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WALANT as an Optimal Approach in Hand Surgery during Pandemics

Gordana Georgieva, Blagoja Srbov, Bisera Nikolovska, Sofija Tusheva, Katerina Jovanovska, Tomislav Jovanoski, Boro Dzonov, Smilja Tudzarova Gjorgova, Sofija Pejkova
University Clinic for Plastic and Reconstructive Surgery, Faculty of Medicine, University St. Cyril and Methodius, Skopje, North Macedonia

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Abstract: The emergence of the COVID-19 pandemic imposed fundamental changes in the field of surgery. Reorganization was made in order to adequately treat the patients during the pandemic. WALANT (Wide Awake Local Anesthesia No Tourniquet) approach was found to be a very convenient method in facilitating continuity in hand surgery with limited staff. A retrospective comparative study was performed between period of April 2020 till September 2021 at our clinic to evaluate advantages of WALANT approach. This study included 136 patients, from which 72 (53%) were operated with WALANT, compared to the control group of 64 (47%) patients without WALANT. Average hospital stay for the WALANT group was 2.2 days vs. 4.7 days for the control group. Average operating room personnel were 3.8 for WALANT and 6.2 for the control non-WALANT group. Intraoperative and postoperative VAS (visual analogue scale) score was evaluated. Due to its diversity, low cost and low complication rate, we recommend WALANT approach in acute and elective hand surgery.

Mailing Address: Blagoja Srbov, MD., University Clinic for Plastic and Reconstructive Surgery, Mother Teresa No. 17, 1000 Skopje, North Macedonia; Phone: +389 708 073 17; e-mail: blagoja_s@hotmail.com

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Introduction

The emergence of the COVID-19 pandemic imposed fundamental changes in everyday life. Due to the diversion of the staff and facilities for the treatment of patients with SARS-CoV-2, the elective cases for surgery were postponed for a period of time. That was not the case with emergency surgeries in our country that have been treated throughout the whole period since the pandemic has begun. For a more efficient functioning, reorganization was made in order to adequately treat the patients in the conditions imposed by the pandemic (DiFazio et al., 2020).

The capacity to perform urgent surgery has been reduced due to the diversion of anesthesiologists, theatre staff, anesthetic equipment and surgeons for management of the current crisis (DiFazio et al., 2020; Hobday et al., 2020). Furthermore, many departments are often and suddenly repurposed as COVID-19 intensive care units, increasing the demand for free hospital beds (Hobday et al., 2020; Khor et al., 2021). WALANT (Wide Awake Local Anesthesia No Tourniquet) approach was found to be a very convenient method in facilitating continuity in hand surgery with limited staff. Finding new strategies to get ahead was essential during this period.

Material and Methods

A retrospective comparative study was performed at the University Clinic for Plastic and Reconstructive Surgery in Skopje, North Macedonia. The aim of our study was to investigate the advantages of using Wide Awake Local Anesthesia No Tourniquet (WALANT), its applicability and overall outcome in hand trauma. In the period between April 2020 till September 2021, 304 patients with hand injuries were treated. Inclusion criteria for participation in the study were patients over 18 years old that were indicated for and consented to surgery with acute hand injuries. Acute hand injuries are defined as injuries of the hand that were inflicted suddenly by a traumatic force to the hand, that may result in lesion of anatomical structures and function and require immediate medical attention. Exclusion criteria were patients with mangled hand injuries with vascular trauma of the hand. Seventy-two patients were treated with WALANT by two surgeons in our department. Additionally, as a control group we designed a second group with patients from two other surgeons that did not use WALANT in the same time frame. This group counted 64 patients. All of the patients tested negative for COVID-19 with routine PCR tests on admission. Preoperatively, they received a single-shot antibiotic. Approximately 40 minutes before the procedure, WALANT solution containing lidocaine buffered with 8.4% sodium bicarbonate $NaHCO_3$ at a 5:1 ratio, was administered at the ward (Lalonde, 2017; Kurtzman et al., 2021). The solution we used was a mixture of 1% lidocaine with epinephrine in 1:100 000 ratio and 1 ml 8.4% bicarbonate in 10 ml of lidocaine-epinephrine solution to buffer lidocaine-induced acidity at the injection site. According to current guidelines, for surgery with longer duration (>2.5 hours) bupivacaine can be added to the mixture. Additionally, in case of epinephrine-induced ischemia phentolamine should be available as a reversal option

in a concentration of 1 g to 10 ml of 0.9% saline (Fish and Bamberger, 2021). The injection site was determined depending on the type and location of the injury.

