

The Effect of Moving Carpal Tunnel Releases Out of Hospitals on Reducing United States Health Care Charges

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Purpose To better understand how perioperative care affects charges for carpal tunnel release (CTR).

Methods We developed a cohort using ICD9-CM procedure code 04.43 for CTR in the National Survey of Ambulatory Surgery 2006 to test perioperative factors potentially associated with CTR costs. We examined factors that might affect costs, including patient characteristics, payer, surgical time, setting (hospital outpatient department vs. freestanding ambulatory surgery center), anesthesia type, anesthesia provider, discharge status, and adverse events. Records were grouped by facility to reduce the impact of surgeon and patient heterogeneity. Facilities were divided into quintiles based on average total facility charges per CTR. This division allowed comparison of factors associated with the lowest and highest quintile of facilities based on average charge per CTR.

Results A total of 160,000 CTRs were performed in 2006. Nearly all patients were discharged home without adverse events. Mean charge across facilities was \$2,572 (SD, \$2,331–\$2,813). Patient complexity and intraoperative duration of surgery was similar across quintiles (approximately 13 min). Anesthesia techniques were not significantly associated with patient complexity, charges, and total perioperative time. Hospital outpatient department setting was strongly associated with total charges, with \$500 higher charge per CTR. Half of all CTRs were performed in hospital outpatient departments. Facilities in the lowest quintile charge group were freestanding ambulatory surgery centers.

Conclusions Examination of charges for CTR suggests that surgical setting is a large cost driver with the potential opportunity to lower charges for CTRs by approximately 30% if performed in ASCs. (*J Hand Surg Am. 2015;40(8):1657–1662. Copyright © 2015 by the American Society for Surgery of the Hand. All rights reserved.*)

Type of study/level of evidence Economic/decision analysis II.

Key words Carpal tunnel release, charge reduction, health care innovation.

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IMPROVING HEALTH CARE EFFICIENCY is critical to containing costs and thus ensuring access to good care. There are 53 million United States (US) surgical and nonsurgical outpatient procedures performed annually, yet the cost drivers of outpatient procedures have not been well studied.^{1,2} In response to this, the Centers for Disease Control and Prevention developed the National Survey of Ambulatory Surgeries (NSAS) to improve our understanding of outpatient procedures and their costs.³

Carpal tunnel release (CTR) is well-suited to studying the cost of outpatient procedures. Carpal tunnel

release has clear indications, a highly standardized surgical technique, and a low complication rate.^{4,5} Approximately 500,000 CTRs are performed each year in the US and spending on carpal tunnel syndrome exceeds \$2 billion.⁶ Like most outpatient procedures, variations in perioperative processes could affect costs. For example, CTR can be safely performed in a variety of surgical settings: a procedure room, an ambulatory surgery center (ASC), or a hospital outpatient department (HOPD). Anesthesia type for CTR varies from local to general.¹ These variations in setting and anesthesia type are seldom driven by quality considerations. Rather they are primarily attributed to surgeon preference or institutional policy.⁷

Previous studies have shown an increase in the number of CTRs performed every year, with variations in anesthesia care and surgical setting.⁸ This observational study investigated the impact of these potentially mutable features of care (anesthesia type and surgical setting) on CTR charges.

MATERIALS AND METHODS

Data source

We performed a national cross-sectional study of charges for outpatient CTRs using the NSAS 2006. The NSAS is maintained by the National Center for Health Statistics. Data are collected through 2 systems: (1) a manual system in which data are abstracted by the hospital staff or by staff of the US Census Bureau on behalf of the National Center for Health Statistics; and (2) an automated system using purchased electronic medical record data from commercial organizations, state data systems, hospital, or hospital associations. Approximately 45% of respondent hospitals provided data through the automated system. The overall response rate for HOPDs and ASCs was 74%. The NSAS sample was weighted to give national estimates and compare hospital types on a national scale.⁹

Cohort

We constructed our cohort by using ICD9-CM procedure code 04.43. We excluded records with additional procedure codes to avoid confounding procedures.

Study variables

Patient factors examined included: age (in years), sex, number of comorbidities (mean Charlson score), and primary payer.¹⁰ Facility was the place in which the procedure occurred. Facility factors examined included total charges, perioperative times, setting, anesthesia

type, discharge status, and adverse events. These variables were defined in the NSAS dataset and were chosen based on the published literature with additional confirmation from expert opinion and anecdotal experience.^{8,11–13}

Perioperative time was subdivided into surgery time, operating room time, postoperative time, and total time. Perioperative time was defined as follows: surgery time (time surgery started and ended), operating room time (time into and out of the operating room), postoperative time (time in the recovery room for postoperative care), and total time (time in the operating room, time in postoperative care, and transport time between the operating room and the recovery room). Setting was based on facility type: HOPD or ASC. Hospital outpatient department was defined using the Verispan, LLC (Yardley, PA) definition: a facility that is physically connected to a main hospital.⁹ The hospital universe included non-institutional hospitals exclusive of federal, military, and Department of Veterans Affairs hospitals located in the 50 states and the District of Columbia. The freestanding facility universe included facilities regulated by the states or certified by the Centers for Medicare and Medicaid Services for Medicare participation excluding facilities specializing in dentistry, podiatry, abortion, family planning, or birthing.⁹

Carpal tunnel release performed in office-based minor procedure rooms was not captured in the NSAS dataset. Anesthesia type included local, monitored anesthesia care, regional, or general. Some records had more than one anesthesia type coded. If records had more than one type coded, they were assigned to the more intensive anesthesia category. We rated general anesthesia as the most intensive.

Total charges included all facility-reported charges for the procedure performed. In most cases, charges excluded any professional (eg, surgeon or anesthesiologist) fees. However, some may have included professional fees if a facility billed for professional services.

Statistical analysis

Records were grouped at the facility level to minimize surgeon heterogeneity. Facilities were assigned to quintiles based on their average total charge per CTR. Patient and facility factors were also compared for facilities in lowest and highest total charge quintiles. Statistical comparisons of facilities in each of these 2 quintiles were performed using analysis of variance or Kruskal-Wallis test. For our model, we dichotomized facilities in the highest charge quintile (yes/no), setting

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