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Pain score evaluation in patients underwent hand surgery under WALANT compared to those under local or general anesthesia with tourniquet

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ABSTRACT

Background: The Wide Awake Local Anesthesia No Tourniquet (WALANT) has been reported to offer simpler pre-surgical instruction and assessment, faster operating time, better surgical visualization, shorter hospital stay, fewer complications and side effects, lower cost, faster post-operative recovery time, better patient's satisfaction, and less pain and discomfort. This study aims to review the pain score in hand surgery using the WALANT technique compared to local anesthesia or general anesthesia with a tourniquet.
Methods: A comprehensive literature search was conducted in PubMed, Cochrane Library, and Google Scholar in March 2021. Eligible randomized-controlled trials (RCTs) and cohort studies compared injection time intra-operative or post-operative pain using Visual Analog Score (VAS) in WALANT and local anesthesia or general anesthesia with a tourniquet.
Results: Five studies (3 RCTs and two cohorts) were included in this article, including 645 hand surgeries (376 carpal tunnel syndrome cases, 181 trigger finger cases, 42 cubital tunnel syndrome cases, 44 de Quervain's disease cases, and two ganglion cyst cases). Three studies reported a significantly lower VAS in the WALANT group, while the other two reported a lower VAS in the WALANT group, but not statistically significant.
Conclusion: WALANT is still a technique worth considering in hand surgery because of its superiority in minimizing intra-operative and post-operative pain.

Keywords: *hand surgery, WALANT, wide awake surgery*.
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BACKGROUND

Many minor hand and wrist surgeries, such as tunnel carpal release, trigger finger, or ganglion cyst, could be done with local anesthesia. Local anesthesia has been proven to reduce complications and prevent hospitalization compared with general anesthesia. However, the most known use of local anesthesia in minor hand and wrist surgery was with a tourniquet. The use of a tourniquet in hand and wrist surgery can cause complications such as nerve damage, pain, and discomfort. Because of these complications, a new technique called the wide-awake surgery has gained popularity.[1-10]

The Wide-Awake Local Anesthesia No Tourniquet (WALANT) is a new technique widely used in minor hand and wrist surgery where lidocaine and epinephrine are injected for local anesthesia and vasoconstriction. The WALANT allows the surgery to be performed in fully awake patients, which helps in intraoperative hand motion assessment, no tourniquet preventing pain and discomfort, and a less bloody surgical field.[1,5,7,9,11,12]

The WALANT has been reported to have several better outcomes than general and local anesthesia with a tourniquet. It offers simpler pre-surgical instruction and assessment, faster operating time, better surgical visualization, faster recovery, a shorter hospital stay, fewer complications and side effects, lower cost, better patient satisfaction, and less pain and discomfort.[1,7,11-14]

This study aims to review the intra-operative and post-operative pain score using the WALANT technique compared to local anesthesia or general anesthesia with a tourniquet and to recommend which type of anesthesia has a better intra-operative and post-operative pain outcome in minor hand and wrist surgery.

METHODS

A comprehensive literature search was done using an electronic PubMed, Cochrane Library, and Google Scholar database. The combinations of main keywords used were as follows: "WALANT" or "wide awake surgery" AND "hand surgery" AND "lidocaine" AND "epinephrine" AND "anesthesia." The search was done in March 2021.

We included all studies that meet all the following criteria: adult population (≥ 18 years old); diagnosed with either traumatic or atraumatic hand and wrist disease; undergoing WALANT procedure; compared to local anesthesia or regional anesthesia or general anesthesia with a tourniquet; patient's intra-operative or post-operative pain outcome scored using

Visual Analog Scale (VAS); study design of randomized controlled trials (RCTs) or quasi-randomized trial and cohort studies.

The retrieved articles were screened in two steps: first, by matching the articles with the inclusion criteria, and second, by evaluating the articles' eligibility for systemic review. The screening was done by two reviewers (MAY and TNP). The two reviewers screened all the titles and abstracts identified from each database's search results to determine eligibility. The full text of eligible articles was then retrieved and reviewed. All articles were limited to English and were released in the last ten years.

The information from the original articles was collected using the standardized data abstraction list, including the first author's last name, year of publication, country, type of study, design of the study, anesthesia method (WALANT, local anesthesia with tourniquet or regional anesthesia or general anesthesia), and outcome (VAS).

RESULTS

We acquired 134 potential articles from the electronic literature search, and then we excluded 28 articles; 9 were due to duplication, three were not in English, and 16 were published before 2011. After screening titles and abstracts, 92 articles were excluded, giving 15 articles to be assessed. After full-text screening, 5 articles met the inclusion criteria.

