

SYMPTOM OUTCOME OF WALANT TECHNIQUE FOR CARPAL TUNNEL RELEASE A PROSPECTIVE STUDY IN THE TERTIARY CARE HOSPITAL, NOWSHERA

Naseer Hassan¹, Raza Hassan², Muhammad Usman³, Farooq Azam⁴, Hamayun Tahir⁵, Zahid Irfan Marwat⁶, Momina Saleem⁷

Correspondence

²Raza Hassan, Assistant Professor,
Orthopedic Department, Northwest
General Hospital and Research Center,
Peshawar

☎: +44-7729-969000

✉: drrazaa@hotmail.com

¹Associate Professor/Head of
Neurosurgery Department, Nowshera
Medical College, Nowshera

³Associate Professor, Neurosurgery
Department, Fazaia Medical College,
PAF Hospital, Islamabad

⁴Professor, Neurosurgery Department,
Lady Reading Hospital, Peshawar

⁵Assistant Professor, Neurosurgery
Department, Nowshera Medical
College, Nowshera

⁶Professor, Biochemistry Department,
Nowshera Medical College, Nowshera

⁷Trainee Medical Officer,
Departments of Orthodontics, Khyber
College of Dentistry, Peshawar

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INTRODUCTION

Carpal tunnel syndrome (CTS), the most common peripheral nerve entrapment syndrome, is defined as a compression of the median nerve at the wrist joint level leading to increased pressure above 20-30 mm Hg (Normal is 2.5-13 mm Hg). This decreased blood and axoplasmic flow resulting in nerve dysfunction, edema, and scarring. It has an incidence of 6% and a prevalence of 5 to 20%, with higher numbers seen in industrial workers, females, and the elderly (55-60 years) people.^{1,2} Several medical conditions are associated with CTS, including diabetes mellitus (DM), obesity, pregnancy, contraceptives, thyroid dysfunction, and inflammatory conditions such as rheumatoid arthritis.³ The patient presents with numbness, pain, and paresthesia in the thumb, index, middle, and radial half of the ring finger that is worst at

night and, in severe cases, can present with atrophy of the thenar muscles and decreased pinch and grip strength. Wrist flexion and extension increase pressure in my wake patient's carpal canal during sleep. They may also have pain that migrates proximally.¹ The severity of nerve compression, graded by a combination of preoperative clinical examination and Neurophysiological testing, is closely associated with anticipated improvement in symptoms after carpal tunnel release by WALANT technique.⁴ The neurophysiological severity was graded as⁵
Mild: Normal motor latency of Abductor pollicis brevis (APB) (<4 ms).
Normal sensory conduction velocity >50 m/s.
Moderate: Motor latency >4 ms,
Sensory conduction velocity >50 m/s
Severe: Motor latency >4 ms,
Sensory conduction is absent.

ABSTRACT

OBJECTIVES

The study aims to determine the outcome of the WALANT technique for Carpal Tunnel Release CTR.

METHODOLOGY

A descriptive study was done in the Neurosurgery department at Qazi Hussain Ahmad Medical Complex, Nowshera, from 15th September 2020 to 15th March 2021. A total of 29 consecutive patients of carpal tunnel syndrome (CTS) were undergoing carpal tunnel release (CTR) under wide awake local anaesthesia no tourniquet (WALANT) technique, using a mixture of lidocaine and epinephrine for local anaesthesia, and the outcome was assessed for patient satisfaction by Boston Carpal Tunnel Questionnaire (BCTQ) (symptom severity scales (SSS)) at pre-operatively and six weeks postoperatively.

RESULTS

Wide awake CTR was done in 29 patients; 86.2% were female and 13.8% male. The mean age was 47.3 years. The average time of return to daily activity was three weeks. No complications were noted, like wound infection and dehiscence. BCTQ symptom (BCTQ-S) score significantly improved at six weeks postoperatively. 86% significantly reduced the symptom severity score (SSS). Mean SSS improved from preoperative 3.2 points to 1.7 points postoperatively. There was a significant decrease in distal latencies ($p < 0.01$).

CONCLUSION

Wide awake surgery is an excellent technique with favourable outcomes and good satisfaction rates for CTR. The study shows that clinical symptoms resolve rapidly after CTR. Without the need for monitored anaesthesia, the cost could decrease dramatically.

