

## Evaluation of Wide-Awake Local Anesthesia No Tourniquet Technique for Extremity Surgeries

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### ABSTRACT

**Background:** A wide-awake local anesthesia with no tourniquet (WALANT) technique is introduced for treating an elective and selected hand trauma cases in the outpatient setting.

**Objective:** This study aimed to evaluate the effectiveness and benefits of WALANT technique.

**Patients and methods:** Seventy patients were managed in Zagazig University Hospital, Plastic and Reconstructive Surgery Department. The patients were divided according to the type of anesthesia into; group 1 included 36 cases used tumescent, and group 2 included 34 cases used traditional anesthesia.

**Results:** There was no significant difference as regard age and the duration of surgery between both groups. There was a significant difference between the studied groups in pain measurement scale as well as in hospital stay ( $P < 0.001$ ).

**Conclusion:** The WALANT approach is effectively allowing the procedure to be performed without the need for anesthetic recovery or hospitalization.

**Keywords:** Extremity Surgeries; Wide-Awake Local Anesthesia No Tourniquet.

### INTRODUCTION

The wide-awake local anesthesia with no tourniquet (WALANT) surgical approach uses a local anesthetic and hemostatic agent to produce the ideal conditions for hand surgery without the need of sedation or a tourniquet <sup>(1)</sup>.

By bypassing both operating rooms and overnight hospital stays, WALANT reduces unneeded exposure to patients and employees. Sedation eliminates the danger of intubation exposure and reduces the number of staff workers required to facilitate room turnover. By doing this, the hospital is able to free up operating rooms for critical situations needing anesthesia <sup>(2)</sup>.

It is also simple to use WALANT in the operating room for complicated operations like tendon transfers and multiple fracture fixations that need sophisticated equipment and additional supporting personnel. Patient safety, easier access to surgical needs, and enhanced intraoperative diagnosis and assessment are the three main advantages of WALANT <sup>(3)</sup>.

WALANT's enhanced access to surgical treatment and workflow are its preoperative advantages. Numerous studies show shorter wait times from the initial consultation through the day of operation. Patients drive themselves to the facility and have breakfast beforehand without worrying about drowsiness. Despite having less infrastructure, remote and underdeveloped locations can house surgeons <sup>(4)</sup>.

The preoperative period is shorter since patients can arrive up to 30 minutes before the scheduled operation. For safe outcomes, a preoperative workup is not required. Since preoperative permission from an anesthesiologist is not necessary, there are fewer operation cancellations and delays. Patients with major comorbidities, such as chronic obstructive pulmonary

disease (COPD) or congestive heart failure (CHF), had lower perioperative risk <sup>(5)</sup>.

In order to prevent abrupt respiratory compromise in patients with obstructive sleep apnea, COPD, or CHF, the procedure can be carried out in the upright position if necessary. Since the injections may be finished in the preoperative area, the operation and injections are carried out in different rooms to speed up room turnover <sup>(1)</sup>.

This study aimed to evaluate the effectiveness and benefits of WALANT technique.

### PATIENTS AND METHODS

Seventy patients were managed in Zagazig University Hospital, Plastic and Reconstructive Surgery Department. The patients were divided according to the type of anesthesia into; group (1) included 36 cases used tumescent, and group (2) included 34 cases used a traditional anesthesia (general anesthesia with tourniquet and local intravenous with sedation).

#### Inclusion criteria:

Patients (49 males and 21 females); their age ranged from 16 to 66 years old, and suffering from different upper extremity lesions, were involved. Some of the patients were suffering from chronic diseases as (HTN, DM, Cardiac diseases, etc.).

The seventy patients were from different six areas in Elsharkia Governorate (Zagazig, Hehia, Heria, Abu Kbeer, Fakous, Alsalhia, Abu Hammad, Menia Elkameh, Diarb negm, Elaslogy, Kafr Sakr, Ibrahemia, and 10<sup>th</sup> of Ramadan), Eldakahlia (Mit Ghamr), Cairo, Tanta, Qena, and Bani Suief.

**Exclusion criteria:**

Uncooperative (more common with children), needle-phobia, hypercoagulable states, lidocaine hypersensitivity, ongoing infection, polytraumatized patients and language/cultural differences like deaf were excluded.

