

Clinical and epidemiological evaluation of patients undergoing surgical treatment with local anesthesia using the walant technique

Abstract

Local anesthesia without tourniquet, also called WALANT, is a technique that uses the vasoconstrictive effects of adrenaline and local anesthetics of lidocaine to establish an anesthesia with hemostatic control. Allowing the active participation of the patient in the intraoperative period, the local anesthesia fully agreed without the use of tourniquet improves the patient's satisfaction to rehabilitation and produces greater patient satisfaction. This study evaluated the pain of patients undergoing hand surgery using the visual analogue scale (VAS) intraoperatively, presenting the patient with a scale with numbers 0 and 10 during the surgical procedure, questioning him about the level of his pain during the procedure surgery. A prospective interventional study was carried out in which patients undergoing surgical treatment of the hand using the WALANT technique were evaluated. Of the total number of patients evaluated (n=23), 15 (65%) of the patients "did not have any complaints of pain", which according to the VAS scale is classified as zero, 6 (25%) reported feeling "mild pain", classified in 1 to 3 by the VAS scale, and 2 (8%) patients indicated "moderate pain", classified in 4 and 5 by the VAS scale. The application of the WALANT technique increased patients' comfort and convenience, allowing the patient to be discharged on the same day, almost immediately after surgery, in addition to good receptivity for this type of technique. Because it is a quick, non-bureaucratic procedure, more agile to perform the surgery, and a reduction in surgical time, this type of technique is clearly effective and safe during hand surgery procedures, with no reports of complications.

Keywords: anesthesia, hand surgery, tourniquet

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Introduction

Popularized by plastic surgeon Donald Lalonde, the Wide Awake Local Anesthesia No Tourniquet (WALANT) technique has been gaining ground in hand surgery. This technique involves using a local anesthetic and a hemostatic agent such as adrenaline for procedures on the upper limb, especially the hand, without the need for sedation and/or tourniquets, consequently reducing surgery waiting times.^{1,2}

Offering a variety of benefits, such as anesthetic safety for the patient and the ability to participate intraoperatively, observing immediate surgical results. Its main characteristics include the use of local anesthetic with adrenaline in the operative field, including the fingers; the use of larger volumes of local anesthetic to achieve a tumescent effect; avoidance of regional anesthesia, general anesthesia, sedation, or tourniquet use; and intraoperative involvement of a physiotherapist to assess the range of motion.³

Numerous procedures can be performed with WALANT, and it is well-suited for patients with comorbidities where sedation would be contraindicated (congestive heart failure, obstructive sleep apnea). Tourniquet use can also be contraindicated in some patients, providing another reason to choose WALANT.⁴

Traditionally used to prevent blood loss, tourniquet use is commonly associated with trauma, employed to perform surgery without bleeding for better surgical site visualization. Although previously described as a last resort technique, experiences in Afghanistan and Iraq, along with routine and safe use of tourniquets by surgeons, led to a reconsideration of this approach.^{5,6}

On the other hand, developed to eliminate tourniquet pain during

upper limb and hand surgery while improving operating room and hospitalization time utilization, the WALANT technique eliminates the risks of muscle, skin, and neurovascular injuries, such as neuropraxia that may occur when the tourniquet time is exceeded.^{7,8}

Understood through the use of a mixture of local anesthetic (lidocaine) with epinephrine to allow adequate visualization of the operative field through epinephrine's vasoconstrictor effect, providing a safe and efficient condition for extremity procedures. The WALANT technique optimizes surgical time, enabling more procedures with lower hospital costs. It also benefits locations with poor access to healthcare where there is no equipped surgical infrastructure.^{2,9,10}

Local anesthetics (LA) are widely used as agents for anesthesia and analgesia during intraoperative and postoperative periods. Lidocaine and bupivacaine, both amides, are commonly used in the WALANT technique. These amides block voltage-dependent sodium channels, leading to a decrease in the sensation of pain and are metabolized by the liver.¹¹

The introduction of adrenaline into the local anesthetic aims to reduce bleeding in surgical incisions, benefiting the surgeon by enabling delicate hand procedures without the use of a tourniquet and other more invasive anesthetic techniques, thus reducing surgical time.¹²

