Surgery Article

HAND
2017, Vol. 12(6) 606–609

DOI: 10.1177/1558944716677536
hand.sagepub.com

Prospective Evaluation of Opioid Consumption Following Hand Surgery Performed Wide Awake Versus With Sedation

Andrew Miller[1], Nayoung Kim[1], and Asif M. Ilyas[1]

Abstract

Background: We prospectively evaluated opioid consumption postoperatively following trigger finger release (TFR) and open carpal tunnel release (CTR), and hypothesized that cases performed wide awake with local anesthesia and no tourniquet (WALANT) would result in increased opioid consumption compared with cases performed under monitored anesthesia care (MAC). **Methods:** Postoperative opioid consumption following CTR and TFR was prospectively collected over 6 months. The primary end points of the study were: (1) total opioid consumption; and (2) the number of days an opioid was used for both groups. **Results:** Mean opioid use and number of days the opioid was used for all MAC cases were 3.95 pills and 1.8 days, respectively. The results for WALANT were 3.85 pills and 1.6 days. **Conclusions:** These results suggest that effective pain control postoperatively may be independent of anesthesia type for soft tissue procedures of the hand. Specifically, average opioid consumption and days of utilization were similar in both the MAC and WALANT groups. Average postoperative opioid consumption was approximately only 4 opioid pills. Consideration should be given to prescribing fewer opioids for surgeries such as CTR and TFR.

Keywords: wide-awake local anesthesia, monitored anesthesia care, pain control after hand surgery, opioid consumption

Introduction

Postoperative pain control in hand surgery is a multifactorial issue that affects patient outcomes, patient satisfaction, and health care costs. Adequate management of postoperative pain with opioids or other pain medication must be tempered against the growing prevalence of opioid abuse and dependence.[6,7] Anesthesia is a particularly complex variable that can influence perioperative and postoperative pain management.[1] Optimizing the role of anesthesia is essential to minimizing well-recognized complications such drowsiness, nausea, urinary retention, and even mortality.[9] Currently, the majority of ambulatory hand surgery cases performed in the United States are with monitored anesthesia care (MAC). However, there is increasing interest in WALANT (wide awake with local anesthesia and no tourniquet), which foregoes the inconvenience, expense, and risks associated with sedation and tourniquet use. Hand surgery in particular has experienced a significant increase in experience and utilization of the WALANT technique. Patient responses to WALANT have also been encouraging thus far. Koegst et al[2] found in a postoperative survey that approximately 83% of patients undergoing WALANT would agree to undergo surgery with the same type of anesthesia while only 9% of patients would elect a different anesthesia.

In light of the growing interest in WALANT and the ongoing opioid epidemic, there is a paucity of data available that evaluate the effect of anesthesia type on postoperative pain and ultimately opioid consumption. To better understand the effect of anesthesia type on postoperative pain, we prospectively evaluated opioid consumption following carpal tunnel release (CTR) and trigger finger release (TFR), and hypothesized that cases performed using WALANT would result in increased opioid consumption postoperatively compared with cases performed with MAC. As a secondary goal of the study, we sought to determine an appropriate number of opioids to prescribe for soft tissue procedures of the hand.

Methods

After obtaining institutional review board approval, 8 board-certified and fellowship-trained hand surgeons prospectively collected postoperative patient opioid consumption data for 6 consecutive months. Patients were included if they had a single primary outpatient TFR or open CTR. All patients undergoing inpatient procedures or with chronic preoperative narcotic use were excluded. All cases performed under WALANT were anesthetized with 1%

[1]Thomas Jefferson University, Philadelphia, PA, USA

Corresponding Author:
Andrew Miller, Rothman Institute, Thomas Jefferson University, 925 Chestnut Street, Philadelphia, PA 19107, USA.
Email: andrewmiller28@gmail.com

lidocaine with epinephrine buffered with bicarbonate but without the use of any sedation or tourniquet. All cases performed under MAC were anesthetized preoperatively with a 1:1 combination of 1% lidocaine and 0.5% Marcaine, all without epinephrine or bicarbonate. All patients underwent either MAC or WALANT based on their treating surgeon's practice routine. Four physicians utilized MAC and 4 physicians utilized WALANT for their CTR or TFR surgeries.

