Risk Factors for Subjective Hand Numbness Following Shoulder Arthroscopy

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INTRODUCTION: Shoulder arthroscopy is one of the most common procedures in orthopaedic surgery with relatively low complications rates. One rare, but potential, complication of shoulder arthroscopy is hand numbness which may require referral to hand surgery and subsequent carpal or cubital tunnel release. The purpose of this study was to evaluate for possible risk factors for developing hand numbness following shoulder arthroscopy, with the hypothesis that preoperative nerve block administration and intraoperative patient positioning would increase the risk of postoperative hand numbness.

METHODS: This was a retrospective review of patients undergoing shoulder arthroscopy from 2014-2017 at a single institution. Patient demographic information collected included age at surgery (years), sex, BMI, preoperative diagnoses of carpal tunnel syndrome or diabetes, and laterality of surgery (dominant vs. nondominant side). Operative data included type of procedures performed, number of suture anchors, duration of surgery (minutes), patient positioning (beachchair vs. lateral decubitus), and surgical arm positioning (suspended vs. other arm position). Nerve block data was also collected, including the location of the block (interscalene vs. suprascapular), type of medication injected (bupivacaine monotherapy vs. bupivacaine/mepivacaine combination therapy), and volume of medication injected (<20mL vs. ≥20mL). For statistical analysis, patients were divided into two cohorts based on whether they reported hand numbness postoperatively. Those with hand numbness (cases) were compared to those without (controls) to evaluate for significant risk factors. All analyses were performed using STATA and significance was set to $p \leq 0.05$.

RESULTS: Out of 1,500 charts reviewed, 28 patients reported hand numbness postoperatively (1.9%). 188 patients with complete operative and anesthesia nerve block data were included for analysis, including the 28 cases. The remaining 160 served as controls. The average time from surgery to reported hand numbness was 0.43±0.30 years. Analysis of patient demographics revealed no significant differences in sex, age, BMI, preoperative carpal tunnel syndrome, or preoperative diabetes diagnosis ($p=0.53$, $p=0.87$, $p=0.49$, $p=0.74$, $p=0.06$, respectively). Interestingly, having surgery on the nondominant arm was found to be significant in those with postoperative hand numbness ($p=0.01$). When evaluating preoperative nerve block characteristics, there was no difference in the location of the nerve block or volume of medication injected ($p=1.00$, $p=0.20$). However, administration of bupivacaine monotherapy proved to significantly differ from those who received a combination of bupivacaine/mepivacaine between cohorts ($p=0.002$). Analysis of intraoperative characteristics showed neither patient body positioning nor operative arm positioning were significant ($p=0.12$, $p=0.89$). While rotator cuff repair, acromioplasty, and debridement were the most common procedures performed, they did not differ between groups ($p=0.83$, $p=0.64$, $p=0.18$). There were also no differences in the rates of synovectomy, biceps tenodesis/tenotomy, Bankart repair, or SLAP repair ($p=0.14$, $p=0.81$, $p=0.17$. $p=0.63$, respectively). However, only 6.3% of those without postoperative numbness underwent capsular release compared to 28.6% in those with postoperative numbness, and this was significant ($p=0.001$). The duration of surgery in minutes also did not statistically differ between groups ($p=0.78$). and there were no differences in the average number of suture anchors placed between groups ($p=0.87$). 6 patients (21%) from the hand numbness cohort required carpal tunnel release, while 2 required cubital tunnel release (7%).

DISCUSSION AND CONCLUSION: While postoperative sling immobilization has historically been considered the biggest risk factor of hand or arm numbness after shoulder surgery, typical sling use is recommended only up to 6 weeks following surgery. However, this study revealed that hand numbness was most commonly reported at an average of 5 months postoperatively, which is outside of the typical sling time frame. Therefore, other factors of nerve-related complications causing persistent hand numbness must be considered, such as patient demographics, preoperative nerve block administration, side of surgery, intraoperative patient positioning, procedure type, and duration of surgery. This study showed that nondominant-sided surgery, preoperative bupivacaine monotherapy nerve block administration, and capsular release are risks for acute to subacute hand numbness following shoulder arthroscopy.