Epinephrine, when used in combination with amides, provides hemostasis by activating alpha-adrenergic receptors, causing vasoconstriction of blood vessels. This vasoconstriction also delays the absorption of lidocaine, prolonging analgesia and improving the safety profile of lidocaine. There is evidence that epinephrine also achieves hemostasis through platelet aggregation.¹³

A unique advantage of WALANT is that it reduces the risk of adhesion formation due to the earlier active participation of the patient, which begins intraoperatively. Collagen formation begins on the third postoperative day, so it is a priority to start supervised exercises after most hand procedures to avoid stiffness and adhesions. Prolonged immobilization causes tendons and soft tissues to adhere to the fracture callus and tendon sheaths, resulting in permanently stiff joints.⁹

Furthermore, WALANT avoids the inconvenience of neuropraxia in the tourniquet placement topography. It also allows the surgeon to correct possible technique-related complications, and the patient can start rehabilitation intraoperatively.¹⁴

Studies show that the WALANT technique is cost-effective and more practical for execution, making it feasible for performing procedures in an ambulatory setting, such as offices. Since there is no need for sedation, the use of analgesics, and anti-inflammatory drugs intraoperatively.¹⁵

Supporting the author,¹⁵ during the COVID-19 pandemic, the WALANT technique was considered safe and beneficial, becoming an ally for reduced patient and healthcare professional exposure, decreasing the hospital stay of these patients, and minimizing the risks of professional exposure due to the aerosol exposure risk of intubation.^{16,17}

Moreover, WALANT also facilitates better communication between the surgeon and the patient, promoting understanding, adherence, and prevention of postoperative injuries. Leading to improved patient satisfaction. In addition, one of the important principles of WALANT is pain control intraoperatively and postoperatively compared to tourniquet use.

In this context, the present study aimed to evaluate the pain of patients undergoing hand surgery using the visual analog scale (VAS) intraoperatively. Presenting the patient with a scale ranging from 0 to 10 during the surgical procedure, questioning the level of pain experienced.

Objective

To evaluate the satisfaction and pain level of patients undergoing hand surgery using the WALANT local anesthesia technique.

Methods

This is a primary interventional prospective study to evaluate the epidemiological and clinical aspects of patients undergoing surgical treatment with the WALANT local anesthesia technique. To obtain the result of this study, the methods of VAS (Visual Analog Scale) evaluation were employed.

The VAS evaluation system consists of a 10 cm line that generally has “no pain and unbearable pain” as extremes. At one end of the line, “no pain” is marked, and at the other, “worst imaginable pain” is marked. The patient is then asked to evaluate and mark on the line the pain present at that moment. VAS, besides being easy and quickly applied, is easily understood by the patient, making it a suitable way to estimate the intensity of present pain.¹⁸

The application of the VAS system was performed on a total of 23 patients of both genders, aged 18 to 70 years, while they underwent hand surgical treatment. During the procedure, the WALANT technique was applied, using a standard solution for anesthesia: lidocaine with epinephrine 2% (4 mL) plus distilled water (4 mL) and sodium bicarbonate 8.4% (1 mL). The anesthetic procedures were

performed with a 10 mL syringe, a 40x12 needle for liquid aspiration, and a 30x07 needle for infiltration (Figure 1).



Figure 1 WALANT technique applied.

After the injection of the solution at the site to be addressed, a 40-minute wait was observed before the surgical start (Figure 2). Patients operated with this type of anesthesia do not require sedation, allowing information exchange during the procedure, enabling active movement of the operated limb, and a faster return home after the operation.^{19,20} During the procedures to assess patient pain, the VAS questionnaire was applied to these patients (Figure 3).



Figure 2 After the injection of the solution, when vasoconstriction was observed.



Figure 3 The Vas questionnaire was applied to patient.

The VAS was applied intra-operatively during the surgical procedure. One of the researchers presented the scale and the patient quantified their painful experience using phrases that represented

different intensities of pain, namely: no pain, mild pain, moderate pain, intense pain and pointing to the scale (Figure 4).²¹



Figure 4 Visual Analog Scale (VAS).

Furthermore, for the assessment, the recording of possible surgical complications was performed, such as: use of a tourniquet, use of intravenous analgesic medication, and/or the need for conversion to another type of anesthesia.

