The Efficacy of Major Peripheral Nerve Neuroma Surgery in Reducing Postoperative Opioid Use in Patients with Preoperative Opioid Use

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Background:
Opioids are routinely used to manage neuroma pain. Although recent work has indicated that neuroma surgery can reduce postoperative opioid use, the efficacy of various techniques—namely, excision alone versus excision with implantation, conduit repair, or autograft repair—remains unclear. This study aimed to evaluate whether surgical excision of major peripheral nerve neuromas (MPN) would reduce the use of opioids in patients with preoperative opioid use. Secondarily, we sought to determine whether additional surgical treatment alongside excision would further reduce opioid use.

Methods:
The MExtr dataset within the PearlDiver database was queried by CPT codes for MPN neuroma excision. The MExtr dataset focuses on hand, elbow, and nerve procedures spanning from 2010 to 2018. Patients were stratified by those with opioid prescription fill records within 30 days of the excision. From this cohort, patients were then separated by additional operative technique involving either 1) nerve implantation into bone/muscle, 2) nerve reconstruction by conduit/autograft or 3) excision alone. Opioid prescription fill records were then assessed at 1, 3, and 6 months postoperatively. Opioid use preoperatively and postoperatively, and across techniques, were analyzed using chi-square analysis. Logistic regression identified risk factors for chronic opioid use, defined as opioid use at 6 months, with $p < 0.05$ considered statistically significant for all reported results.

Results:
Our cohort included 3,887 patients who underwent excision for upper extremity MPN neuromas. The average patient age was 49.0 years (SD ± 16.0), and a majority were female (53.82%). Among individuals undergoing neuroma excision, 5.18% (n=332) were smokers, 6.05% (n=388) were diagnosed with diabetes mellitus, and 29.81% (n=1,175) used opioids preoperatively. The predominant surgical technique was excision alone (72.04%) followed by excision with implantation into bone/muscle (21.24%) and finally excision with nerve reconstruction (6.72%). In patients with preoperative opioid use, neuroma surgery significantly reduced opioid use at 1, 3, and 6 months postoperatively ($p<0.001$) Specifically, 73.96% of patients used opioids at 1-month post-op, followed by 65.87% at 3 months, and 63.40% at 6 months post neuroma excision. While excision alone resulted in lower opioid use compared to excision with implantation at 6 months postoperatively (61.13% vs 70.76% $p=0.0039$), there were no significant differences in opioid rates between the other technique comparisons at the earlier postoperative time points. Analysis of risk factors identified smoking and diabetes as notable contributors to sustained postoperative opioid use at 6 months following neuroma excision ($p<0.001$).

Conclusions:
The study found that excision of major peripheral nerve neuromas significantly reduces postoperative opioid use in patients with preoperative opioid reliance. However, additional techniques such as nerve implantation or reconstruction did not further decrease opioid use. Smoking and diabetes were identified as significant risk factors for prolonged opioid use post-surgery.