Cost, Value, and Patient Satisfaction in Carpal Tunnel Surgery

Joseph Ingram, MD*, Benjamin M. Mauck, MD,
Norfleet B. Thompson, MD, James H. Calandruccio, MD

KEYWORDS

• Carpal tunnel release • Costs • Endoscopic • Open • Complications • Outcome
• Patient satisfaction

KEY POINTS

- The cost of carpal tunnel release (CTR) surgery can be significantly reduced by changes in location (freestanding ambulatory surgery center vs hospital) and technique (open vs endoscopic).
- The use of electrodiagnostics in the diagnosis of carpal tunnel syndrome remains a matter of controversy.
- Because of the infrequent occurrence of infection after CTR, perioperative antibiotics do not appear to be indicated.
- Patient satisfaction may relate more to shorter waiting times and the quality of the interaction with the surgeon than with the quantity of time spent.

INTRODUCTION

Carpal tunnel release (CTR) is one of the most frequently done hand/wrist procedures, with approximately 600,000 CTR procedures done each year. Approximately 2% of men and 4% of women will have CTR during their lifetimes.[1] The treatment costs associated with CTR represent a large cost to the health care system. Identifying quality, value, and safety issues associated with CTR may help identify factors that can be extrapolated to other hand and wrist procedures.

LOCATION

A number of methods for reducing costs of hand procedures have been proposed. Van Demark and colleagues[2] suggested using "minor field sterility" and wide-awake local anesthesia no tourniquet (WALNAT) to decrease costs while maintaining patient safety and satisfaction. Others also have evaluated the use of a minor procedure room rather than a standard operating room (OR).[3–7] Leblanc and colleagues[6] reported a 0.4% rate of superficial infection and no deep infections after CTR with "field sterility." In their protocol, field sterility was obtained by preparing the hand with iodine or chlorhexidine and using the equivalent of a single drape and a sterile tray with modest instruments. Sterile gloves and masks are used, but surgeons are not gowned. No prophylactic antibiotics are given. The use of the procedure room was found to be more than twice as time-efficient and cost 73% less per case than procedures done in the OR. In a later detailed cost and efficiency analysis, they determined that open CTR done in the procedure room cost 32% less than in the OR, with similar postoperative pain control, satisfaction scores, and frequency of infection. Savings of 85% with the use of WALNAT in a

Campbell Clinic-University of Tennessee, Department of Orthopaedic Surgery and Biomedical Engineering, 1211 Union Avenue, Suite 510, Memphis, TN 38104, USA
* Corresponding author.
E-mail address: Jingram@campbellclinic.com

Orthop Clin N Am 49 (2018) 503–507
https://doi.org/10.1016/j.ocl.2018.06.005

procedure room rather than the main OR for CTR were reported by Rhee and colleagues[8]

TECHNIQUE

In addition to the location of CTR, the technique used can make a marked difference in cost. Law and colleagues[9] compared 507,924 open CTRs to 68,758 endoscopic procedures in Medicare patients. Contrary to previous literature, they found that endoscopic CTR had lower charges and higher reimbursement rates than open CTR. Similar differences in reimbursement were reported by Zhang and colleagues[10]: reimbursement fees for endoscopic CTR ($2602) were significantly higher than for open CTR ($1751), primarily because of higher facility fees for endoscopic CTR. Because of the lack of clear evidence of the superiority of one procedure over the other, however, these investigators suggested that value-based health care models may favor open CTR for delivery of high-quality care while minimizing costs. Using a large database of 576,692 patients, Hubbard and colleagues[11] also found that annual charges were significantly higher for open CTR than endoscopic CTR, but reimbursements paid by Medicare were higher for endoscopic CTR. More recently, however, Kazmers and colleagues[5] compared open CTR with endoscopic CTR done in the OR procedure room and found that open CTR done with local anesthetic in the procedure room significantly minimized costs relative to other surgical methods (endoscopic CTR) and anesthetic methods (Bier block, monitored anesthesia care, general). The cost-savings of open CTR compared with endoscopic CTR have been confirmed in other studies.[3,7,12]

PREOPERATIVE AND POSTOPERATIVE PROTOCOLS

Costs of CTR may be affected not only by location and technique, but also by preoperative and postoperative protocols. The use of electrodiagnostic studies, such as nerve conduction studies, and imaging studies, such as MRI, remains a controversial topic, with proponents for and against these.[13–18] Although these additional tests undoubtedly contribute to the cost of treatment of carpal tunnel syndrome, some argue that confirming its existence before CTR actually is cost-effective in that it avoids unnecessary surgery.[16,19] However, Glowacki and colleagues[15] compared the outcomes of open carpal tunnel release in 2 patient cohorts: one with a clinical diagnosis of carpal tunnel syndrome confirmed using nerve conduction study (NCS) and one without NCS before surgery. Outcomes were similar between the groups, and the investigators concluded that routine NCS before surgery was not indicated. Fowler and colleagues[13,14] compared ultrasound, NCS, and the 6-item carpal tunnel symptoms scale (CTS-6) for the diagnosis of carpal tunnel syndrome and found similar sensitivity and specificity among the 3. NCS had the lowest sensitivity and specificity. The diagnostic accuracy of MRI compared with electrodiagnostic studies is only moderate in evaluating patients with carpal tunnel syndrome (CTS). MRI may be useful in helping to predict which patients will respond best to medical or surgical treatment.

Because surgical site infections often are used as a performance metric in assessing the quality of health care, prophylactic antibiotics are commonly used perioperatively. Johnson and colleagues[20] hypothesized that prophylactic antibiotics are overused in clean soft tissue hand procedures (open or endoscopic CTR, trigger finger release, de Quervain release, and wrist ganglion excision). In their study, approximately 20% of patients who had clean soft tissue hand procedures had preoperative or postoperative antibiotic administration. Younger age, male gender, lower income, and obesity were factors leading to more frequent antibiotic use. The investigators estimated that $1.6 million could have been saved without this use of prophylactic antibiotics. They also noted that this represents a fraction of total costs, which may include the treatment of allergic reactions, *Clostridium difficile* complications, widespread antimicrobial resistance, and the costs associated with purchasing, storing, and administering the antibiotic. Harness and colleagues,[21] likewise, found that antibiotic use did not decrease the risk of infection in patients with CTR, including patients with diabetes. They suggested that the routine use of antibiotic prophylaxis is not indicated.

Postoperative pain control is another area in which cost reductions are possible. Dwyer and colleagues,[22] in a study of 121 CTRs, reported that written guidelines for surgeons and educational handouts for patients significantly reduced the number of prescribed opioid pills by 25% to 55%, while achieving high patient satisfaction and a low refill rate. They recommended 5 to 10 opioid pills after surgery. Pain catastrophizing has been shown to be associated with greater opioid consumption[22]; recognition of this behavior may help target patients for additional support, such as counseling or behavioral therapy. Several other studies have found