The following data were recorded for each patient: age, gender, procedure type, pain medication type, number of days the medication was used, and anesthesia type (WALANT or MAC). We assumed analgesic equivalency among all opioids prescribed in our cohorts (consisting of Percocet 5/325, Vicodin 5/300, and Tylenol #3). All opioids were prescribed based on the attending physician's practice preference.

The two primary end points of this study were (1) the evaluation of total postoperative opioid consumption based on total pill consumption and (2) the total number of overall days an opioid was used, for both the WALANT and MAC groups.

A sample size calculation determined that at least 75 patients per cohort would be ample enough to detect a one pill difference with a power of 80%. An unpaired Student *t* test was used to detect statistically significant differences between MAC and WALANT groups with respect to the aforementioned variables. A chi-square test for significance was performed to evaluate for differences in noncontinuous data between groups. A *P* value of less than 5% was considered significant.

Results

A total of 181 WALANT cases (78 TFR and 103 CTR) were performed compared with 235 MAC cases (50 TFR and 185 CTR). The average age of patients undergoing WALANT was 64.4 years (22-89) compared with 63.7 years (29-89) for MAC. The gender of patients was 54% females and 46% males for WALANT cases compared with 58% females and 42% males for MAC cases.

In both cohorts, the prescribed opioids included Vicodin, Tylenol #3, and Percocet. For study purposes, these opioid pills were considered equivalent. The average number of opioids prescribed was 20 pills (range, 15-40). Three patients from the WALANT group and 2 patients from the MAC group were removed from the study secondary to abnormally high opioid requirements due to preoperative chronic pain opioid requirements.

Mean total opioid consumption for MAC patients for all procedures evaluated was approximately 3.95 opioid pills (range, 0-33 pills; SD, 5.7) (Table 1). For WALANT, the mean total opioid consumption was 3.85 opioid pills (range, 0-32 pills; SD, 6.7) (Figure 1). This difference in overall opioid consumption was not found to be statistically significant ($P = .86$). When controlling for procedure type (TFR and CTR), there was also no difference in opioid consumption ($P = .36$ and $P = .77$, respectively).

Table 1. WALANT and MAC Table of Results.

	WALANT	MAC	*P* value
Total narcotic use			
Average total pill consumption	3.85	3.95	0.86
Opioid utilization rate	49%	62%	0.01
Mean days used	1.61	1.83	0.03

Note. WALANT = wide-awake with local anesthesia and no tourniquet; MAC = monitored anesthesia care.

Average number of days that an opioid was utilized was 1.83 days for the MAC group (range, 0-12 days), versus 1.61 days for the WALANT group (range, 0-22 days) (Figure 2). This was statistically significant ($P = .03$).

Discussion

We disproved our hypothesis by finding that there was no difference in opioid consumption between MAC and WALANT in our series. We speculate that with the patient awake during the procedure, they may be more prepared for the postoperative pain due to the ability of the surgeon to counsel the patient during the surgery.

There has been growing interest in WALANT as an alternative to MAC due to a number of variables, including increased patient safety, improved operating room efficiency, and decreased cost of care for a number of commonly performed hand surgeries that are otherwise performed under MAC.[3-5] In our series, we also studied opioid consumption for CTR and TFR surgeries. We found that both WALANT and MAC patients on average consumed approximately 4 opioid pills postoperatively. With an average prescription of 20 pills, there were on average 16 pills left unused and potentially available for abuse or diversion. Already the most widely overprescribed opioid country, these results echo concerns that too many opioids are being prescribed after surgeries.[6-8,10,11] If on average 4 pills are being consumed postoperatively for soft tissue procedures of the hand, the prescription target amount should reflect these data. A more reasonable target of 10 opioid pills (giving consideration to the standard deviation) for soft tissue procedures of the hand would be more than adequate in more than 90% of patients within our cohort.

One shortcoming of this study was that the opioid consumption data were dependent upon the reliability of patient self-reporting which may introduce recall bias and that we did not measure preoperative versus postoperative pain scores. A second weakness of this study was that patients were not randomized to either anesthesia group but allocated according to individual physician preference for anesthesia. However, we believe selection bias was minimized as each surgeon consistently utilized the same anesthesia type for all their patients in the study.

