Ultrasound-Guided Radial Tunnel Injection for Diagnosis and Treatment of Radial Tunnel Syndrome and Its Role in Orthopedists' Decision to Pursue Surgery

Introduction: Radial tunnel syndrome (RTS) is a rare condition involving compression of the posterior interosseus nerve (PIN) within the radial tunnel, leading to pain without sensory or motor deficits. RTS has a prevalence of 0.091% and annual incidence of 0.0091% in the United States. The present study investigates the utility of ultrasound-guided radial tunnel injection in both the diagnosis and treatment of RTS and quantifies patients who underwent subsequent radial tunnel decompression surgery.

Methods: We identified patients who underwent ultrasound-guided radial tunnel injection with lidocaine and betamethasone at a single institution using ICD-10-CM code G56.3 (Lesion of the radial nerve) and CPT code 76942 (Ultrasonic guidance for needle placement). Demographic, surgical, and postoperative complication data were recorded. Statistical analyses included Mann-Whitney U, chi-square, and Fisher's exact tests using Stata Standard Edition (Version 19.5) and Microsoft Excel, with statistical significance set to $P<.05$.

Results: 27 consecutive RTS patients who received at least 1 ultrasound-guided injection were identified. 5 patients (18.5%) subsequently underwent radial tunnel decompression surgery, with 1 postoperative emergency department visit for dizziness within 90 days, but no readmissions or reoperations. Patients who underwent surgery had significantly higher body mass index (BMI) compared to those managed nonoperatively (40.3 vs 30.0 kg/m^2, $P=.0098$). No significant differences were observed in mean age (60.2 vs 52.8 years), follow-up duration (468.6 vs 205.6 days), or Charlson Comorbidity Index (2.4 vs 1.86) (all $P>.05$). Sex, smoking status, prior ipsilateral upper extremity surgery, lateral epicondyle pain on examination, and improvement following ultrasound-guided injection were not associated with occurrence of radial tunnel decompression surgery (all $P>.05$).

Conclusion: Ultrasound-guided radial tunnel injection may be a valuable diagnostic and therapeutic tool in RTS. Future prospective, multisite investigation is warranted to better understand the management of this rare condition.