Of all the remaining articles, three were randomized control trial studies, and 2 were cohort studies. 2 were conducted in South Korea, one each in the USA and Malaysia. All articles were published in English between 2011 and 2021.

The total samples of all five articles were 645: 185 in the first article, 86 in the second article, 230 in the third article, 104 samples in the fourth, and 40 samples in the last article, with a total of 645 hand surgeries, 376 carpal tunnel syndrome cases, 181 trigger finger cases, 42 cubital tunnel syndrome cases, 44 de Quervain's disease cases, and two ganglion cyst cases. In 2 studies, pain score outcome was assessed post-operatively, in 2 studies intra (injection time) and post-operatively, and in 1 study intra-operatively (injection time).

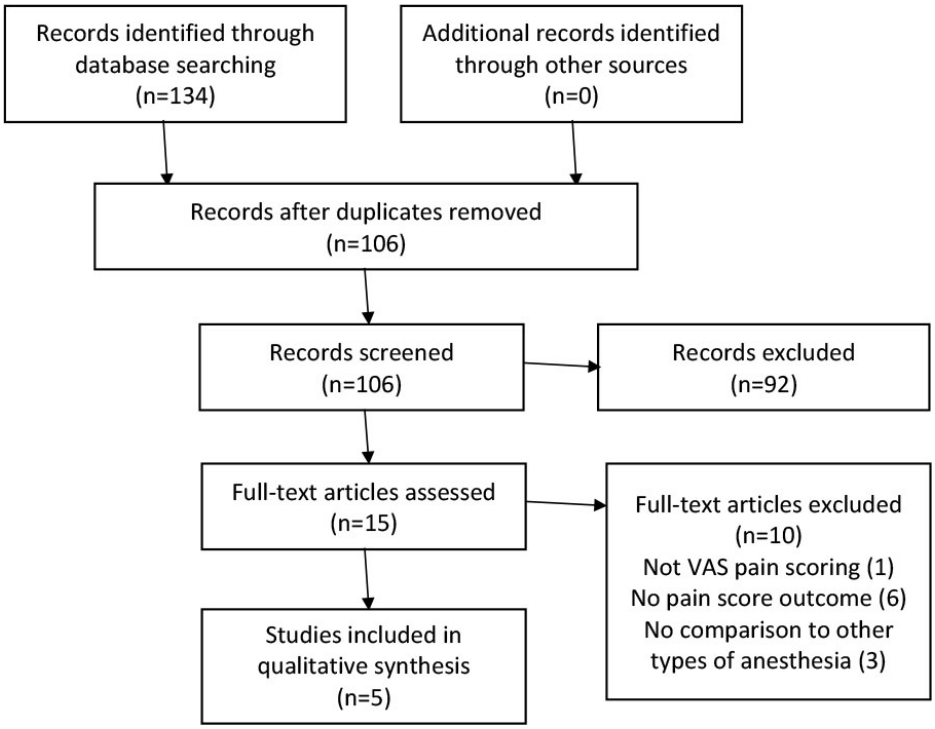

Figure 1. Literature screening.

The first study comparing the injection time and post-operative pain VAS in 185 samples (65 trigger finger cases, 76 carpal tunnel syndrome cases, and 44 de Quervain's disease cases; 159 women and 26 men) showed a significantly lower injection pain in the WALANT group: the pain scores were 3.21 ± 1.27, 6.13 ± 1.49 in A1 pulley release ($p < 0.001$), 3.63 ± 0.97, 6.86 ± 1.74 in 1st extensor retinaculum release ($p < 0.001$), and 4.28 ± 1.37, 7.38 ± 1.67 in CTR ($p < 0.001$) in the WALANT group and the conventional group, respectively. And a significantly lower post-operative pain in the WALANT group until one day after surgery.

The second study compared the injection time pain VAS in 86 trigger finger cases (59 women and 27 men). The mean pain score was 4.88 in the WALANT group and 5.3 in the local anesthesia with the tourniquet group, which is not statistically significant.

The third study compared the two-week and three-month post-operative pain VAS in 230 carpal tunnel syndrome cases (no data of the population's sex). The mean pain score two weeks post-operative was 2.32 and 1.8 in the WALANT group and MAC with the tourniquet group, respectively ($p = 0.06$). The mean pain score three months post-operative was 1.55 and 1.61 in the WALANT group and MAC with the tourniquet group, respectively ($p = 0.85$), which is not statistically significant.

