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Cubital tunnel release with Wide Awake Local Anaesthesia No Tourniquet (WALANT) technique in an outpatient setting is safe and effective

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Ulnar nerve release is often performed under general anaesthesia. Wide Awake Local Anaesthesia No Tourniquet (WALANT) is a new anaesthetic method increasingly used by hand surgeons in an outpatient setting. It has advantages such as the possibility to shift surgical interventions out of the regular surgical theatre settings into an outpatient clinical setting, no risk of complications or side effects resulting from regional and general anesthesia and decreased costs. The use of WALANT has not been investigated extensively in elbow surgery. This study aims to evaluate clinical outcomes after ulnar nerve release under WALANT 27 patients with ulnar nerve release for cubital tunnel syndrome were included. The primary outcome was the presence of (remaining) symptoms after ulnar nerve release. Data was extracted from medical records. 13 out of 27 patients had (mild) remaining symptoms after ulnar nerve release, and 1 complication (superficial wound infection) was seen. Ulnar nerve release under WALANT is safe and effective in patients with primary ulnar nerve entrapment that have failed conservative therapy.

Keywords: Wide Awake Local Anaesthesia No Tourniquet (WALANT), cubital tunnel syndrome, ulnar nerve release.

INTRODUCTION

Ulnar nerve entrapment is the second most common peripheral compression syndrome after carpal tunnel syndrome in the upper extremity[1]. Cubital tunnel syndrome, compression of the ulnar nerve at the elbow in the cubital tunnel is the most common. Patients present with paraesthesia in the ulnar nerve sensory distribution[1]. Compression of the ulnar nerve can ultimately result in muscular weakening of the intrinsic hand muscles[1]. Clinical severity of symptoms of cubital syndrome are described according to the Dellon criteria. Late presentation with muscle weakening (Dellon II and III) is associated with a less favourable prognosis[1]. Cubital tunnel syndrome is diagnosed using ultrasonography or EMG. Conservative treatment of cubital tunnel syndrome includes modification of activities to prevent deep flexion and leaning directly on the cubital tunnel, physical therapy, corticosteroid injections, night splints or a 'towel-at-night' around the elbow to prevent deep flexion (over 90 degrees)[1]. Surgical treatment of cubital tunnel syndrome consists of a release of the ulnar nerve which is under general anaesthesia or using a brachial plexus block with the use of a tourniquet[2]. In more complex cases a transposition of the nerve may be added to the procedure, when there is clinical or perioperative subluxation of the ulnar nerve. Wide Awake Local Anaesthesia No Tourniquet (WALANT), is a relatively new anaesthetic method increasingly used by hand surgeons in outpatient surgery. This technique enables surgery to be performed with the patient fully awake and without a tourniquet, thus allowing intra operative assessment of motor function[3]. In WALANT a pain free and bloodless field is created in the area to be operated by the surgeon by multiple injections of a mixture of lidocaine and epinephrine. Epinephrine added to the local anaesthetic leads to vasoconstriction, which allows for a better view during surgery. Also, when adding epinephrine to the local anaesthetic, there is no need for the use of a tourniquet because of vasoconstriction caused by epinephrine. The WALANT technique provides advantages due to its convenience, cost effectiveness and high level of patient satisfaction[2]. Compared to general anaesthesia, fasting before surgery is not needed, and there is no risk of common side-effects of general anaesthesia, such as nausea or vomiting[3]. The WALANT technique can be used in an outpatient

setting, in contrast to general anaesthesia or tourniquet techniques. Another advantage of WALANT is the possibility of actively testing joint range of motion of the elbow during surgery[3]. However, a condition of the WALANT technique is that patients need to be able stay relaxed and keep the arm still. Although the WALANT technique has increasingly been used by hand surgeons, in elbow surgery it has not been investigated as extensively. We have been using the WALANT technique to help patients with several types of elbow surgery in an outpatient setting. This study aimed to evaluate clinical outcomes of ulnar nerve release using the WALANT technique.

MATERIALS AND METHODS

A retrospective case series of 27 patients who underwent ulnar nerve release under WALANT at our center between March 2018 and July 2022 was performed. The primary outcome was the presence of (remaining) symptoms after ulnar nerve release. The secondary outcomes were post-operative complications.

