CASE REPORT

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Pain score evaluation in patient 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 postoperative 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 comparing injection time, intra-operative, or postoperative pain using Visual Analog Score (VAS) in WALANT and local anesthesia or general anesthesia with tourniquet were included.
Results: Five studies (3 RCTs and 2 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 2 ganglion cyst cases). Three studies reported a significantly lower VAS in the WALANT group, while the other two studies reported a lower VAS in the WALANT group, but it was not statistically significant.
Conclusion: WALANT is still a technique worth considering in hand surgery because of its superiority in minimizing intra-operative and postoperative pain.

Keywords: WALANT, wide awake surgery, hand 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, cost, 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 in which 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 anesthesia and local anesthesia with a tourniquet. It offers simpler pre-surgical instruction and assessment, a faster operating time, better surgical visualization, a faster recovery, a shorter hospital stay, fewer complications and side effects, lower cost, better patient satisfaction, and less pain and discomfort.[1,7,11,12-14]

This study aims to review the intra-operative and postoperative pain score using the WALANT technique compared to local anesthesia or general anesthesia with tourniquet, and to propose a recommendation on 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 using an electronic database of PubMed, Cochrane Library, and Google Scholar was done. The used combinations of main keywords 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 postoperative 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 in English and were released in the last ten years.

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

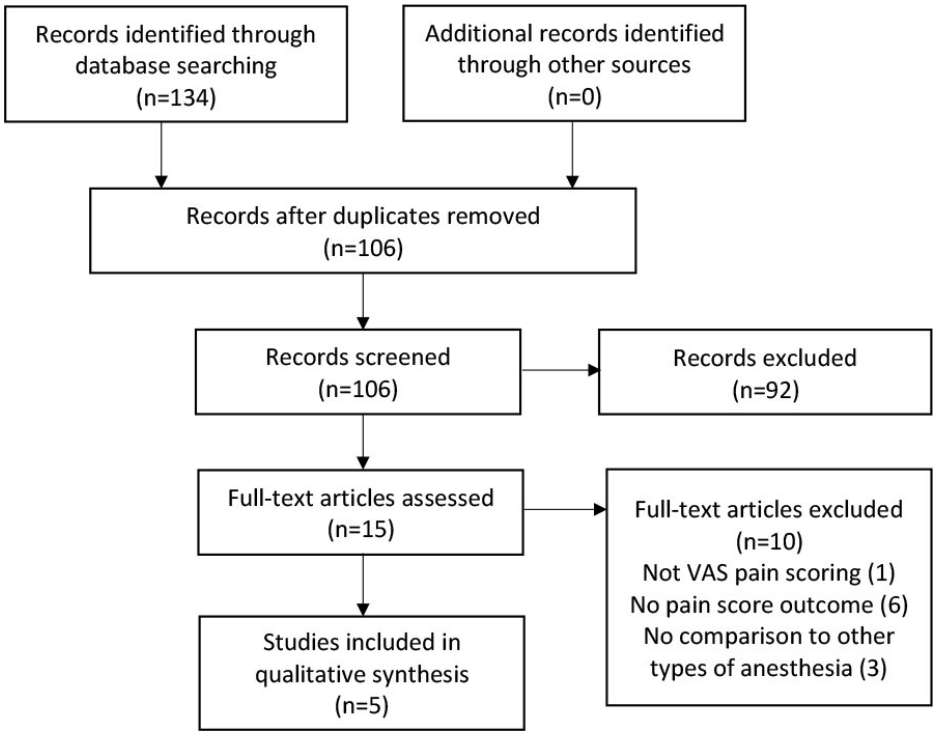

Figure 1. Systematic Review Flow Diagram (PRISMA 2020).

RESULTS

We acquired 134 potential articles from the electronic literature search; then we excluded 28 articles; 9 articles were due to duplication, 3 articles were not in English, and 16 articles were published before 2011. After screening titles and abstracts, 92 articles were excluded, giving 15 articles to be assessed. After full-text screening, five articles met the inclusion criteria.

Of all the remaining articles, three were randomized control trial studies and two articles were cohort studies. 2 studies were conducted in South Korea, 1 in USA and Malaysia. All articles were published in English between 2011 and 2021.

The total samples of all 5 articles was 645; 185 in the first article, 86 in the second article, 230 in the third article, 104 in the fourth, and 40 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).

In the first study comparing the injection time and postoperative 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 postoperative pain in the WALANT group until one day after surgery.[8]

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.[7]

The third study compared the two weeks and three months of postoperative pain VAS in 230 carpal tunnel syndrome cases (no data on the population's sex). The mean pain score two weeks postoperative 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 postoperative was 1.55 and 1.61 in the WALANT group and MAC with tourniquet group respectively ($p= 0.85$), which is not statistically significant.[12]

The fourth study compared the injection time, peri-operative, and postoperative 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 WALANT group. The WALANT group had a significantly less pain up to 48 hours after surgery ($P <0.05$) and a significantly lower pain VAS 2– 12 hours postoperative ($P <0.01$). In the carpal tunnel syndrome cases, the WALANT group had a 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($P<0.05$).[11]

The fifth study comparing the postoperative pain VAS in 40 samples (8 carpal tunnel syndrome cases, 30 trigger

Table 1. Characteristics of The Included Studies

Author	Study Design	Population	Arms	Sample Size (N)	Outcome
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, 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
Tulipan et al.[12]	Prospective cohort study	Men or women (>18 YO) verified CTS electrodia gnostically	WALANT MAC + tourniquet	230	Post-operative pain VAS
Kang et al.[11]	Retrospective cohort study	Patients tunnel syndrome and carpal tunnel syndrome	WALANT General anesthesia + tourniquet	104	Injection time, post-operative pain VAS
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

finger cases, and 2 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, and in the local anesthesia with tourniquet group was 4.72 ± 3.05.6

The summary of basic characteristics of the included studies are provided in Table 1.

DISCUSSION

There has been many reports on the advantages of the new emerging WALANT technique, especially in minimizing the intra-operative and postoperativepostoperative pain. This systematic review concluded that the WALANT technique had an overall lower intra- operative and post operative VAS compared to other anesthesia with tourniquet.

The initial purpose of the use of tourniquets in hand surgery was to achieve a blood- free operative field. However, a tourniquet can cause pain from its direct mechanical pressure on the skin, soft tissue, and muscle of the arm and forearm. It has been reported that the average time a patient can tolerate the tourniquet is 20 minutes. In the WALANT technique, the use of a tourniquet has been completely disregarded, which resulted in the disappearance of pain and discomfort caused by the tourniquet application.[6,10]

Ralte et al. reported the discomfort of patients who underwent carpal tunnel release was related to the inflated arm tourniquet during the procedure. Their study also reported the use of adrenaline in the local anesthesia solution prolonged the postoperative analgesia effect.[15]

Rashid et al. also reported the use of adrenaline prolonged the analgesia effect of lignocaine up to 5 hours.[7]

Ruxasagulwong et al. reported in their study that the use of epinephrine on local anesthesia provided better patient comfort by eliminating arm pain caused by tourniquet application.[1]

Davidson et al. reported the majority of their patients felt less pain during the WALANT procedure and were willing to choose the same method of anesthesia given the opportunity. They also reported a lower narcotics use for postoperative in the WALANT group.[16]

CONCLUSION

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

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