**All patients were subjected to:**

**A. Preoperative Assessment:**

Full history taking (age, sex, occupation, special habit of medical or surgical importance, chronic illness, dominant hand). Clinical examination. Patient Communication and explanation of the problem, procedure and postoperative management plan. Standardized color digital photography of the cases. Laboratory investigations e.g., CBC, and coagulation profile. Radiological examination e.g., X-ray, and ultrasonography. Preoperative surgical chemoprophylaxis: third generation cephalosporin e.g., cefotaxime sodium was given I.V to all patients one hour preoperatively.

**B. Technique**

The three major aspects of WALANT are the management of pain with lidocaine, the management of bleeding with epinephrine, and the management of anxiety with technique and environment. To reduce the chance of a vasovagal reaction, the patients were injected while they were sitting up straight. Injection was perpendicular to the skin, keeping the needle as steady as possible. Instead of forcing the needle into the skin, the affected extremity was moved in its direction. A local wheel was maintained at least one centimetre in front of the advancing needle tip while injecting up to 10 cc just beneath the skin in an antegrade motion. To provide further injections, needle was re-inserted the into the numb locations. Patients only experienced pain on the first injection when everything was done correctly.

**C. Postoperative care and follow up**

There were no complications after surgery. Postoperative recovery time, postoperative hospital stay and pain scale measurement were recorded for all patients.

**Ethical Considerations:** The study was approved by Zagazig University's Academic and Ethical Committee. All participants provided written informed consent. This experiment was done in compliance with the World Medical Association's Code of Ethics (Declaration of Helsinki) for human studies.

**Statistical analysis**

Data were collected and analyzed using Microsoft Excel software. Data were then imported into Statistical Package for the Social Sciences (SPSS version 20.0) software for analysis. According to the type of data; qualitative were represented as number

and percentage and were compared by chi<sup>2</sup> test. Quantitative continuous data were represented by mean ± SD and range and were compared by independent t test. P value was set at <0.05 for significant results and P<0.001 for high significant result.

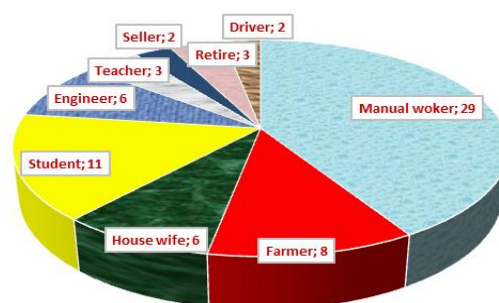
**RESULTS**

The present study showed no significant difference as regard age and sex between both groups (Table 1).

**Table (1): Demographic data between the studied patients**

Variables	Group 1 (n= 36)		Group 2 (n= 34)		p-value
<b>Age</b>	36.75 ± 5.62 (16-66)		35.25 ± 6.12 (16-66)		0.29
<b>Gender</b>	No.	%	No.	%	0.68
<b>Female</b>	10	27.78 %	11	32.36 %	
<b>Male</b>	26	72.22 %	23	67.64 %	

The occupations were mainly manual workers (29) as mechanics, tailers, carpenters, textile workers, factory workers, and housekeepers (Figure 1).



**Figure (1):** A pie graph represents the occupations of the seventy patients, operated upon, in the present study

Regarding duration of surgery, there was no significant difference between both groups (Table 2).

**Table (2): Duration of surgery between the studied patients**

Variables	Group 1 (n= 36) Mean ± SD	Group 2 (n= 34) Mean ± SD	p-value
<b>Duration of surgery (min)</b>	42.36± 20.95	38.82±11.06	0.38

There was a significant difference between the studied groups in pain measurement scale (Table 3).

**Table (3): Pain measurement scale between the studied patients**

Variables	Group 1 (n= 36) Mean ± SD	Group 2 (n= 34) Mean ± SD	p- value
Pain measurement scale	2.53 ± 0.61	5.03 ± 0.99	< 0.001

Concerning hospital stay, there was a significant difference between the studied groups in hospital stay scale (Table 4).

**Table (4): Postoperative hospital stay between the studied patients**

Variables	Group 1 (n= 36) Mean ± SD	Group 2 (n= 34) Mean ± SD	p- value
Postoperative hospital stay (hours)	2.15 ± 0.75	8.84 ± 4.76	< 0.001

## DISCUSSION

Through active patient engagement throughout the surgery, WALANT enables a more precise assessment of gapping. This can save you a trip back to the surgeon's office, since tendon "bunching" against suture can lead to rupture; once active range of motion begins postoperatively (6).