Patients with cubital tunnel syndrome aged 18 years and older, diagnosed by ultrasonography or EMG, who underwent ulnar nerve release using the WALANT technique were included in the study. Patients were excluded if one of the following exclusion criteria applied: (1) the presence of other neurological conditions (cervical pathology and other peripheral nerve entrapments, such as carpal tunnel syndrome or radial tunnel syndrome), (2) a subluxating ulnar nerve that requires a nerve transposition, (3) patients with cognitive impairment or language barrier. A follow up appointment was usually 6 weeks post operatively. The following patient characteristics were collected: age, gender, symptoms according to the Dellon grading system, prior treatment rest/physical therapy/splinting/elbow surgery and diagnostics.

All patients who visited the outpatient clinic were asked to fill in a questionnaire regarding symptoms and prior treatment as is routine for all patients that see the orthopaedic surgeon in our department. Ulnar nerve entrapment was a clinical diagnosis combined with either ultrasonography and/or EMG. All patients with ulnar nerve entrapment were treated conservatively first, with either physical therapy, corticosteroid injections or night splints. Patients with primary (idiopathic) ulnar nerve entrapment that failed conservative treatment were selected for ulnar nerve release using the WALANT technique.

All patients were operated with the use of the WALANT technique. The local anaesthetic consists of 1% lidocaine with 1:100,000 epinephrine and it is buffered with 8.4% bicarbonate in a 10:1 ratio[5]. It is administered in the subcutaneous, dermal and then deep layer of the operative field. The patient is then requested to wait for approximately 45 minutes in the waiting room for the adrenaline to completely take its effect to create a bloodless field. The surgeon marks a 2 cm incision distal to the medial epicondyle[5]. The patient is then positioned supine on a bed with a hand table, where the hand is positioned in 15 degrees flexion[5]. A 2 cm incision is made posterior to the medial epicondyle and the subcutaneous structures are cleared with blunt dissection[3]. A self-retaining retractor is placed and the Osborne ligament is released over the posterior border, exposing the ulnar nerve[5]. Other compressing structures are then released proximal (Struthers arcade) and distal (fascial layers of the flexor carpi ulnaris) to the cubital tunnel[4]. Stability of the ulnar nerve is evaluated in full flexion. The subcutaneous layer and skin are closed and the wound is dressed. After surgery the patients got a compressive bandage and were asked to wait for 15 minutes with a nurse before leaving the hospital. The patient is instructed to remove the bandage on postoperative day 2. Active use of the entire arm was allowed immediately after surgery, although heavy lifting and intensive use of the arm were only allowed after 4 weeks.

Data was extracted from electronic medical records. Patient characteristics that were entered into the database were: age, gender, severity of symptoms, (prior) conservative treatment, diagnostics (ultrasound and/or EMG), symptoms after ulnar nerve release and complications. Clinically, patients were classified according to the Dellon scale of severity of symptoms: mild (intermittent sensory symptoms, no muscle atrophy), moderate (intermittent sensory symptoms, objective weakness in grip strength, no muscle atrophy) and severe (persistent sensory symptoms, objective weakness in grip strength, muscle atrophy)[6].

RESULTS

27 patients with cubital tunnel syndrome who underwent ulnar nerve release surgery under WALANT between March 2018 and July 2022 at our center were included. Patient characteristics that were collected are presented in table 1. The mean follow up time in the WALANT group was 6 weeks (range 6 weeks-3 months). Before WALANT surgery, 23 patients (82.2%) had mild symptoms and 4 patients (15.0%) had moderate symptoms according to the Dellon grading system. 10 patients had prior conservative treatment for cubital

Table I. — Patient characteristics

	WALANT (n = 27)
Age, median (range)	50 (26-80)
Gender	
Female	13
Male	14
Symptoms	
Mild	23
Moderate	4
Severe	0
Treatment prior to WALANT	
No prior treatment	17
Physical therapy	8
Arthroscopy	3
Injection	1
Surgery for epicondylitis lateralis	1
Night splint	4
Diagnostics	
Positive ultrasound	16
Positive EMG	11
Negative ultrasound and EMG	4
Complications	1

tunnel syndrome (table I). 16 patients had a positive ultrasound, 11 patients had a positive EMG and 4 patients had a negative ultrasound and EMG. 27 ulnar nerve releases were performed by two surgeons.

