Utility of local anesthesia for open carpal tunnel release in patients with psychiatric diagnoses

Haripriya S. Ayyala*, Nikki Castel, Omar M. Mohamed, Erica Y. Xue, Nicholas C. Oleck, Edward S. Lee

Division of Plastic and Reconstructive Surgery, Department of Surgery, Rutgers – New Jersey Medical School, Newark, NJ, USA

Abstract

Purpose: Carpal tunnel release, one of the most commonly performed procedures in Veterans Affairs (VA) medical centers, is often performed under local anesthesia alone. In this patient population, there is an increased prevalence of psychiatric disorders. Our hypothesis is that there is no difference in operating time, request for sedation, or complications in the veteran population with or without a recognized psychiatric history.

Methods: A retrospective cohort study was performed at a VA medical center from January 2013 to January 2017 by the senior surgeon (E.S.L.). Patients were divided into two groups: patients with no known psychiatric history \( (n = 33) \) and patients with an active psychiatric diagnosis \( (n = 25) \), including post-traumatic stress disorder, anxiety disorder, bipolar disorder, depression, substance abuse, or panic disorder. Primary endpoints included operation time, time in operating room, request for sedation, and complication rates.

Results: Fifty-nine percent of patients successfully underwent wide-awake hand surgery, while 41% requested sedation. Patients with no known psychiatric history had a 45.5% rate of requesting sedation compared to 36% in those with a psychiatric diagnosis. No patients converted from wide-awake surgery to sedation. There was no statistically significant difference in operation time, time
in the operating room, need for sedation, or complication rate between all groups.

Conclusions: Wide-awake hand surgery is an excellent technique that can be safely used in patients with a history of psychiatric illness. Without the need for monitored anesthesia care, the cost for carpal tunnel releases done in military medical centers could decrease dramatically.

Type of Study: Prognostic

Level of Evidence: Level II

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Introduction

Prior to 2011, carpal tunnel surgery in the United States was most commonly performed under general anesthesia or local/regional anesthesia with sedation.1 Reasons for these anesthesia techniques include the surgeon’s concern about visibility in the operative field without a tourniquet and the patient’s need for sedation to tolerate the tourniquet. There was also apprehension regarding pain tolerance during the injection of the local anesthetic, which is a frequent fear leading to patient request for sedation. With the advent of the wide-awake local anesthesia no tourniquet technique by Lalonde, the experience for both the surgeon and patient has radically changed. The “hole in one” technique removes the patient’s fear of pain during the procedure and epinephrine hemostasis has eradicated the need for a tourniquet to achieve a bloodless field of operation.1–4 There have been numerous papers disproving the previous “fear” of epinephrine causing finger necrosis.5–8 Epinephrine is both safe and extremely effective in hand surgery, obviating the need for tourniquet, and therefore, the sedation to help tolerate the tourniquet.

Wide-awake surgery has become a popular option to offer patients undergoing hand procedures. This technique is proven to be both cost effective and efficient, avoiding the need for preoperative testing and postsedation recovery.9 Patients with significant medical comorbidities who would normally be unable to tolerate sedation or general anesthesia can undergo these procedures with reduced risk. Despite the abundance of literature discussing the wide-awake technique in carpal tunnel release, there are no studies that analyze its use in patients with a history of psychiatric disorders. In the veteran population, there is an increased prevalence of psychiatric disorders compared to the civilian population, namely post-traumatic stress disorder (PTSD).10,11 This current study aims to evaluate if patients with a history of psychiatric disorders are willing and able to tolerate wide-awake hand carpal tunnel release.

Methods

Data collection

All patients undergoing carpal tunnel release surgery at a single Veterans Affairs (VA) medical center by a single surgeon between 2013 and 2017 were reviewed retrospectively. Inclusion criteria contained patients with documented carpal tunnel syndrome by electromyography. Exclusion criteria included recurrent carpal tunnel syndrome, patients with median nerve compression more proximal than the wrist, carpal tunnel release combined with another operation, and patients deemed not safe for surgery by their primary care physicians. Informed consent was obtained from all patients – discussion of wide-awake local anesthesia technique versus sedation was standardized to all patients. Patients were asked to follow up at two weeks for suture removal.
Table 1
Demographics.

