

An Economic Analysis of MAC Versus WALANT: A Trigger Finger Release Surgery Case Study

HAND
2017, Vol. 12(4) 348–351
© American Association for
Hand Surgery 2016
Reprints and permissions:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1558944716669693
hand.sagepub.com

Jason L. Coddling¹, Suneel B. Bhat¹, and Asif M. Ilyas¹

Abstract

Background: There has been recent interest in wide awake hand surgery, also referred to as “wide awake local anesthesia with no tourniquet” (WALANT) surgery. Using a model of single trigger finger release (TFR) surgery, a hypothesis was made that WALANT would result in decreased hospital time and cost than patients receiving sedation with monitored anesthetic care (MAC). **Methods:** Consecutive cases of single TFR surgery with MAC were compared with WALANT. All surgeries were performed in the same manner, at the same facility, and by the same surgeon. Total operating room (OR) time, surgical time, recovery time, and anesthesia costs were analyzed. **Results:** There were 78 patients: 31 MAC and 47 WALANT. The MAC group averaged 27.2 minutes of OR time; the WALANT group averaged 25.2 minutes. The MAC group surgical time was 10.2 minutes versus WALANT of 10.4 minutes. Post-operatively, the MAC group averaged 72.3 minutes in the recovery room compared with WALANT group of 30.2 minutes. Each case performed under MAC had a minimum of excess charges from anesthesia of approximately \$105. **Conclusions:** Patients undergoing single TFR surgery under WALANT trended toward less time in the OR, had similar surgical times, and spent significantly less time in the recovery room, compared with MAC, thereby resulting in less indirect costs. Each MAC case also had minimum direct excess anesthesia charges of \$105, which knowingly underestimates overall charges as it excludes material and fixed costs associated with the delivery of anesthesia. Avoiding sedation for high-volume procedures such as TFR may result in significant systemic savings to payers, and in the future with bundling and episode-based payments can become increasingly important to patients, facilities, and surgeons.

Keywords: epinephrine, lidocaine, local anesthesia, no tourniquet, wide awake surgery

Introduction

There has been growing interest in wide awake hand surgery, also referred to as “wide awake local anesthesia no tourniquet” (WALANT) surgery.²⁻⁹ In this technique, the patient does not receive sedation through monitored anesthesia care (MAC), eliminating the need of an anesthesia provider. Pain control is obtained via a local injection of lidocaine with epinephrine. The epinephrine used in combination with the lidocaine preserves hemostasis of the operative field, negating the need and discomfort of a tourniquet. Despite the widely accepted belief that epinephrine used in the distal extremity may ultimately lead to finger necrosis, recent studies have demonstrated the safety and efficacy of utilizing epinephrine in the hand.^{1-9,12}

One of the purported benefits of WALANT surgery is less operative and hospital time, and subsequently less cost.^{2,5,6} Without the need for induction of formal anesthesia, operating room (OR) time may be reduced. In addition, recovery from the anesthetic is not necessary and may lead to a shorter post-anesthesia care unit (PACU) time, further

shortening a patient’s hospital experience. An additional potential benefit of WALANT surgery is cost reduction. Without the use of MAC, the standard preoperative patient diagnostic evaluation including medical consultation, lab-work, and other diagnostic studies is not necessary; an anesthetic provider is not needed, and the costs of anesthetic agents and the fixed costs of its delivery are eliminated. However, little is known of the objective potential economic benefits. With the propagation of bundled and episode of care payments, there has been growing demand for more cost efficient care.

The purpose of this study is to investigate the operative and PACU time in WALANT hand surgery, and to perform an economic analysis of WALANT hand surgery utilizing a

¹The Rothman Institute at Thomas Jefferson University, Philadelphia, PA, USA

Corresponding Author:

Jason L. Coddling, The Rothman Institute, Thomas Jefferson University, 925 Chestnut Street, 5th Floor, Philadelphia, PA 19107, USA.
Email: jasoncoddling@gmail.com

single trigger finger release (TFR) surgery model, as compared with patients receiving sedation with MAC. A hypothesis was made that WALANT surgery would result in decreased hospital time and cost than patients receiving MAC.

Materials and Methods

After obtaining institutional review board (IRB) approval, all consecutive cases of single trigger finger and trigger thumb release surgery performed between 2010 and 2012, all performed with MAC, were compared with all consecutive cases performed between 2013 and 2014, all performed with the WALANT technique. All surgeries were performed in the same manner, at the same medium-sized community hospital, and by the same board-certified orthopedic surgeon with fellowship training in hand surgery. Excluded were patients who had multiple digit TFRs, revision TFRs, or a single TFR with a concomitant procedure, such as a carpal tunnel release. Total OR time, surgical time, and recovery time were retrieved from the anesthesia record and nursing documentation. These times were compared and statistically analyzed. Anesthesia charges were based on Current Procedural Terminology (CPT) code 01810—anesthesia for all procedures on tendons of the forearm, wrist, and hand, which is assigned 3 base units. Based on our average total OR time in the MAC group, discussed below, 1.8 time units were utilized. The 2013 national average conversion factor of 21.9243 was utilized.