The degree of bleeding was not accounted for due to the difficulty of objective and precise assessment during the procedures.

Finally, it is emphasized that the project result of this study was submitted to the Plataforma Brasil and for review and approval by the Research Ethics Committee (CEP), having been approved through the Consubstantiated Opinion of CEP No. 5.427.029. It is noteworthy that the present study did not require approval from the National Research Ethics Committee (CONEP).

Results

The following variables were considered: age, gender, diagnostic hypothesis, conduct, laterality, complications, and VAS.

The data obtained were submitted through descriptive and exploratory statistics, where quantitative variables were expressed with measures of central tendency and categorical ones, such as absolute and relative frequency. The statistical analysis will be performed using the Statistical Package for the Social Sciences (SPSS). For this study, the Shapiro-Wilks test was used with data normality distribution, the Two Proportions Equality Test in the frequency distribution of qualitative covariates, and the T-Student test for quantitative data comparison. A significance level of $p < 0.05$ was considered.

Additionally, for variable analysis, the p-value was also used. This statistical analysis aims to help identify the results applied by SPSS. Source: author's elaboration.

Initially, profiling the patients in terms of age (P-01), of the total evaluated patients (n=23), the observed average age was $42.60 \pm$ years, which is equivalent to saying that the average varies from 36.77 to 46.35 years. Regarding the variable P-02 "gender" of the evaluated patients, 09 (39.13%) are female, while 14 (60.87%) are male.

Regarding the variable P-03 "diagnostic hypothesis": 02 (9%) of the patients presented "carpal tunnel syndrome," 01 (4%) presented "revision of carpal tunnel syndrome," 01 (4%) presented "neuroma," 1 (4%) presented "trigger finger," 1 (4%) presented "burn sequel," 1 (4%) presented "gouty tophus," 1 (4%) presented "glomus tumor"; 02 (9%) presented "extensor tendon injury," 4 (17%) presented "flexor tendons and/or digital nerve neurolysis," 3 (13%) presented "trauma sequel," 4 (17%) presented "fractures," 1 (4%) presented "synthesis material loosening," and 1 (4%) presented "Stener lesion."

In turn, regarding the variable P-04 "conduct," of the total evaluated patients: 2 (9%) patients underwent "arthrodesis"; 2 (9%) underwent "excision," 1 (4%) underwent "neurectomy," 3 (13%) underwent "neurolysis," 3 (13%) underwent "osteosynthesis," 1 (4%) underwent "derotational osteotomy," 1 (4%) underwent "ligament reconstruction," 1 (4%) underwent "stump regularization," 1 (4%) underwent "synthesis material (RMS)," 1 (4%) underwent "tenolysis," 4 (17%) underwent "tenorrhaphy," 2 (9%) underwent "tenorrhaphy + neurolysis," and 1 (4%) underwent "tenotomy."

Concerning the variable P-05 "laterality": 1 (4%) is related to the "2nd right digit"; 2 (9%) to the "2nd left digit," 1 (4%) to the "3rd right digit," 3 (13%) to the "3rd left digit," 1 (4%) to the "4th right digit," 1 (4%) to the "4th left digit," 3 (13%) to the "5th right digit," 5 (22%) to the "right hand," 4 (17%) to the "right thumb," 1 (4%) to the "right thumb" and 1 (4%) to the "right trapezium."

Regarding complications, according to variable P-06: 1 (4%) of the patients needed the use of "electric scalpel + NSAID," 2 (9%) of the patients needed the use of "electric scalpel + sedation + tourniquet," 1 (4%) had "complementary anesthesia," 4 (17%) of the patients needed "sedation," while the majority, 15 (65%) of the patients underwent surgical procedures with the WALANT technique "without any complications." Finally, regarding the variable VAS (Visual Analogue Pain Scale), of the total numbers of patients evaluate (n=23); 15 (65%) of the patients "had no complaints of pain", which on the scale it is classified as zero; six patients (25%) reported feeling "mild pain", classified as 1 to 3 on the VAS scale and 2 (8%) patients indicated "moderate pain", classified as 4 and 5 by the EVA scale (Figure 5).



Figure 5 Results VAS (Visual Analogue Pain Scale).