13 patients (48.1%) had remaining symptoms after ulnar nerve release. These symptoms consisted of pain around the elbow (n = 7, 26.0%) and paresthesia in the ulnar nerve sensory distribution (n = 10, 37.0%).

In the WALANT group, 1 complication occurred during follow up. The complication that was registered was a superficial wound infection which was treated with antibiotics.-

DISCUSSION

In this study, we aimed to evaluate clinical outcomes of ulnar nerve release under Wide Awake Local Anaesthesia No Tourniquet (WALANT) technique. The WALANT technique is a method that has been increasingly used by hand surgeons. However, the WALANT technique has not been investigated as extensively in elbow surgery. The WALANT technique enables ulnar nerve release to be performed with the patient fully awake and without a tourniquet[7,8]. This technique can be performed in an outpatient setting and allows intraoperative assessment of function. We performed a retrospective analysis of ulnar nerve release in patients treated with the WALANT technique. The primary outcome was remaining symptoms after ulnar nerve release. One complication was registered for 1 patient, which was a superficial wound infection that resolved after treatment with oral antibiotics. Kang et al. have found no significant difference in functional outcomes when comparing WALANT surgery and general anesthesia in ulnar nerve release in cubital tunnel syndrome[2]. Gousheh et al found mild and occasional sensory symptoms remained in 15 (25.9%) and moderate symptoms persisted in 6 (10.3%) patients (n= 58) after ulnar nerve release using the WALANT technique[7]. This finding was comparable to our finding of remaining sensory symptoms after ulnar nerve release after WALANT (n = 10, 37.0%). Kang et al. found significant postoperative pain reduction in ulnar nerve release when WALANT was compared to general anaesthesia up to 48 hours after surgery ($p< 0.05$)[2]. In our study, we did not assess pain within 48 hours after surgery. Gousheh et al have found improvement of muscular hypotrophy after ulnar nerve release after WALANT surgery (n = 5, 41.7%)[7]. In our study, we did not find improvement of muscular hypotrophy after WALANT. In our study, we have found that patients still had pain and occasional sensory symptoms remaining after ulnar nerve release using the WALANT technique. An explanation for this finding may be that the follow-up time after surgery was a maximum of 3 months. Our theory is that these remaining symptoms will decrease over a longer period of time because the ulnar nerve sensory distribution needs more time to recover after surgery. Patients for this study were not selected based of severity of symptoms. Our hypothesis is that patients with more severe symptoms of ulnar nerve compression are more complicated cases and therefore often have contra indications for WALANT and will need surgery under general anaesthesia. For instance, patients with a subluxating ulnar nerve require a nerve transposition. This makes subluxation of the ulnar nerve a contra indication for WALANT[5]. In our study, we have found that ulnar nerve release using WALANT is a safe and effective technique that can be used in an outpatient setting. We have found that patients with primary (idiopathic) ulnar nerve compression can be treated with the WALANT technique. This can be done in an outpatient setting which does not require an anaesthesiologist or an operating room. Moreover, a patient is fully awake so the orthopaedic surgeon can actively test joint range of motion, which is useful to test if the ulnar nerve subluxates in full flexion. The WALANT technique has been increasingly used by orthopedic surgeons in the Amphia hospital, but only in recent years. This provides us with only a

limited sample size and short follow up time. In other studies, the final outcome after ulnar nerve release was evaluated after 2 to 4 months after surgery[7]. There is a possibility that the final outcome after WALANT could not be completely objectified in this study due to the short follow up time. For future research, a prospective cohort study with a larger sample size of patients with cubital tunnel syndrome treated with WALANT surgery would be appropriate.

CONCLUSION

In conclusion, using the WALANT technique for ulnar nerve release in patients with primary cubital tunnel syndrome is safe and effective. A prospective cohort study with a large cohort and longer follow up time is required to monitor long term clinical outcomes.

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