Both MAC and WALANT patients are brought into the operative theater and remain on the stretcher, positioned supine. A non-sterile tourniquet on the upper arm was applied to those undergoing MAC, while no tourniquet was applied in the WALANT group. Both groups undergo prepping and draping in the standard sterile fashion.

Upon induction of anesthesia for the MAC cases, but prior to initiating surgery, a total of 5-10 cc of 1% lidocaine without epinephrine was injected into the surgical site. After injection but prior to making incision, the MAC group utilized an esmarch to exsanguinate the limb followed by insufflation of the tourniquet to 250 mm Hg.

For patients undergoing WALANT hand surgery, 9 cc of 1% lidocaine with 1:100 000 epinephrine and 1 cc of sodium bicarbonate was mixed. A total of 5-10 cc of this mixture was injected into the surgical site prior to making incision. Identical incisions were made in both groups, and all incisions in both groups were closed with 2 horizontal mattress 4-0 nylon sutures.

Results

A total of 78 patients met the inclusion criteria; 31 patients underwent sedation with MAC and 47 patients with WALANT surgery. The average ages were 62 and 61 for

MAC and WALANT groups, respectively. There were 24 females in the MAC group (77%) and 20 in the WALANT group (43%). There were no complications in either group.

As defined by the in-room and out-room time, patients in the MAC group had an average total OR time of 27.2 (range 20-38) minutes, while the WALANT group averaged 25.2 (range 19-35) minutes ($P > .05$).

The surgical time, as defined by the documented procedure start and end time, averaged 10.2 (range 7-20) minutes in the MAC group. The WALANT group averaged 10.4 (range 7-23) minutes ($P > .05$).

Post-operatively, patients in the MAC group spent an average of 72.3 (range 45-354) minutes in the recovery room prior to discharge, compared with 30.2 (range 15-55) minutes in the WALANT group ($P < .01$).

We estimated that each case performed under MAC had excess charges secondary to anesthesia reimbursement of approximately \$105.

Discussion

Trigger finger is a common hand condition that is often treated with surgical release of the A1 pulley.¹⁰ Anesthetic practices, including sedation with MAC, have been utilized during surgery for sedation and pain control for both the surgical pain and tourniquet discomfort. However, recent advances in WALANT hand surgery have offered patients and surgeons an alternative approach to the surgical management of trigger finger forgoing the need for anesthesia staff involvement.^{6,8}

In our analysis of WALANT hand surgery performed in the treatment of single digit TFR surgery, we found no significant difference in the length of the procedure or the total time spent in the OR when compared with sedation with MAC. However, our results did demonstrate a statistically insignificant trend of less time in the OR and similar surgical time from incision to closure. Less time in the OR can be expected to result in decreased indirect costs such as overhead and nursing costs. Moreover, less time in the OR can also be expected to result in improved utilization of the OR for additional cases.

PACU times were significantly shorter in the WALANT group (30.2 minutes) versus the MAC group (72.3 minutes). As WALANT patients do not receive anesthetic agents, they do not have to recover from their effect. In addition, these patients are allowed to drive themselves home and do not have to arrange or wait for a ride. For example, 1 patient in the MAC group had difficulty with their ride post-operatively, as their driver left the hospital during the procedure. The patient then spent 354 minutes in the PACU. Even when this outlier was removed from the statistics, the average PACU time for the MAC group was 62.9 (range 45-101) minutes, still more than double the average WALANT time of 30.2 minutes ($P < .01$). Again, less time in the recovery room can

be expected to result in decreased indirect costs such as overhead and nursing costs.

TFR utilizing WALANT surgery instead of sedation with MAC demonstrated savings of approximately \$105 per case, based on anesthesia provider reimbursement. However, this number represents the absolute minimum difference and is a gross underestimation of the actual cost savings associated with WALANT surgery. This figure does not take into account the overhead costs of providing anesthesia. This includes the cost of administered drugs, anesthesia set-up costs, and equipment and maintenance costs that are typically incurred by facilities that provide anesthesia services. In addition, the cost of extended staffing hours in the PACU must be considered when utilizing MAC anesthesia instead of WALANT surgery. Finally, the majority of patients undergoing WALANT surgery do not need a preoperative evaluation and clearance, saving the costs, time, and discomfort associated with a standard preoperative medical evaluation and clearance.