We compared the two groups of patients by average hospital stay, pain using the visual analogue scale (VAS) score, the number of staff in the operating room per operation, conversion rate and complications. We assessed the COVID-19 transmission rate in the operating theatre and hospital ward. Patients were scheduled for regular follow-up 1 month postoperatively and questioned for pain levels and overall satisfaction with the procedure using VAS (Heller et al., 2016; Delgado et al., 2018). The results were statistically analysed.

Results

This study included 136 patients, from which 72 (53%) were operated with WALANT by two surgeons compared to the control group of 64 (47%) patients from two other surgeons from our department that did not use WALANT. The average age in the WALANT group was 46.8 (range 20–74 years), as for the other group the average age was 48.8 years (range 21–77 years) (Table 1).

The WALANT group counted 67 (93%) males and 5 (7%) females, whereas the non WALANT group were 56 (86%) males and 8 (14%) females. The total gender distribution was in favour for the male population (90%, n=123) compared to the females (10%, n=13) (Table 2).

Patients were divided according to the type of injury into several groups. Most of the patients were with combined injuries of the hand in both WALANT and

Table 1 – Age distribution of WALANT and Non-WALANT patients

Age	WALANT patients	Non-WALANT patients
20–29	13	11
30–39	16	14
40–49	11	9
50–59	12	10
60–59	9	7
70–79	11	13
Total	72 (average 46.8) (range 20–74)	64 (average 48.8) (range 21–77)

Table 2 – Gender distribution

Gender	Male	Female
WALANT	67 (93%)	5 (7%)
Non-WALANT	56 (86%)	8 (14%)
Total	123 (90%)	13 (10%)

Table 3 – Patients divided by their individual injuries

	Integument	Skeleton	Muscle/ tendon	Neuro-vascular	Combined
WALANT	3 (4%)	7 (10%)	28 (39%)	2 (2%)	32 (45%)
Non-WALANT	5 (8%)	3 (5%)	23 (36%)	1 (1%)	32 (50%)
Total	8 (6%)	10 (7%)	51 (38%)	3 (2%)	64 (47%)

Table 4 – Hospital days and number of staff needed in the operating room

	Hospital days	Operating room personnel
WALANT	2.2	3.8
Non-WALANT	4.7	6.2

non-WALANT group (47%, n=64). Patients with muscle or tendon injury were on second place with 38% (n=51). The rest of the patients were with skeleton (7%, n=10), integument (6%, n=8) and neurovascular (1%, n=1) injuries (Table 3).

Average hospital stay for the WALANT group was 2.2 days, as opposed to the control group 4.7 days, which is significantly less days in favour for the first group. Average operating room personnel were 3.8 for WALANT and 6.2 for the control non-WALANT group (Table 4). It required significantly less staff in the OR for the WALANT group compared to the other group.

Seventy three percent of the patients did not report pain in the first 6 hours after WALANT surgery. None of the patients required opioids for pain management. Only 1 patient with WALANT was converted to general anesthesia due to unexpected duration of surgery. There was no reported case of COVID-19 transmission in WALANT patients. No complications were reported as a result of the local anesthetic or adrenaline. The visual analogue scale was used to determine the pain intensity intraoperative and in the early postoperative phase. A numerical rating from 0 to 10 was used, with 10 being the least comfortable and 0 being the most comfortable (Heller et al., 2016; Delgado et al., 2018).

Table 5 – Visual analogue scale in both groups with intraoperative and postoperative score with statistically significant ($p<0.05$) in favour for the WALANT patients

	Intraoperative VAS	Postoperative VAS
WALANT	1.89 (SD 1.52)	1.20 (SD 1.10)
Non-WALANT	4.67 (SD 2.85)	3.85 (SD 1.55)

VAS – visual analogue scale; SD – standard deviation

Intraoperative the mean VAS for the WALANT group was 1.89 (SD [standard deviation] 1.52), whereas it was 4.67 (SD 2.85) for the other group, and the difference was statistically significant ($p<0.05$).

Postoperatively, the mean VAS for the WALANT group was 1.20 (SD 1.10), whereas it was 3.85 (SD 1.55) for the other group, and the difference was statistically significant ($p<0.05$) (Table 5).

