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Original Article

Subacromial pain pump use is safe after arthroscopic rotator cuff repair

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ABSTRACT

Background: Intra-articular pain pumps with local anesthetics have been implicated as a potential cause of post-arthroscopic glenohumeral chondrolysis (PAGCL) of the shoulder. In short-term studies, subacromial pain pump use is effective and safe without association with PAGCL. Patients with full thickness rotator cuff tears may be at high risk of PAGCL given disruption of the tendinous integrity which may allow intra-articular infusion of local anesthetics. We hypothesized that subacromial pain pump use after arthroscopic rotator cuff repair would not result in PAGCL.

Methods: We analyzed a consecutive series of 34 patients treated with subacromial pain pump placement after arthroscopic rotator cuff repair and subacromial decompression for full thickness rotator cuff tears. Thirty patients met inclusion criteria of greater than 12-month follow-up with an average age of 51 (28–68). All patients had the subacromial pain pumps placed under arthroscopic visualization and infused 0.25% bupivacaine without epinephrine at 2 cc/h for 48 h. All patients had clinical examinations and radiographic studies performed more than 1 year after surgery.

Results: Patients had an average rotator cuff size of 1.6 cm and fixation was performed with bioabsorbable suture anchors. All patients had at least 150° of abduction and forward flexion at latest follow-up without palpable crepitus and no patients had any evidence of joint space narrowing on post-operative radiographs.

Conclusion: Subacromial pain pump use after arthroscopic rotator cuff repair is safe. Despite probable lack of a water-tight seal from repair, there were no cases of PAGCL.

Level of evidence: IV.

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1. Introduction

Pain modalities, along with advances in arthroscopy, have allowed many operations to be performed as ambulatory surgery. In addition to the use of oral opiate and pain medications, local anesthetics injections have also been utilized. Alternatively, regional anesthesia can be performed as a single injection nerve block or with a pain pump. Trained anesthesiologists are necessary to administer these interscalene regional nerve blocks in the shoulder and are not always available.[1] Pain pumps administering local anesthetic medications have been used in both the knee and shoulder for post-operative pain control that allow the patient to continue to receive the pain medication through a self-contained unit after discharge home. These units are self-contained storage and delivery systems and typically are filled with lidocaine or bupivacaine. Pain pumps placed in the intra-articular space of both the shoulder and knee have recently been associated with post-arthroscopic glenohumeral chondrolysis (PAGCL).[2–7]

For the shoulder, post-arthroscopic glenohumeral chondrolysis (PAGCL) has been associated with thermal electrocautery, bioabsorbable anchors, and pain pumps administering local anesthetics with or without epinephrine. In one study with at least 1-year follow-up, no patients developed PAGCL with subacromial pain pump placement or with intra-articular pain pumps using 0.5% bupivacaine at 2.08 mL/h.[8] However, of the 16 patients with pain pump use at the higher flow rate of 4.16 mL/h, 3 developed PAGCL. All pain pumps were used for 65 h which is longer than has typically been used in other clinical studies.[8] Although several reports have associated intra-articular pain pumps and local anesthetics with PAGCL, only one case report has been published documenting a case of PAGCL with subacromial pain pump use.[2]

Our previous study found the subacromial pain pump to be very safe in the short-term after arthroscopic shoulder surgery.[9] In our previous study of 583 patients with greater than one month follow-up after various surgeries and use of a subacromial pain pump administering bupivacaine for 48 h, we found only one minor complication of external catheter breakage that did not require any surgical intervention.[9] From this study, we decided to focus on the arthroscopic rotator cuff repair patient subset longer term to determine if there were any cases of PAGCL. We assumed that this subset of patients would be at higher risk for PAGCL with the use of a subacromial pain pump with bupivacaine because of the lack of a water-tight seal that is not uncommon after rotator cuff repair. This may expose the intra-articular space to greater concentrations of bupivacaine. We hypothesized that no patients would have developed PAGCL after arthroscopic rotator cuff repair and use of a subacromial pain pump.

2. Materials and methods

We analyzed a single surgeon consecutive series of 34 patients treated with subacromial pain pumps after arthroscopic rotator cuff repair and subacromial decompression for full thickness tears treated by a single surgeon. Thirty patients met inclusion criteria of greater than 12-month follow-up. The average age was 51 (28–68), with 67% male and 33% female patients. The left and right shoulders were involved in 13 (43%) and 17 (57%), respectively.

Although all patients underwent arthroscopic rotator cuff repair and subacromial decompression, other concomitant surgeries were also performed. None had concomitant labral surgeries, 4 (13%) had biceps tendinopathy partial thickness debridement without tenotomy or tenodesis, and 3 (10%) had distal clavicle resection performed arthroscopically. Six (30%) of the cases were revision surgery for rotator cuff repair. Patients were positioned in the lateral decubitus position for arthroscopy. Rotator cuff repair was performed with bioabsorbable anchors. Subacromial decompression was routinely performed with removal of the bursa and burring of the undersurface of the anterolateral acromion.

After completion of the arthroscopic surgery, all patients had a subacromial pain pump placed under arthroscopic visualization using a percutaneous technique. With the arthroscope in the posterior portal in the subacromial space, the insertion sheath for the pain pump catheter is placed 1 cm off the anterolateral acromion. With placement confirmed, the pain pump catheter is placed into the subacromial space. This allows confirmation of pain pump placement and to place it independent of any arthroscopic portals. The Pain Care 3000 pump (BREG, Vista, CA) was used for all cases and infused with 0.25% bupivacaine without epinephrine at 2 cc/h for 48 h. This pump offers a patient-controlled bolus option of 4 cc up to every 2 h beyond the basal rate. Total amount of bupivacaine used and bolus doses were not recorded. Supplemental oral opiate medication use was not recorded.

All patients had clinical examinations for range of motion and crepitus, as well as radiographic studies both performed at greater than 12 months after surgery. Radiographs consisted of AP and scapular-Y views of the operative shoulder. Clinical examinations were performed by the senior author.

3. Results

All surgeries were performed arthroscopically with no conversion to open or mini-open approaches. The average tear size was 1.6 cm with a range from 1 cm to 2.5 cm. Rotator cuff repair was performed with bioabsorbable suture anchors. All cases had sufficient rotator cuff tissue for complete repair without excessive tension.

None of the patients had any short-term complications with pain pump use. There were no cases of infection, internal or external catheter breakage, or admission to the hospital for pain control. All patients took opiate medication as needed for pain after surgery and were discharge home after surgery. Although clinical outcomes scores were not used as they were not a focus of this study, no patients had any pain or limitation of activities.

All patients had at least 150° of abduction and forward flexion at latest follow-up without palpable crepitus and no patients had any evidence of joint space narrowing on radiographs.