The fourth study compared the injection time, peri-operative, and post-operative pain VAS in 104 samples (42 cubital tunnel syndrome cases and 62 carpal tunnel syndrome cases). In the cubital tunnel syndrome cases, the reported mean injection pain VAS was 2.4 ± 1.2, and the perioperative pain VAS was 0.6 ± 0.4 in the WALANT group. The WALANT group had significantly less pain up to 48 hours after surgery ($P < 0.05$) and a significantly lower pain VAS 2– 12 hours post-operative ($P < 0.01$). In the carpal tunnel syndrome cases, the WALANT group had significantly less pain at the time of injection (VAS—group WALANT 2.2±1.2, group LA 5.8±2.8; $P=0.01$), 24 hours postoperative ($P<0.05$).

The fifth study comparing the post-operative pain VAS in 40 samples (8 carpal tunnel syndrome cases, 30 trigger finger cases, and two ganglion cyst cases) showed a statistically significant lower pain VAS score in the WALANT group ($P<0.05$). The mean VAS in the WALANT group was 2.33 ±1.94); in the local anesthesia with the tourniquet group, it was 4.72 (3.05). A summary of the essential characteristics of the included studies is provided in Table 1.

Table 1. Characteristics of The Included Studies

Author	Study Design	Population	Arms	Sample Size (N)	Outcome
Gunasagaran et al.[6]	Randomized controlled trial	Patients with carpal tunnel syndrome, trigger finger, or ganglion	WALANT Local anesthesia + tourniquet	40	Post-operative pain VAS
Rashid et al.[7]	Randomized controlled trial	Patients scheduled for trigger finger release	WALANT Local anesthesia + tourniquet	86	Injection time pain VAS
Sangki et al.[8]	Prospective Randomized Controlled Trial	Patients diagnosed with trigger finger, carpal tunnel syndrome, or de Quervain's disease	WALANT Local anesthesia + tourniquet	185	Injection time, postoperative pain VAS
Kang et al.[11]	Retrospective cohort study	Patients with cubital tunnel syndrome and carpal tunnel syndrome	WALANT General anesthesia + tourniquet	104	Injection time, postoperative pain VAS
Tulipan et al.[12]	Prospective cohort study	Men or women (>18 YO) verified CTS electrodiagnostically	WALANT MAC + tourniquet	230	Post-operative pain VAS

DISCUSSION

Several studies have documented the advantage of the latter regarding the use of local anesthesia with a tourniquet over the WALANT technique.[15] In a prospective randomized study, Saleh et al.[16] reported that carpal tunnel decompression (CTD) and spring finger surgery had better results in intraoperative comfort in patients who did not use a tourniquet. In a systematic review, similar results were reported by Olaiya et al.[17]. They concluded that patients who operated using WALANT experienced less perioperative discomfort because they did not use a tourniquet. However, overall patient satisfaction was similar in both groups. Publications regarding tourniquet durability include several publications showing that times greater than 17 minutes are associated with pain and tourniquet intolerance. Gunasagaran J et al.[18] also reported improved intraoperative comfort in patients who underwent surgery without a tourniquet. Although this study included the carpal tunnel, spring finger, and ganglion, the operative time was 16 minutes in the tourniquet group and 17 minutes in the WALANT group. Therefore, we should not use the WALANT technique in patients with vascular insufficiency. Despite these potential complications, we believe the WALANT technique may be very useful in some procedures such as tendon repair and transfer, requiring longer surgical times. This provides the advantage of assessing intraoperative mobility.[15]

There are many reports about the benefits of the new WALANT technique, especially in minimizing intraoperative and postoperative pain. This systematic review concluded that the WALANT technique has lower intraoperative and postoperative VAS than other tourniquet anesthetics. Using tourniquets in hand surgery initially helped achieve a bloodless surgical field. However, tourniquets can cause pain because they apply direct mechanical pressure to the arm and forearm's skin, soft tissue, and muscles. The average time a patient can tolerate a tourniquet is reported to be 20 minutes.[6,10]

WALANT technology completely ignores the use of tourniquets, thereby eliminating the pain and discomfort caused by the use of tourniquets. Ralte et al. reported that discomfort in patients undergoing carpal tunnel release was related to inflating arm tourniquets during the procedure. Their study also reported that using epinephrine as a local anesthetic prolonged the postoperative analgesic effect.[15] Rashid et al. also reported that epinephrine prolonged the analgesic effect of lignocaine by up to 5 hours.[7]

Ruxasagulwong et al. reported in their study that using epinephrine on local anesthesia provided better patient comfort by eliminating arm pain caused by tourniquet application.[1] The majority of patients reported experiencing less pain during their WALANT procedure and would be willing to choose the same anesthesia method if given the opportunity. The WALANT group also reported reduced narcotic intake after surgery.[16]

CONCLUSION

WALANT is still a technique worth considering in hand surgery because of its superiority in minimizing intra-operative and post-operative pain.

AUTHOR CONTRIBUTION

All authors contributed equally to preparing this manuscript.

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CONFLICT OF INTEREST

No conflict of interest.

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