| Group                        | n   | Age (average) | BMI (average) | Smoker | ASA class (average) |
|------------------------------|-----|---------------|---------------|--------|---------------------|
| 1: No psychiatric diagnoses  | 33  | 66.6          | 32.2          | 12.1%  | 2.8                 |
| 2: Psychiatric diagnoses     | 25  | 58.4          | 31.8          | 36%    | 2.8                 |
| 2a: PTSD                     | 7   | 61.0          | 32.9          | 28.6%  | 2.7                 |
| 2b: Depression               | 7   | 61.3          | 29.2          | 28.6%  | 2.9                 |
| 2c: Bipolar disorder         | 1   | 32            | 29.4          | 0%     | 3.0                 |
| 2d: Substance abuse          | 1   | 51            | 25.0          | 100%   | 2.0                 |
| 2e: Multiple disorders       | 9   | 57.2          | 32.5          | 44.4%  | 2.8                 |

**Patient characteristics**

Patients were divided into two groups. Group 1 included patients with no psychiatric history. Group 2 was divided into subgroups including patients with an active diagnosis of psychiatric illness, namely PTSD, anxiety disorder, bipolar disorder, depression, substance abuse, or panic disorder, and multiple diagnoses. Psychiatric diagnoses were determined through chart review confirming active diagnoses under care of a mental health professional. Demographics were collected, including age, body mass index (BMI), smoking status, and American Society of Anesthesiologists (ASA) classification. ASA classification was determined by the anesthesiologist preoperatively as an assessment of the patient’s health status.

**Operative characteristics**

All operations, regardless of anesthesia type, were performed in the operating room with monitored anesthesia care by a licensed anesthesiologist or CRNA, as per the institution’s policy. The patient was prepped and draped in the normal sterile fashion. A tourniquet was applied and used in sedation cases; it was neither applied nor used in wide-awake cases. Open carpal tunnel release was performed in all patients under a single surgeon. All patients who underwent wide-awake anesthesia received 20 cc of 1% lidocaine with 1:100,000 epinephrine and buffered with 8.4% sodium bicarbonate. The incision began at the most proximal part of the incision and was advanced using the “hole in one” technique described by Lalonde. Incision started after waiting at least 10 min from injection time. Additional local anesthesia was administered if the patient reported pain.

**Outcomes**

Outcomes included time in the operating room, procedure time, sedation status, and complications. Procedure time was measured from incision start to the end of closure. Sedation status included patients who opted for sedation or converted from wide awake to sedation in the operating room. Sedation was performed in patients who requested to “be asleep” for the procedure, often due to fear of feeling the procedure and anxiety, even after a full informed consent discussion. Complications were noted in each group, including delayed wound healing, infection, hematoma, unresolved symptoms, or recurrent symptoms. Statistical analysis was performed utilizing Pearson’s chi-squared test for nominal variables and independent two tailed t-test and analysis of variance for quantitative variables. A p-value of less than 0.05 was considered significant for all data.

**Results**

Fifty-eight patients were included in the analysis. In this cohort, 33 patients had no known psychiatric diagnoses (Group 1) and 25 patients had at least one psychiatric diagnosis (Group 2). Group 2 was further divided into those with PTSD (n = 7), depression (n = 7), bipolar disorder (n = 1), substance abuse (n = 1), and multiple diagnoses (n = 9). Patient demographics were not statistically different between the groups regarding average age, BMI, smoking status, or ASA class (Table 1).
The average age for all patients in the study was 62.5 years (range 32–89 years). The average BMI was 32.0, which is classified as obese.

There was no statistically significant difference in outcomes between the two groups, including operative time, time in the operating room, likelihood of requesting sedation, conversion from wide awake to sedation in the operating room, or complication rates. There was no statistical difference in procedure time between Group 1 and Group 2, or in awake versus sedated patients (p = 0.39). The variance between the groups was small. The mean procedure time was between 22 and 25 min for Groups 1 and 2, with average time in the operating room extending from 50 to 57 min (Table 2). There was no statistically significant difference in time in the operating room between the groups (p = 0.26). There was also no statistical difference in requesting sedation between the two groups. Forty-five percent of patients in Group 1 and 36% of patients in Group 2 requested sedation. When Group 2 was further subdivided, there was no statistical difference in sedation rate when all groups were compared (p = 0.16). There was also no statistically significant difference when only comparing Group 1 to Group 2 (p = 0.47), Group 1 to Group 2a (p = 0.13), Group 1 to Group 2b (p = 0.22), or Group 1 to Group 2e (p = 0.21). With only one patient in Group 2c (bipolar disorder) and Group 2d (substance abuse), significant comparisons could not be made within these subgroups.