Our cost analysis was performed based on the Medicare reimbursement schedule, which often differs from private insurance reimbursement. In addition, we only considered single trigger finger surgery in our analysis, excluding revision surgery and TFR surgery combined with other procedures. These procedures take more time to perform, and the cost savings from longer cases is not reflected in our estimate, but the cost savings could readily be extrapolated to be greater with longer cases also performed under WALANT. Ultimately, with the introduction of bundled payments, WALANT surgery could allow the surgeon to capture a greater fraction of the payment.

Because the purpose of the study was designed to investigate perioperative times and to perform an economic analysis, no outcome measures, patient satisfaction scores, or follow-up data were collected. However, a few studies have investigated patient satisfaction in patients undergoing WALANT hand surgery. Davison et al found that 93% of patients undergoing carpal tunnel release wide awake would choose to undergo surgery wide awake again in the future.² They also found that the patient's intraoperative anxiety during wide awake surgery was no greater than their preoperative anxiety, and that wide awake patients had significantly less preoperative anxiety than patients undergoing the same procedure with sedation. Teo et al found that 86% of patients undergoing wide awake hand surgery for various procedures would choose wide awake surgery again in the future. Ninety-one percent of their patients felt the pain they experienced during surgery was comparable with a dental procedure and that anxiety levels were generally low.¹¹

Our study has some weaknesses. First, it is a retrospective study based on the experience of a single surgeon operating at a single institution. Multicenter, prospective, randomized trials could build upon our data and add to the hand surgery

literature. As discussed above, the study was not designed to investigate outcomes or patient satisfaction, and is predominately an economic analysis and investigation into procedure times, thus lacking any clinical data. Furthermore, our cost analysis was extrapolated and based on Medicare reimbursement schedules. This likely underestimates the cost savings of WALANT hand surgery, particularly relative to private insurers. Similarly, the cost savings are further underestimated, as the fixed costs of anesthesia as well as the added costs of preoperative patient diagnostic evaluation are not included in this analysis.

In conclusion, patients undergoing single TFR surgery under WALANT demonstrated a trend of less time in the OR and similar surgical time from incision to closure, compared with sedation with MAC. Patients in the WALANT group also spent significantly less time in PACU post-operatively, and saved approximately \$105 in excess anesthesia charges, which is likely an underestimate. Avoiding the use of anesthesia services for high-volume procedures such as WALANT trigger finger surgery may result in significant systemic annual savings to payers. In the future, these savings may be desirable with the growth of bundling and episode-based payments to patients, facilities, and surgeons.

Ethical Approval

This study was approved by our institutional review board.

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. This article does not contain any studies with animal subjects.

Statement of Informed Consent

Informed consent was obtained from all individual participants included in the study.

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. Al Youha S, Lalonde DH. Update/review: changing of use of local anesthesia in the hand. *Plast Reconstr Surg Glob Open*. 2014;2(5):e150.
2. Davison PG, Cobb T, Lalonde DH. The patient's perspective on carpal tunnel surgery related to the type of anesthesia: a prospective cohort study. *Hand (N Y)*. 2013;8(1):47-53.

3. Lalonde D. Minimally invasive anesthesia in wide awake hand surgery. *Hand Clin.* 2014;30(1):1-6.
4. Lalonde D, Eaton C, Amadio P, Jupiter J. Wide-awake hand and wrist surgery: a new horizon in outpatient surgery. *Instr Course Lect.* 2015;65:249-259.
5. Lalonde D, Martin A. Epinephrine in local anesthesia in finger and hand surgery: the case for wide-awake anesthesia. *J Am Acad Orthop Surg.* 2013;21(8):443-447.
6. Lalonde D, Martin A. Tumescent local anesthesia for hand surgery: improved results, cost effectiveness, and wide-awake patient satisfaction. *Arch Plast Surg.* 2014;41(4):312-316.
7. Lalonde DH. Wide-awake extensor indicis proprius to extensor pollicis longus tendon transfer. *J Hand Surg Am.* 2014;39(11):2297-2299.
8. Lalonde DH, Wong A. Dosage of local anesthesia in wide awake hand surgery. *J Hand Surg Am.* 2013;38(10):2025-2028.
9. Ruxasagulwong S, Kraissarin J, Sananpanick K. Wide awake technique versus local anesthesia with tourniquet application for minor orthopedic hand surgery: a prospective clinical trial. *J Med Assoc Thai.* 2015;98(1):106-110.
10. Saldana MJ. Trigger digits: diagnosis and treatment. *J Am Acad Orthop Surg.* 2001;9(4):246-252.
11. Teo I, Lam W, Muthayya P, et al. Patients' perspective of wide-awake hand surgery—100 consecutive cases. *J Hand Surg Eur Vol.* 2013;38(9):992-999.
12. Vinycomb TI, Sahhar LJ. Comparison of local anesthetics for digital nerve blocks: a systematic review. *J Hand Surg Am.* 2014;39(4):744-751.