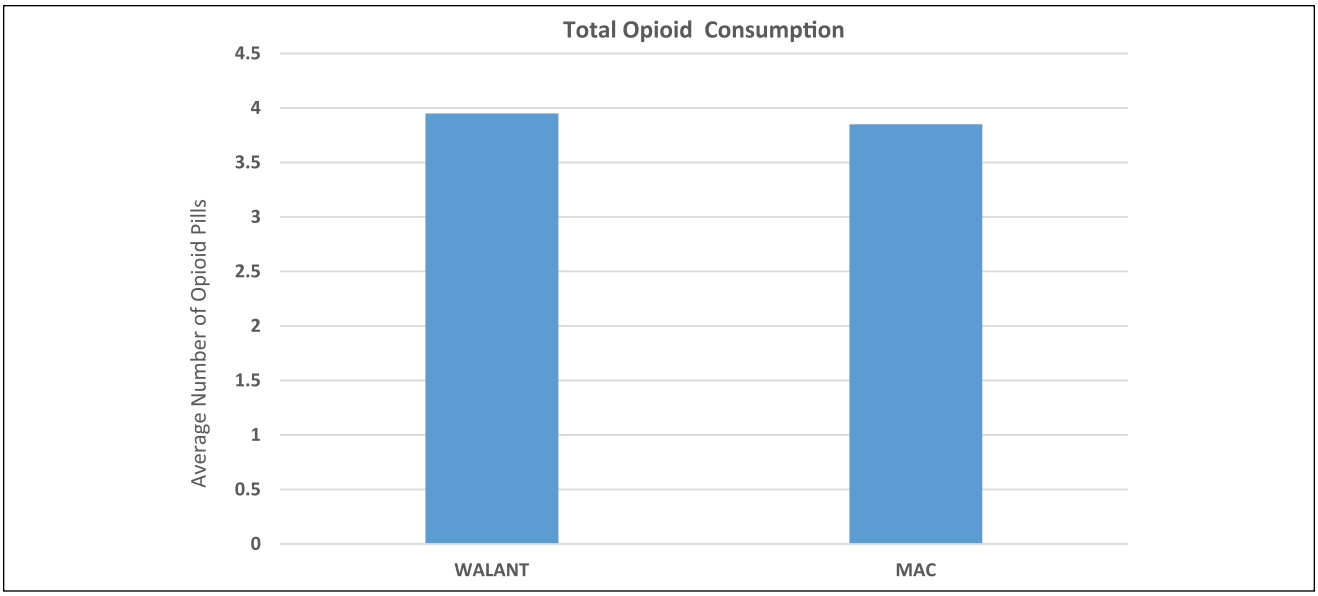

Figure 1. Total average opioid pill consumption.
Note. WALANT = wide-awake with local anesthesia and no tourniquet; MAC = monitored anesthesia care.

