SCIENTIFIC ARTICLE

Surgical Demographics of Carpal Tunnel Syndrome and Cubital Tunnel Syndrome Over 5 Years at a Single Institution

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Purpose Carpal tunnel and cubital tunnel syndrome are the 2 most common upper-limb compressive neuropathies. However, whether the characteristics of patient populations undergoing surgery for these conditions are similar is unclear in terms of demographics and concomitant pathologies. Our null hypothesis was that there are no identifiable differences between these patient populations.

Methods A retrospective cohort study was performed by billing system query using Common Procedural Terminology (CPT) codes for all patients who underwent open carpal tunnel release (CTR) (CPT code 64721) and/or open cubital tunnel surgery (CPT code 64718) by 1 of 4 hand surgeons from August 2008 to July 2013. Application of exclusion criteria of acute trauma, revision surgery, neoplasm, age less than 18 years, and inaccurate or insufficient records resulted in identification of 1,114 patients who underwent CTR, 264 patients who underwent cubital tunnel surgery, and 76 patients who underwent both. Computerized medical records were analyzed for demographic variables, medical comorbidities, and other procedures performed under the same anesthetic.

Results In the multivariable analysis, older age, female sex, higher body mass index, trigger finger, and de Quervain tenosynovitis were associated with CTR. Prior trauma to the anatomic site was more common in the cubital tunnel group. Diabetes mellitus was associated with patients who had both procedures.

Conclusions The populations of patients who undergo surgery for different upper-extremity compressive neuropathies are not homogenous: CTR is associated with older age, female sex, higher body mass index, and hand tendinopathies. Cubital tunnel decompression is associated with prior trauma to the anatomic site. Diabetic patients are more likely to have both procedures. Diabetic patients undergoing either procedure should be evaluated for other peripheral nerve compression pathologies. *(J Hand Surg Am. 2017;■(■):1.e1-e8.*

Type of study/level of evidence Diagnostic IV.

Key words Carpal tunnel syndrome, cubital tunnel syndrome, carpal tunnel release, cubital tunnel release, demographics.

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CARPAL TUNNEL SYNDROME (CTS) AND cubital tunnel syndrome (CuTS) are the 2 most common upper-extremity compressive neuropathies. The annual incidence of CTS is estimated to be 424/100,000 people[1] and that of CuTS is 20.9/100,000 people.[2] The prevalent theory of the pathophysiology of compressive neuropathy is recurrent demyelinations resulting from relative neural

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ischemia over a limited anatomic space.[3] Traction of the ulnar nerve has been hypothesized as an additional factor in the causation of CuTS.[4,5]

A subset of patients with CTS and CuTS undergo surgical treatment. Because CTS and CuTS are both compressive neuropathies of the upper extremity, it might be expected that the populations of patients who undergo surgery for these 2 conditions are similar. However, the demographic characteristics of these populations are not well described. The rationale for focusing on the surgical populations of CTS and CuTS is threefold. First, surgeons have particular interest in the subset of patients who undergo elective surgical treatment, and therefore naturally wish to characterize this population better. Second, the surgical populations of CTS and CuTS generally consist of patients with chronic, more severe pathology, with more likely accurate and precise diagnoses. Finally, data on the surgical subset of CTS and CuTS are readily and reliably accessible retrospectively through billing databases. The objectives of this study were to describe the patient populations undergoing CTS and CuTS using patients from a single institution over 5 years and to test the null hypothesis that there would be no significant demographic differences between the 2 populations.

MATERIALS AND METHODS

We conducted a retrospective cohort study of all patients who underwent CTS and CuTS by 4 Certificate of Added Qualifications–certified orthopedic hand surgeons at our institution over 5 years from August 2008 to July 2013. The study was performed with institutional review board approval. The billing database was queried using Common Procedural Terminology (CPT) codes for all patients who underwent open carpal tunnel release (CTR) (CPT code 64721: neuroplasty and/or transposition; median nerve at carpal tunnel) and/or open cubital tunnel release (CuTR) (CPT code 64718: neuroplasty and/or transposition; ulnar nerve at elbow) within the study period. The resultant patient sample was divided into 3 categories: patients who underwent CTR, patients who underwent CuTR, and patients who underwent both CTR and CuTR (CTR + CuTR) during the study period. Patients in the combined CTR + CuTR group were not duplicated in the CTR and CuTR groups.

Initial query of our hospital billing database from August 2008 to July 2013 yielded 1,257 patients in the CTR category, 326 in the CuTR category, and 100 in the CTR + CuTR category. Exclusion criteria included age less than 18 years, misdated or miscoded procedures, insufficient medical records to analyze, revision surgery, acute trauma to the anatomic site within 2 weeks of the operation, and operation for excision of neoplasm. This yielded 1,114 patients in the CTR category, 264 in the CuTR category, and 76 in the CTR + CuTR category. Of the 76 patients in the CTR + CuTR category, 71 had both procedures performed under the same anesthetic and 5 had both procedures performed within the study period but at different times.

For patients who met the inclusion criteria, we investigated the medical records for demographic variables as well as medical and surgical comorbidities. Variables included age, sex, body mass index (BMI), diabetes mellitus, hypertension, hypothyroidism, chronic kidney disease, rheumatoid arthritis, cervical radiculopathy, Dupuytren disease, thumb carpometacarpal (CMC) arthritis, trigger finger, de Quervain tenosynovitis, current smoking status, past smoking status, prior trauma to the anatomic site, and workers' compensation status. The presence or absence of diagnoses was identified after a thorough review of all available documentation in the electronic medical record, not limited to hand surgery clinic notes. If a diagnosis was not found after our review of available documentation, it was assumed that the patient did not carry that diagnosis. No inferences were made for diagnoses that were not clearly documented, and diagnoses noted in the medical records were assumed to be accurate. Prior trauma to the anatomic site was defined as a history of fracture, dislocation, or tendon or ligament injury in the patient's lifetime around either the wrist or elbow in question, more than 2 weeks before surgery. Other operations performed under the same anesthetic were identified by review of operative reports.

Descriptive statistics for explanatory variables were calculated for all groups. In the bivariate analysis, unpaired comparisons of continuous variables among all 3 groups were made using analysis of variance. Student *t* test was used for continuous data and Fisher exact test was used for categorical data for comparisons between the CTR and CuTR groups in the bivariate analysis. Significant bivariate variables were included in the multivariable logistic regression analysis to determine significant differences independently among the study groups. A binary logistic regression model was used to compare the CTR group with the CuTR group, using the CTR group as the reference group; thus the odds ratios indicated the increased odds of undergoing CTR versus CuTR