KEYWORDS: Wound Infection, Dehiscence Outcome, Anaesthesia, Tourniquet

CTS was initially managed conservatively with activity modification, wrist splints, anti-inflammatory and analgesic medications, and injections of corticosteroids into the carpal canal. Patients who do not improve need surgical decompression, which relieves symptoms in 70-90% of patients.⁶ Worse surgery outcomes have been associated with longer symptoms, preoperative muscle weakness or atrophy, co-morbidities (diabetes and thyroid disease), heavy or repetitive manual work, exposure to vibration, incorrect diagnosis, incomplete sectioning of the transverse carpal ligament (TCL) and mild NCS. Predictors of favourable surgical outcomes include prominence of paresthesia (rather than numbness or weakness), a clear response to corticosteroid injection, and greatest prolongation in nerve conduction latencies across the carpal tunnel had the complete pain relief.⁶ This study aimed to improve access to hand surgery care for carpal tunnel release without using a tourniquet. Hand surgery in the clinic setting may result in substantial cost savings under local anaesthesia and provide a safe alternative to performing similar procedures in the operating room.

METHODOLOGY

This descriptive study was done in the Neurosurgery department at Qazi Hussain Ahmad Medical Complex, Nowshera, from 15th September 2020 to 15th March 2021. A total of 29 consecutive carpal tunnel syndrome patients underwent the WALANT technique, using a mixture of lidocaine and epinephrine for CTR using Loupe magnification (2.5x). The inclusion criteria were:¹ Diagnosis of CTS based on history and physical examination with confirmation by positive nerve conduction studies in all patients.² Paresthesia involves at least two fingers (thumb, index, middle, and ring fingers).³ Positive Phalen's / Durkan's test and Tinel's sign.⁴ duration of symptoms exceeds one month.⁵ age > 18 years.⁶ Failed conservative treatment. Exclusion criteria include age < 18 years, mild NCS, Previous carpal tunnel decompression, Pregnancy, Cervical radiculopathy, and De Quervain's tenosynovitis. Informed consent was obtained from all patients. No complication was noted, including scar tenderness, pillar pain, persistent symptoms, wound infection, and dehiscence. Patients were followed at three weeks for suture removal and then at six weeks to determine the effectiveness of surgery and patient satisfaction regarding the WALANT technique. Before surgery, the affected hand, wrist, and forearm were cleaned with pyodine solution in the main operating room. The ideal hand position is obtained with wrist extension 30°. Before giving the incision, all patients received third-generation antibiotics through a 20-gauge cannula. The beauty of wide-awake surgery is

that no tourniquet was applied, no sedation was given, and the patient received 1% lidocaine with 1:100,000 epinephrine. The injection began at the most proximal part of the incision and was advanced using the hole in one" technique. A 2-2.5 cm incision was given in the palm beginning at the intersection of Kaplan's cardinal line, and a line was drawn along the radial border of the third web to the centre of the distal wrist crease (proximal carpal tunnel). A small opening was made in the transverse carpal ligament (TCL) with a surgical blade no. 15, and a dissector was introduced beneath the carpal ligament and then cut. After the haemostasis, an incision was closed with a 3/0 prolene suture. The postoperative sterile soft dressing was applied. Sutures were removed on their 1st follow-up appointment in 3rd week. No splinting was used, and finger movements were allowed immediately postoperatively. The symptoms severity scale (SSS) of the Boston carpal tunnel questionnaire (BCTQ) was used to evaluate patient symptom outcomes after the WALANT technique for CTR. This is a patient-oriented and self-administered questionnaire. It includes 11 items from six clinical areas critical to assess carpal tunnel syndromes symptoms such as pain, paraesthesia, and nocturnal symptoms. Each item score ranges from 1 (no difficulty) to 5 (cannot perform the activity). Each summative score is calculated as the mean with a standard deviation of the scores of individual items. A high score indicates severe impairment. A preoperative and six-week postoperative symptoms severity score was compared. At the end of the questionnaire, patients were asked to rate the effectiveness of WALANT surgery as satisfactory or unsatisfactory. If there was an improvement of >50% of presenting signs and symptoms, it was graded as satisfactory and <50% was considered unsatisfactory. P-values of <0.05 were considered statistically significant. Microsoft excels, and SPSS 25 were used to analyze and store data then results were presented as descriptive statistics and tables.