Discussion

This study evaluated the pain of patients undergoing hand surgery using the WALANT technique and applying the visual analogue scale (VAS).

Traditionally, upper limb and hand surgeries are regular procedures in orthopedic surgery, where the tourniquet is used to prevent blood loss, using two well-established anesthetic techniques: 1) Intravenous Regional Anesthesia (IVRA) and/or “Bier block”, and 2) Anesthesia with Brachial Plexus Block. However, these anesthetic techniques may fail due to the pain associated with the use of the tourniquet.²²

Gunasagaran et al.,²³ in their studies, pointed out that of the 72 patients undergoing hand surgery, the use of a tourniquet was the main cause of intraoperative pain. For Lalonde,⁷ the discomfort of the tourniquet is very unpleasant and unnecessary for patients. To avoid this, an anesthesiologist is traditionally used to provide sedation, brachial plexus or Bier block, or general anesthesia. In the study in question, of the patients (n=2/ 9%) who had complications requiring the use of an electric scalpel + sedation + tourniquet, there was a note of “moderate pain” within grades 3 to 5 of the VAS scale applied during the surgical procedure.

Corroborating studies by Iqbal et al.,²⁴ which state that the use of a tourniquet causes “unnecessary pain” intraoperatively with little identifiable benefit when compared to the same surgery without the use of a tourniquet.

Therefore, aiming to improve access to hand surgery care, optimizing medical resources, many hand surgeons have exchanged traditional surgery using a tourniquet and sedation, for an approach that uses local anesthesia with the patient fully awake and without turnstile.²⁵

In this technique, only two medications are used on patients, lidocaine and epinephrine. Attesting that the lack of sedation during WALANT has considerable advantages, as removing the need for a tourniquet by adding adrenaline has been shown to be less painful for patients, with lower scores on the VAS scale, in addition to reducing total blood loss in comparison.²⁶

In relation to the present study, of the patients (n=4 / 17%) who had complications requiring the use of “sedation”, they reported a pain level of 0 “zero”, according to the VAS scale, with no complaints among them. pain and/or discomfort during the procedure.

Sraj et al.,²⁷ in their study about comparing the carpal tunnel release technique with the use of local anesthesia, with and without epinephrine, states that cases without the use of epinephrine had longer surgical times. It should be noted that in the study in question, the duration of each procedure was not evaluated within the variables. Kang et al.,²⁸ when comparing pain parameters and functional results in patients undergoing the WALANT technique with patients undergoing local anesthesia, without epinephrine, and general anesthesia, concluded that patients in the WALANT group had lower scores of postoperative pain, while functional results did not show statistically significant differences.

Corroborating Kudr et al.,²⁹ who state that the tourniquet-free local anesthesia technique (WALANT) offers a means of overcoming restrictions on access to the operating room and anesthetic support. For Gunasagaran et al.,²³ when evaluating perceived comfort during minor hand surgeries with local anesthesia in an awake patient without a tourniquet (WALANT) versus local anesthesia (LA)/tourniquet. The authors concluded that the WALANT technique was associated with

better patient comfort. Since the tourniquet was the main reason for discomfort during surgeries. Therefore, WALANT is an alternative in minor hand surgeries for a bloodless surgical field and without the discomfort of applying a tourniquet.

Likewise, Larsen et al.,³⁰ in a descriptive study on the usefulness and reliability of anesthesia in patients undergoing total arthroplasty of the trapeziometacarpal joint by a surgeon using local anesthetic awake without a tourniquet. They concluded that awake local anesthetic without a tourniquet is useful in providing adequate anesthesia and hemostasis, in addition to being reliable and safe, with no adverse effects.³¹

In the study in question, in addition to not presenting any complications (n=15/65%), according to variable p=07 “Pain Assessment Scale–EVA”, (n=15/ 65%) of patients declared that they did not feel any pain during the surgical procedure, demonstrating excellent receptivity and comfort of patients when undergoing hand surgery using the WALANT technique.

Conclusion

The application of the WALANT technique increased patient comfort and convenience, allowing the patient to be discharged on the same day, almost immediately.

Acknowledgments

None.

Conflicts of interest

Authors declare that there is no conflict of interest.

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