Discussion

During COVID-19 pandemics our hospital underwent major reorganization of personnel and resources, all elective hand surgeries were cancelled, or postponed, and only acute hand injuries were treated. Our clinic encountered practicing medicine in unfamiliar and challenging circumstances, one of the biggest obstacles being lack of staff and hospital beds. As such, we started considering methods that required less engagement by healthcare workers and reduced the time of hospital stay. As a result of the scarcity of anesthesiology personnel, we started using Wide Awake Local Anesthesia No Tourniquet (WALANT). Introduced over a decade ago by Dr. Donald H. Lalonde, the WALANT technique was used for treating patients in the outpatient setting (Lalonde, 2017). Since then, the technique has gained popularity and its specter of use was broadened significantly (Turcotte et al., 2020; COVIDSurg Collaborative and GlobalSurg Collaborative, 2021). It is correlated with positive outcomes and patient satisfaction. In detail, local anesthetics, hemostatic agents and alkalizing agents are applied to the operative site through a local injection. It is believed that the alkalizing agent (lidocaine buffered with 8.4% sodium bicarbonate $NaHCO_3$ at a 5:1 ratio), acts beneficially for lowering pain associated with local anesthetic infiltration and further potentiates the hemostatic effect of epinephrine (Lalonde, 2017; Evangelista et al., 2019; Kurtzman et al., 2021). Current experiences show that it is convenient for performing common procedures of the hand or wrist, without the need of tourniquet and intravenous sedation. Thus, pain and discomfort experienced by the patient are significantly lower, while at the same time providing pain control and hemostasis, as well as intraoperative assessment of the hand function. Since the start of the pandemic, only a few authors have described the benefits of this type of anesthesia.

Alves et al. (2021) stated the benefits of WALANT during COVID-19 pandemic are essential. They state that the patients subjected to this technique did not feel any pain during the surgery, proving it to be effective in its purpose. Also, the possibility of evaluating the passive hand movement was a remarkable benefit. In addition, they emphasize the shorter post-surgical length of stay, thus, generating greater benefit to the patient's health.

In other publication, Nolan et al. (2020) clearly reviewed the best available evidence due to function, complications, cost, or patient-reported outcomes. They state that it is improved when flexor tendons are repaired using wide-awake

technique, because it will determine if this novel approach is superior to general or regional anesthesia.

The utilization of WALANT method has grown exponentially over time since its introduction. This anesthetic method has become an attractive option for both surgeons and patients. Its value has been demonstrated by achieving positive results in a broad extent of surroundings (Evangelista et al., 2019; Khor et al., 2021; Masterton and Talwar, 2021). Generally, patients undergoing wide-awake procedures are not succumbed to preoperative assessment for anesthesia clearance, such as laboratory tests and other diagnostic procedures (DiFazio et al., 2020; Khor et al., 2021). The technique is modest in consumption of healthcare resources and contributes to substantial health budget savings by reducing hospital stay, fewer office visits, personnel sparing, medication sparing, etc. Moreover, the properties of WALANT include no aerosolizing procedures, shorter recovery time, reduction of OR personnel and COVID-19 transmission consequently (Kurtzman et al., 2021). Perhaps the greatest advantage is the ability for intraoperative motion to assess the outcome of the repair or reconstruction of hand structures. The ability to assess active hand movement was a significant benefit. As far as tourniquet is concerned, not having an inflated tourniquet eliminates the possibility of ischemic pain, thus reducing the time restriction. Tourniquet inflicted ischemic pain also limits full motion of muscular system units, therefore disabling intraoperative evaluation of repair/reconstruction. The reperfusion pain should also be factored. Patient comfort is greatly enhanced, as there is no need for preoperative starving or stopping medication, anticoagulants included. This has great clinical significance as it lowers the risk for thrombotic occurrences. However, on the downside the duration of analgesia is shorter compared to regional blocks, the field is not as dry in comparison to using a pneumatic tourniquet, and it is recommended to wait at least twenty minutes between application and incision for maximal hemostatic effect. WALANT has diverse application in acute hand trauma surgery.

Conclusion

According to our experience, the WALANT method (Wide Awake Local Anesthesia No Tourniquet) was found to be a convenient and reliable method for treating urgent and non-urgent conditions in the domain of hand surgery. During COVID-19 pandemic we expanded the application of WALANT to more complex injuries with satisfactory results. The patients who were submitted to this approach did not experience any discomfort throughout the procedure, demonstrating that it is successful for its intended purpose. The many up-sides allowed for improved surgical success and as a result, a lower risk of the necessity of surgical re-approach, as well as a shorter post-surgical length of stay, and less healthcare personnel, all of which resulted in greater benefit to the patient's health and rational use of health resources.

We recommend WALANT for further use in acute hand trauma surgery, as well as in elective hand surgery, both in OR and outpatient settings due to its diversity, resulting in low cost and low complication rate.

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