Despite initial criticism for mixing lidocaine and epinephrine, the risks of vasoconstrictive-induced ischemia and tissue necrosis have been demonstrated to be modest, and beneficial outcomes have provided rationale for its ongoing use. Folberg *et al.* (7) concluded that the stated benefits of WALANT made this anesthetic strategy appealing to surgeons, patients, and healthcare stakeholders.

Furthermore, active patient participation enables intraoperative assessment of the strength and function of repairs and reductions, which has been associated to lower re-rupture tendon rates and improved clinical outcomes. By eliminating the common side effects of general anesthesia, postoperative recovery time is decreased (8).

Our study was aiming to evaluate the safety, cost, effectiveness, and benefits of WALANT technique. Seventy patients were managed in Zagazig University Hospital, Plastic and Reconstructive Surgery Department.

Sraj (9) carried out his study on the confrontation of the carpal tunnel release technique using local anesthesia, with and without epinephrine. Cases without the use of epinephrine had longer surgical

times. Against us, he found a significant difference between his patients regarding: gender, age and type of injury.

In addition, Ayhan and Akaslan (10) carried out research that evaluated the results of intravenous regional anesthesia with the WALANT technique. In their study, the patient had bilateral CTS and, on each side, a technique was applied; as a result, the vast majority of patients were more satisfied with the WALANT technique. In accordance with our findings, there was no significant difference between patients regarding age, dominant hand and type of injury.

In the same direction, Tulipan *et al.* (11) also compared the WALANT technique with general anesthesia, using functional scores and a visual analog scale for pain. They did not find any statistical difference between one method over the other, concluding that both methods are safe and efficient, leaving it up to the surgeon to choose with complete safety.

Alter *et al.* (12) also analyzed the costs in their research, from which they compared the costs of the WALANT technique and concluded that there is an important reduction in expenses with the use of the local anesthesia technique associated with epinephrine. There was no significant difference between their patients regarding the zone in which the surgical procedure was done, the surgical procedure performed and duration of surgery however the postoperative hospital stay and patient satisfaction showed a significant difference.

Castro Magtoto and Alagar (13) and Barros *et al.* (14) carried out descriptive studies of the results of their series of cases submitted to the WALANT technique, and both are emphatic on the safety and effectiveness of the technique. Like Sardenberg *et al.* (15), they emphasize the important effectiveness in applying the WALANT technique in their series.

Thomson *et al.* (16) corroborate all the evidence for the dogma that epinephrine is responsible for necrosis of the extremities, through the report of 21 cases that occurred, particularly before 1950, in which the anesthetic used was procaine or cocaine, plus adrenaline. The authors performed an in-depth analysis of these 21 cases to determine their validity as evidence. They also examined in detail all other data in the literature on safety issues with the injection of procaine, lidocaine and epinephrine into the extremities.

Specifically, the application of the WALANT technique for the surgical treatment of upper extremity surgeries has been presenting very relevant and motivating data for its application. First, it enables the procedure to be performed on an outpatient basis, without the need for sedative medication and other anesthetic interventions (such as airway management); thus, it avoids the side effects that can result from sedation, such as nausea and vomiting. Due to the smaller structure required to perform the procedure, it

is possible to perform a greater number of procedures on the same day<sup>(8)</sup>.

The technique of tumescent anesthesia with use of lidocaine associated with epinephrine, with a dilution of 1:100000 (added 1 ml of 8.4% bicarbonate for every 10 ml of anesthetic solution), consists of infiltrating 22 ml of the solution with a needle of the smallest caliber possible (30 x 0.7 mm)<sup>(14)</sup>.

Initially, a small amount infiltrates the subdermal tissue (3-4 ml), in the distal portion of the forearm, in the topography between the median and ulnar paths, 8 ml in the subfascial plane of the distal portion of the forearm, and the remaining 10 ml in the subdermal plane and anterior to the transverse carpal ligament. The time required for application is, on average, 5 minutes, and the time determined for the beginning of the incision, so that the greatest vasoconstrictor effect of epinephrine is obtained, is 26 minutes<sup>(17)</sup>.

## CONCLUSION

The WALANT approach is effectively allowing the procedure to be performed without the need for anesthetic recovery or hospitalization.

It is also worth noting the reduction of the necessary structure for the surgical execution, the postoperative hospital stay, patient satisfaction and the incident costs, which could be an important factor of impact for the celerity of the accomplishment of the procedures, especially in the public health system.

**Supporting and sponsoring financially:** Nil.

**Competing interests:** Nil.

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