SCIENTIFIC ARTICLE

National Utilization Patterns of Steroid Injection and Operative Intervention for Treatment of Common Hand Conditions

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Purpose To conduct a population-level analysis of practice trends and probability of surgery based on the number of steroid injections for common hand conditions.

Methods Patients aged at least 18 years receiving injection or surgery for carpal tunnel syndrome (CTS), trigger finger (TF), or de Quervain tenovaginitis (DQ) were identified for inclusion using the 2009 to 2013 Truven MarketScan databases. The researchers counted the number of injections performed and calculated the time between injection and operation for patients receiving both treatments. A multivariable logistic regression model was created to evaluate the odds of undergoing surgery based on the number of injections performed, controlling for patient age, sex, comorbidities, and insurance type.

Results The study sample included 251,030 patients who underwent steroid injection or operative release for CTS (n = 129,917), TF (n = 102,778), and DQ (n = 18,335). Most patients with CTS were managed with immediate surgery (71%), whereas most patients with TF and DQ were managed initially with injection (74% and 84%, respectively). Among patients receiving both an injection and an operation, a single injection was the most common practice before surgery (69%, 58%, and 67% of patients with CTS, TF, and DQ, respectively). Multiple injections for DQ and TF were associated with relatively low predicted probability of surgery (17% and 26%, respectively, after 2 injections). However, the predicted probability of surgery after 2 injections was higher in patients with CTS (44%).

Conclusions Given the associated probability of surgery after multiple injections for the 3 hand conditions examined, the practice of repeat injections should be critically examined to determine whether underuse or overuse is present and whether efficiency and use of resources can be improved upon. *(J Hand Surg Am. 2016;41(3):367–373. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)*

Type of study/level of evidence Prognostic II.

Key words Steroid injection, treatment utilization, carpal tunnel syndrome, de Quervain tenovaginitis, trigger finger.

Additional material is available online.

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Steroid injection and operative intervention are both used to treat a variety of hand conditions such as carpal tunnel syndrome (CTS),[1] stenosing tenosynovitis (trigger finger [TF]),[2] and de Quervain tenovaginitis (DQ).[3] Steroid injections are simple, low-cost, and easily performed in the office,[4] whereas operative intervention requires more time and resources and has greater risk.[5] Patients may report improved function and symptom relief for a period of time after steroid injection and many patients are able to avoid an operation altogether.[6] Thus, surgeons typically resort to operative intervention after nonsurgical treatments fail for many common hand conditions.[7,8]

The American Academy of Orthopedic Surgeons has developed guidelines for practitioners managing patients with CTS, in which the decision to pursue nonsurgical treatments such as steroid injection before surgery depends on clinical severity, patient preferences, and the availability of therapeutic modalities.[9,10] Depending on the severity of presentation, conservative treatment is often recommended for TF, DQ, and mild to moderate CTS before operative intervention. However, there are no widely accepted guidelines for the number of injections to perform for common hand conditions before pursuing operative release. Kerrigan and Stanwix[4] recommended attempting 2 injections before operative intervention for TF to maximize cost-efficiency. Furthermore, Akram et al[11] suggested that patients could see improvement with up to 3 steroid injections for treatment of DQ. However, a randomized clinical trial by Wong et al[12] found no significant improvement in symptom relief with repeat injection for CTS. Despite recommendations by individual authors, practice trends at a population level are unclear.

Assessing population-level use practice trends and avoidance rates of operative intervention based on the number of steroid injections performed for common hand problems can better assist providers in counseling patients and maximizing efficiency and value of care. In this study we sought to evaluate the use and effectiveness of one or more steroid injections for common hand conditions. Specifically, we performed a population-level analysis of steroid injection use for patients with CTS, TF, and DQ to evaluate national use of steroid injection or surgery alone compared with these treatments in combination, and to evaluate the relationship between the number of injections and the probability of surgery.

MATERIALS AND METHODS

Database and study sample

The study qualified for exempt status from our institutional review board. We conducted a large database analysis using the 2009 to 2013 Truven MarketScan Commercial Claims and Encounters and Medicare Supplement and Coordination of Benefits (MarketScan) databases. The MarketScan databases contain patient-level health care encounters including inpatient, outpatient, and pharmacy claims for over 55 million enrollees annually. The database consists of a national convenience sample from large employers, health plans, and government and public organizations.[13] MarketScan databases have an advantage in using Current Procedural Terminology codes to document surgical procedures in addition to identifying patients with a unique identifier. This allows longitudinal follow-up throughout the duration of participation in the health plan. Patients are followed across providers during that time.

We used International Classification of Diseases, Ninth Revision diagnosis codes to identify patients aged 18 years or older with primary diagnoses of CTS, TF, and DQ. The Current Procedural Terminology codes were examined to identify patients undergoing steroid injection and surgical release for each of the 3 diagnoses. Appendix A lists the codes (Appendix A is available on the *Journal's* Web site at www.jhandsurg.org). To understand patterns of treatment between steroid injection and operative intervention, patients were included only if they pursued injection or surgical treatment for 1 of the 3 conditions. Patients were excluded if they did not have at least 24 months of observation after diagnosis and if more than one diagnosis of interest was present during the observation period. The minimum 24-month observation period was chosen based on the published typical time for recurrence of symptoms for the conditions of interest.[2,14,15]

Study variables

Patient variables included sex, age, insurance type, and associated comorbidities. Insurance was categorized as capitated (managed care) versus noncapitated (fee-for-service) insurance type. The International Classification of Diseases, Ninth Revision diagnosis codes were used to examine all health care claims for the presence of relevant patient comorbidities including diabetes, obesity, hypothyroidism, renal disease, congestive heart failure, alcohol abuse, drug abuse, rheumatoid arthritis/collagen vascular disease, hand/wrist fracture, osteoarthritis of the hand or wrist, pregnancy, or Dupuytren disease (Appendix A lists the codes).

The date of diagnosis was recorded as the first encounter associated with a diagnosis of CTS, TF, and DQ. Dates of steroid injection and surgical release and time between diagnosis and treatments were recorded.