

Schwartzberg RS, Reuss BK, et al. Efficacy of continuous subacromial bupivacaine infusion for pain control after arthroscopic rotator cuff repair. J Shoulder Elbow Surg 2013; 22: 1320-1324.

Design: Randomized clinical trial

Study Question: Does a continuous subacromial infusion of bupivacaine, compared to saline infusion or no infusion, improve pain relief in the postoperative period after rotator cuff repair?

Population/sample size/setting:

- 88 patients (55 men, 33 women, mean age 57) operated on for rotator cuff tears at an orthopedic center in Florida

- Inclusion criteria were age over 18 and giving informed consent for arthroscopic rotator cuff repair; concomitant procedures such as distal clavicle resection, biceps tenodesis, biceps tenotomy, and acromioplasty were eligible
- Exclusion criteria were previous shoulder surgery, chronic opioid use, and concomitant procedures such as labral repair, instability repair, and irreparable rotator cuff tears

Main outcome measures:

- All patients had arthroscopic rotator cuff repairs under general anesthesia; no patient had regional block anesthesia
- Randomization was done with sealed envelopes which were opened by the circulating nurse at the completion of the rotator cuff repair, allocating the patients to one of three intervention groups
 - o Group 1 had no catheter
 - o Group 2 had a catheter with a postoperative infusion of 200 ml of sterile saline at a rate of 4 ml/hr for 50 hours
 - o Group 3 had a catheter with a postoperative infusion of 200 ml of a 0.5% bupivacaine solution at a rate of 4 ml/hr for 50 hours
 - o Patients and surgeons were blinded to the content of the catheter infusion contents
- After the placement of the catheter and closure of the arthroscopy portals, the catheterized patients received a 30 ml bolus of 0.5% bupivacaine without epinephrine
- The main outcome measure was postoperative VAS pain on a 100 point scale
 - o Pain scores were obtained hourly for the first 6 hours, then every 6 hours for the next 48 hours, then every 12 hours for the next 72 hours

- The study was powered to have a 90% chance of detecting a 18 mm difference between treatment groups, since 18 mm was considered to be the minimal clinically important difference
 - o In addition to pain VAS, the use of oxycodone was included as a secondary outcome; all patients received 5 mg of oxycodone for postoperative pain control
- At only one time point was there a statistically significant difference in VAS scores between the three groups
 - o This was immediately postoperatively (0 hours), and the pain was less in the group which had no catheter (mean VAS of 43.9) than in the catheter plus saline group (mean VAS 64.7); the catheter plus bupivacaine group (VAS 51.4) was not significantly different from either the no catheter group or the catheter plus saline group
- In the first 12 hours, the overall VAS score for the no catheter group was 41.1; for the saline group, it was 45.0, and for the bupivacaine group it was 42.7 (p value for the overall difference =0.73)
- There were no difference in the use of oxycodone on any day; over the 5 day observation period, the mean oxycodone use was 3.8 tablets/day in the no catheter group, 5.0 tablets/day in the saline group, and 4.3 tablets/day in the bupivacaine group
- There were no reported complications due to the catheter placement; neither infection nor chondrolysis was reported

Authors' conclusions:

- In the first 5 days following arthroscopic rotator cuff repair, there was no difference in pain VAS scores between no catheter, catheter plus saline, and catheter plus bupivacaine
- The lower score in the no catheter at the 0 hour VAS measurement was probably due to chance error; it is unlikely that the catheter itself would cause significant pain then and at no other time points
- This is the first adequately powered RCT of subacromial catheter infusion of anesthetic for arthroscopic rotator cuff repair
- This study does not apply to open shoulder procedures or to other arthroscopic shoulder procedures, nor does it apply to the use of pain catheters in conjunction with regional blocks

Comments:

- Randomization is done in a way to guarantee allocation concealment: the circulating nurse opened the sealed allocation envelope at the end of the repair, and the study intervention was immediately implemented

- There was a bolus infusion of 30 ml of bupivacaine which was apparently given to both catheter groups; this would underscore the clinical significance of the lack of any pain advantage in the immediate postoperative period, when its effects would have been detected in the catheter patients
- If the power calculation is correct, it is very unlikely that a clinically important difference of 18 mm on the 100 mm VAS scale was missed due to random error
- Continuous infusion of local anesthetic has been trialed as a treatment for post-operative shoulder pain.

Assessment: There is some evidence that in the setting of arthroscopic rotator cuff repair, a subacromial infusion of 4 ml/hour of 0.5% bupivacaine for 50 hours does not reduce postoperative pain or oxycodone consumption in a clinically meaningful way. Therefore it is not recommended.