hours. The response to the opioid crisis has resulted in multiple analgesia modalities, from nonopioid oral medications to intravenous patient-controlled analgesia. Peripheral nerve blocks have also quickly become part of the analgesia arsenal used in shoulder surgery, where they

are administered as a single injection or given in a continuous infusion through an indwelling catheter.¹

In their article entitled “Postoperative Pain Control After Arthroscopic Rotator Cuff Repair: Arthroscopy-Guided Continuous Suprascapular Nerve Block Versus Ultrasound-Guided Continuous Interscalene Block,”² Kim, Kim, Lee, Lee, Park, Kim, Jeon, Koh, and Koh demonstrate that continuous suprascapular nerve blocks are not inferior to continuous interscalene blocks in regard to adequate pain control up to 48 hours postoperatively. Although suprascapular blocks resulted in statistically longer operative times of ~20 minutes, only 21% (8/38) and 3% (1/38) of patients experienced transient motor/sensory neurological deficits and hemidiaphragmatic paresis, respectively, as compared to 85% (32/38) and 76% (29/38) among those patients that had a continuous interscalene block.

The analgesic protocol used in their study is reflective of the past decade of research on multimodal analgesia for arthroscopic rotator cuff repair. Although opioids were at one point single-handedly the gold standard, a multitude of studies over the past 20 years have explored oral therapeutic options, intravenous administration, and other conservative measures, such as cryotherapy and cognitive and behavioral exercises. Nonsteroidal anti-inflammatory drugs (NSAIDs) have been associated with reduced pain, less sleep

Wake Forest Baptist Health (E.M.M., D.R.)

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disturbance, and a reduction in the need for opioids, despite their potential adverse risks of impaired soft tissue healing and disorganized collagen fiber reorganization that may be detrimental to tendinous mechanical properties.³⁻⁵ Yet, the use of gabapentinoids, as was employed in this study's standard regimen, remains equivocal.⁶ Despite its frequent use in neuropathic pain, few studies on gabapentin have demonstrated a clear and consistent benefit, even though there is evidence for minimal differences in its side effect profile when compared to placebo. Non-opioid options have found more success than intraleisional analgesia, which carries a risk of glenohumeral chondrolysis with higher doses and rates of intra-articular transfusion.⁷ As a result, continuous intra-articular (and possibly periarticular) infusion pumps are not advised for contemporary use. Other studies have employed cryotherapy, which shows promise with reduced pain, swelling, and opioid use, but it is often not covered by insurance companies.⁸

The use of nerve blocks for regional anesthesia has truly engendered a shift in the analgesic continuum for arthroscopic shoulder surgery. In early stages of implementation of this modality, two important questions quickly became apparent. Do we attempt to target all innervations to the shoulder joint at the expense of inadvertently targeting other areas of the upper extremity? Or, do we selectively identify a specific neural branch, such as the suprascapular nerve, which provides sensory fibers to only 70% of the shoulder?⁹ If we are able to target the correct area for adequate analgesia, how long during the postoperative setting should this continue prior to starting other modalities? Although the interscalene and suprascapular nerve blocks are effective in the immediate perioperative period, rebound pain may often occur within the first 10-12 hours after surgery.^{10,11} Continuous blocks during this period further combat the concept of rebound pain prior to requiring breakthrough medication, but they may also lead to new or prolonged neurologic deficits.¹²

Kim et al.² highlight the temporary risks of perioperative and postoperative analgesia that are often overlooked. Although postoperative nausea and vomiting are the adverse effects most commonly cited with current standardized regimen, little attention is paid to the potential adverse effects of motor or sensory deficits for certain modes of analgesia, especially nerve blocks. Interestingly, before the term "opioid crisis" became part of the medical vernacular, earlier studies in anesthesia regarding other postoperative analgesia options were driven more by the concern for nausea and sedation associated with opioids rather than the risk of abuse or dependency.¹³ The adverse neurologic effects of a nerve block, especially an interscalene block, were

described by Kim et al. to include temporal brachial partial palsy and phrenic nerve palsy. While rare, persistent phrenic palsy following an interscalene block has been reported in patients with significant pulmonary comorbidities and has led to chronic respiratory insufficiency.¹⁴

Despite the similar pain scores reported up to 48 hours postoperatively between the interscalene and suprascapular block groups, it would be premature to suggest that a suprascapular block be used every time for every patient undergoing arthroscopic rotator cuff repair. Exclusion criteria for the present study involved patient characteristics that have been shown to confer a higher risk for inadequate postoperative pain control, including having a body mass index >30 kg/m², psychological problems, and cervical neuropathy.¹⁵ Additionally, patients included in the study were not randomized, and prior narcotic use was not described. Yet, Kim et al. should be commended for highlighting the potential consequences for neurologic complications associated with continuous nerve blocks, especially the interscalene block, with outpatient surgery and same-day hospital discharge. These factors may be considered in patient selection regarding pulmonary comorbidities and preoperative education, a growing and evolving part of the analgesic process that has been increasingly supported in the recent primary literature. Although all reported neurodeficits and diaphragmatic hemiparesis resolved by 3 weeks, these temporary complications may have important repercussions on the length of hospital stay, initiation, and participation in physical therapy, perioperative pain control, and overall patient satisfaction. These variables further contribute to the evolving challenge of postoperative pain control amid a growing wave of modalities aimed at improving the extent and duration of patient-focused analgesia, especially in the general application of continuous block infusions to other rotator cuff surgeries and other complex open and arthroscopic shoulder care.

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