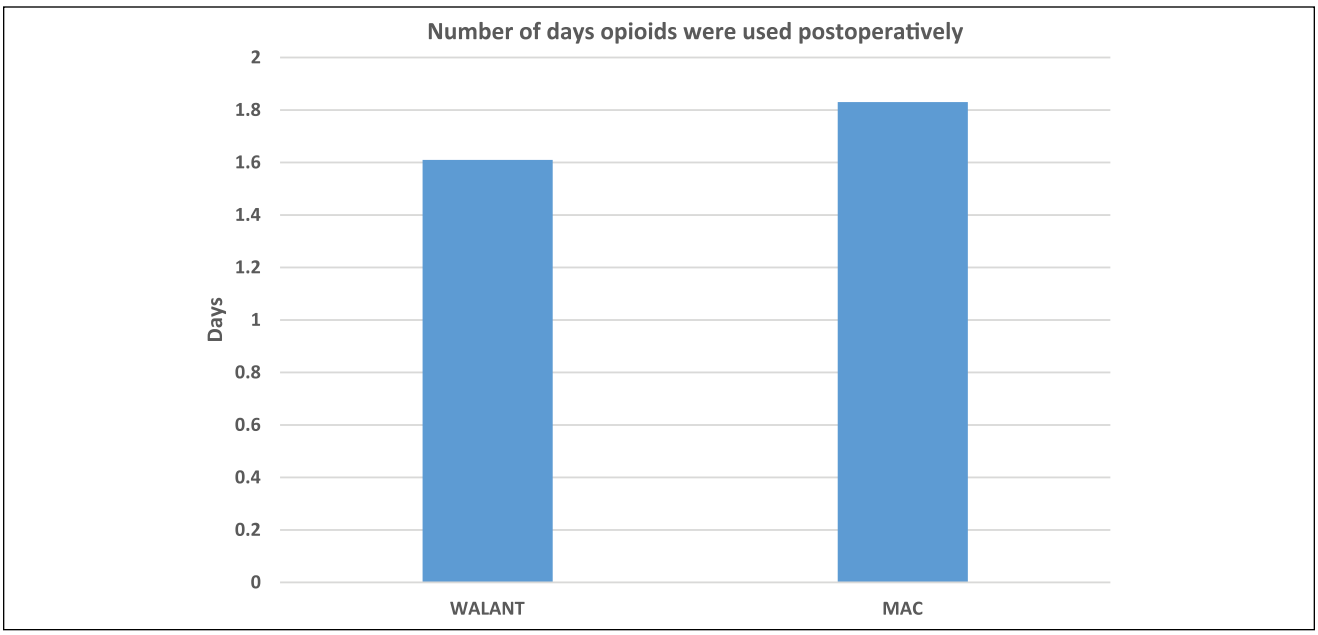

Figure 2. Average total days of opioid use.
Note. WALANT = wide-awake with local anesthesia and no tourniquet; MAC = monitored anesthesia care.

A third limitation of our study is that we assumed analgesic equivalence for the aforementioned pain medications. Although similar, small differences in analgesic efficacy may influence the results garnered in this study. In reality, patients may have consumed slightly more pain medication if the analgesic efficacy was less than the alternative. Finally, 2 different types of local anesthetics were used: 1% lidocaine with epinephrine and bicarbonate preoperatively for the WALANT group, versus 1% lidocaine and 0.5% Marcaine without epinephrine 1:1 preoperatively for the MAC group. Surprisingly, though, the addition of Marcaine, a longer acting anesthetic, in the MAC group did not significantly improve the postoperative pain control and opioid consumption of those constituents as might be expected.

Further research involving additional common hand surgery procedures could also be of benefit to continue to further understand optimal opioid utilization postoperatively after surgeries performed under WALANT and MAC. In

short, we believe that for soft tissue procedures of the hand, like CTR and TFR surgeries, choice of anesthetic (MAC vs WALANT) should not affect the postoperative pain experience of the patient. Moreover, lower amounts of opioids prescribed are warranted based on our findings of utilization rate, average consumption and total number of days needed. We recommend that no more than 10 opioid pills be prescribed for CTR and TFR surgeries.

Ethical Approval

We obtained approval from our university institutional review board and were waived of informed consent and were authorized to collect protected health information.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5).

Statement of Informed Consent

Informed consent was obtained when necessary.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

1. Chung F. Recovery pattern and home-readiness after ambulatory surgery. *Anesth Analg*. 1995;80(5):896-902.
2. Koegst WHH, Wölfle O, Thoele K, et al. The "wide awake approach" in hand surgery: a comfortable anaesthesia method without a tourniquet. *Handchir Mikrochir Plast Chir*. 2011;43 (3):175-180.
3. Lalonde D. Minimally invasive anesthesia in wide awake hand surgery. *Hand Clin*. 2014;30:1-6.
4. Lalonde DH. Reconstruction of the hand with wide awake surgery. *Clin Plast Surg*. 2011;38:761-769.
5. Lalonde DH, Martin AL. Wide-awake flexor tendon repair and early tendon mobilization in zones 1 and 2. *Hand Clin*. 2013;29:207-213.
6. Manchikanti L, Singh A. Therapeutic opioids: a ten-year perspective on the complexities and complications of the escalating use, abuse, and nonmedical use of opioids. *Pain Physician*. 2008;11(2)(suppl):S63-S88.
7. Morris B, Mir H. The opioid epidemic: impact on orthopaedic surgery. *J Am Acad Orthop Surg*. 2015;23(5):267-271.
8. Morris BJ, Zumsteg JW, Archer KR, et al. Narcotic use and postoperative doctor shopping in the orthopaedic trauma population. *J Bone Joint Surg Am*. 2014;96(15):1257-1262.
9. Pedersen T. Complications and death following anaesthesia. A prospective study with special reference to the influence of patient-, anaesthesia-, and surgery-related risk factors. *Dan Med Bull*. 1994;41:319-331.
10. Volkow ND, McLellan TA, Cotto JH, et al. Characteristics of opioid prescriptions in 2009. *JAMA*. 2011;305(13):1299-1301.
11. Zywiel MG, Stroh DA, Lee SY, et al. Chronic opioid use prior to total knee arthroplasty. *J Bone Joint Surg Am*. 2011;93(21):1988-1993.