



AAOS Now

Published 9/15/2023 | Jeffrey Berg, MD, FAAOS; Aaron Carter, MD, FAAOS; Thomas Fleeter, MD, MBA, FAAOS; Ryan Miyamoto, MD, FAAOS

Clinical

Shoulder & Elbow

Perioperative Considerations in Shoulder Replacement Surgery

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Editor's note: This article is the final installment of a three-part series on advancements in shoulder replacement surgery. [Part one](#), published in the June edition of AAOS Now, described advancements in anatomical shoulder replacement; [part two](#),

published in July, covered reverse shoulder replacement.

The final section of this three-part series describes a range of considerations in the perioperative management of patients undergoing shoulder arthroplasty. Advancements in pain management, infection minimization, and blood-loss reduction have helped to improve surgical outcomes.

Perioperative pain management

Numerous studies have identified that multimodal pain-management strategies can reduce postoperative opioid use. A balanced approach of combining preoperative medication, regional blockade, local anesthetics, NSAIDs, acetaminophen, and other modalities has reduced the necessity of opioids as standalone therapy for postoperative pain control.

Preoperative IV dexamethasone has been shown to reduce nausea and postoperative opioid use within the first 24 hours after surgery. A single shot or continuous interscalene nerve block has also been shown to reduce postoperative pain and opioid use within the first 24 to 48 hours postoperatively. Management of these blocks in an inpatient or outpatient setting has also allowed for outpatient total joint arthroplasty to become a more viable option for many patients. Liposomal bupivacaine has also been studied as a medication for use in interscalene nerve blocks or applied locally in conjunction with interscalene blocks utilizing other anesthetics. The authors note that, due to risk of associated complications, liposomal bupivacaine may be held in patients with potential pulmonary compromise or chronic pulmonary disease.

Opioid-sparing pain-medication protocols have also demonstrated efficacy in reducing postoperative pain and opioid consumption. These protocols typically include an NSAID and acetaminophen in addition to limited opioid use. Home cryotherapy devices versus ice have also been employed in these protocols to address postoperative pain.

Infection and blood-loss management

There is a range of new considerations to reduce postoperative infection. Specifically, *Cutibacterium acnes* (*C. acnes*, of the family *Propionibacteriaceae*) is a concern in open shoulder surgery due to its possible introduction into the

surgical site, as *C. acnes* is part of normal skin flora present around the shoulder. Due to low virulence and difficulty detecting *C. acnes*, studies have focused on decreasing risk of infection at time of primary surgery. Reductions in bacterial loads have been demonstrated with preoperative wash, IV antibiotic prophylaxis, and intraoperative subcutaneous treatments.

Application of a preoperative home wash with 5 percent benzoyl peroxide prior to surgery has been shown to reduce *C. acnes* growth at the level of the skin and wound closure. Preoperative IV antibiotic treatment with cefazolin has also demonstrated greater efficacy regarding infection prophylaxis than other antibiotics such as vancomycin. At the time of skin prep, chlorhexidine gluconate has demonstrated the most efficacy in reducing bacteria from the shoulder region.

Deeper treatments involving the level of subcutaneous tissue have also been studied. Introduction of povidone-iodine solution into the subcutaneous tissues after skin incision has been shown to decrease the *C. acnes* growth rate in intraoperative culture swabs of deep tissue and the surrounding surgical field. Other intraoperative deep-tissue treatments, including topical vancomycin powder prior to deltopectoral interval closure and deep-tissue lavage, are also under consideration.

Methods to reduce perioperative blood loss have now employed antifibrinolytic agents such as tranexamic acid (TXA). Literature on the use of TXA in total hip and knee arthroplasty demonstrates reduced perioperative blood loss and lower transfusion rates without increased rate of thromboembolism or other complications. Similarly, emerging studies are demonstrating that administration of IV or topical TXA acid is a safe and effective agent for reducing perioperative blood loss in shoulder arthroplasty.

Postoperative considerations

Optimal postoperative rehabilitation protocols for anatomic or reverse total shoulder arthroplasty are also a subject of discussion. There remains heterogeneity in the literature regarding the role of formal physical therapy, duration of sling use, as well as range of motion and strength parameters. In

addition, there is more evidence to support shoulder arthroplasty as safe and effective in the outpatient setting with proper patient selection.

There is also a growing trend toward outpatient shoulder replacement. Advances in pain management, anesthesia, and perioperative blood-loss reduction have made it possible to discharge increasing numbers of patients on the same day as surgery. There are several factors to consider in same-day surgery, including the overall health of the patient, the presence of another responsible adult in the home, and the willingness of the patient to be discharged. It is never wrong to keep a patient overnight, but with preoperative education and improved patient selection, increasing numbers of patients can be discharged on the same day as surgery. This is a trend that will likely progress as the perioperative management of these patients continues to become more refined.

In conclusion, there are various considerations in the perioperative management of shoulder replacement surgery. Collective efforts to decrease pain and lower infection and complication rates will lead to improved surgical outcomes and patient satisfaction.

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