In total, there were three patients (5.2%) that experienced postoperative complications. In Group 1, there was one incidence of delayed wound healing and one incident of surgical site infection, which was treated with antibiotics for one week. Both patients completed their postoperative course without any further complications. In Group 2, one patient experienced delayed wound healing. This patient healed with subsequent symptomatic relief and no further complications. None of the patients with complications were current or previous smokers. No patients required reoperation. There was no statistically significant difference in complication rates among the groups (p = 0.74).

Discussion

The wide-awake local anesthesia technique is widely used and well-studied in the general population; there are no major contraindications to this wide-awake option. It was previously thought that patients with high anxiety or PTSD would be unable to tolerate a surgical procedure while completely awake. However, this is the first study that specifically examines wide-awake hand surgery in patients with psychiatric diagnoses. Furthermore, there are no studies that examine wide-awake surgery on any part of the body with association to psychiatric illness in general or in PTSD patients. This is especially significant in the military and veteran population because they have a higher prevalence of both carpal tunnel syndrome and psychiatric disorders compared to the general population. While a history of previous psychiatric treatment may suggest that these patients would be more sensitive to undergoing wide-awake surgery, results of this study demonstrate the contrary. There was no difference in requests for sedation, operative time, time in operating room, or complications between patients with or without known psychiatric diagnoses. These findings indicate that wide-awake surgery may be a viable option in patients with psychiatric diagnoses, regardless of the specific psychiatric illness or number of psychiatric illnesses present. While it has been proven that the majority of patients regardless of medical comorbidities can safely undergo the wide-awake option, these results may demonstrate that patients with psychiatric comorbidities can also undergo wide-awake surgery with no difference in complication rates.

In this study, all carpal tunnel releases regardless of sedation status were done in the operating room with an anesthesiologist present, as there is no procedure room in our VA facility. The authors
hope to highlight the advantage of having a procedure room in all VA facilities, as the implementation of the wide-awake technique can dramatically reduce health care resource expenditure, saving time and money for both the patient and the provider. Surgery performed under local anesthesia alone eliminates the need for preadmission appointments or preadmission testing (including blood draws and radiation exposure for chest X-rays). Under the wide-awake technique, carpal tunnel release procedures can be performed in an outpatient procedure room as intraoperative monitoring by an anesthesiologist is no longer required. Performing carpal tunnel surgery in an outpatient setting also saves time. LeBlanc et al. showed that within a 3-h surgical block, 9 carpal tunnel release procedures were performed in the ambulatory setting under the wide-awake technique compared to 4 in the main operating room. The surgical block time may be lower due to decreased turnover time, which includes cleaning the operating room, transportation of the patient, and preoperative preparation by the anesthesiologist.

There is no difference in complication rates if performing the procedure outside the main operating room. While Leblanc et al. experienced an infection rate of 0.4% after open carpal tunnel release in a minor procedure room, Rhee et al. experienced a 2.9% infection rate after open carpal tunnel release. The complication rate in the latter study was similar to our infection rate of 1.7% (one incidence) and total complication rate of 5.2%. This may be because of the fact that Rhee et al. performed their analysis in the VA population as in this study. Rhee et al. also studied the cost savings of a wide-awake hand surgery program out of a VA medical center and found a cost savings of 85% when operating in a clinic procedure room versus the main operating room. Similarly, Leblanc et al. and Chatterjee et al. both found the cost of performing an open carpal tunnel release in the main operating room to be three to four times more expensive than in the clinic.

In the authors’ experience, a significant barrier to scheduling procedures is transportation, as often times our population has difficulty securing a ride home. The authors’ VA hospital has a policy that patients may not drive for 24 h after receiving sedation, necessitating admission for one night. This is a significant expenditure of resources for a same-day procedure. With the wide-awake option, patients can now be instructed that they may drive themselves to and from the procedure without the need for overnight inpatient monitoring.

Major limitations of this study include the small sample size as well as its retrospective nature. With only one patient in Groups 2c and 2d, the influence of bipolar disorder or substance abuse could not be evaluated. Similarly, there were only seven patients with PTSD and seven patients with depression, limiting the overall power of the study. Future research including large prospective randomized-controlled studies should be performed to further stratify patients with psychiatric illness and evaluate outcomes utilizing a validated measure.

Conclusion

Wide-awake carpal tunnel release is a safe and reliable technique in patients with one or more diagnosed psychiatric illnesses. There was no significant difference in operative time, request for sedation, or complication rates between patients with or without a known psychiatric illness. Patients with psychiatric diagnoses are just as willing and able to tolerate wide-awake hand surgery as the general population. In the future, performing wide-awake hand surgery in medical centers with procedure rooms without monitored anesthesia care could drastically decrease medical costs.

Declaration of Competing Interest

None.

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