RESULT

In this study, 29 pts underwent 33 CTR by the WALANT technique, with 4 having bilateral surgeries on separate occasions. Male patients were 4 (13.8%), while female patients were 25 (86.2%), with a female-to-male ratio of 6:1.

Table 1: Demographics of Sample Age

Age (years)	Number	Mean (47.3 years)	
47.3 years			
18-34	01(3.5%)	33	
35-44	08(27.6%)	36,37,38,39,40,41,42,43	
45-54	18(62%)	45,45,45,46,46,47,47,48,49,49,49,50,50,51,51,52,52,54,	
>55	02(6.9%)	56,58	
Occupation	Number		
	Teacher	03(10%)	
	Manual workers	03(10%)	
	Housewife	23(79.31%)	
Hands			
	Male	Female	Total
Dominant (right)	02	19	21(72.4%)
Non-dominant (left)	01	03	04(13.8%)
Bilateral	01	03	04(13.8%)
Total	04	25	29 (100%)
Symptoms			f(n)
Frequency of Symptoms	Pain+Paresthesia		12(41.4%)
	Pain+Paresthesia+Numbness		10(34.5%)
	Pain+Paresthesia+Thenar weakness		02(6.9%) APB, OP
	Pain+Paresthesia+Thumb base arthritis		05(17.2%)
Co-Morbidities	Disease		Number (n=29)
	Diabetes mellitus		06(20.7%)
	Hypertension		02(6.9%)
	Hypothyroid		01(3.45%)
	Hypercholesterolemia		03(10.4%)
	Rheumatoid arthritis		02(6.9%)

Table 2: Demographics of Sample Age

Tests / Signs	Female	Male	Total
Phalen's test	15(60%)	02(50%)	17(58.6%)
Durkan's test	19(76%)	03(75%)	22(76%)
Tinel's sign	10(40%)	02(50%)	20(69%)
All	10(40%)	02(50%)	12(41%)
2Tests Positive	15(60%)	0	09(31%)
1Test Positive	04(12%)	01(25%)	03(10%)

Table 3: Nerve Conduction Studies

Nerve conduction studies	Number (N)
Moderate grade Motor latency >4 m/s, Sensory conduction velocity >50 m/s	23(69%)
Severe grade Motor latency >4 m/s, Sensory conduction is absent.	06(20.6%)

Table 4: Effectiveness of WALANT Surgery

Domain	Satisfactory Outcome	Unsatisfactory Outcome
Male	04(100%)	0
Female	23(72.4 %)	04(16%) (Associated with DM, RA)
Provocative tests	18	01
Co-morbidities	14	02 (Uncontrolled DM, RA)
Thenar weakness	01	01
NCS Moderate	20	03(10.3%) (DM)
Severe	05	01(3.5%) (Thenar weakness)

Table 5: A Summary Result of Each Parameter

Parameter	Before CTR	After CTR (6Weeks)
Pain	8.4(SD1.4)	1.2(SD 0.6)
Numbness	9.0(SD0.8)	1.0(SD 0.8)
Paresthesia	9.1(SD0.5)	0.8(SD 0.5)
Thenar weakness	8.0(SD1.8)	1.1(SD 0.7)
BCTQ-S (Average)	3.2(SD 1.1)	1.7(SD 0.7)
Motor latency(ms)	6.9(SD2.5)	5.2(SD1.7)
Sensory Latency	4.3(SD1.1)	3.6(SD 0.6)

DISCUSSION

Women reported greater preoperative severe symptoms than men.^{3,7,8} These sex differences indicate greater pain sensitivity among females compared to males for most pain modalities likely influenced by social and psychological processes, gonadal hormones, gender roles and cognitive/affective factors.⁹ CTS in women is higher than in men due to differences in carpal tunnel volume between men and women.⁸ Housewives are more affected, as in this study (80%), followed by manual and teachers 33% each. All are in occupations that involve repetitive tasks of hand flexion/extension movement and prolonged exposure. Right-handed pts were more, 72% pts have dominant hand affected alone in our study.³ We haven't performed simultaneous bilateral CTR, and the reason behind this is that the patient needed personal assistance for hygiene and non-hygiene-related activities, which was comparable with that reported by Wang et al. In this study, NCS was done in all patients.¹⁰ It was usually a necessary supplement to the history and physical examination to help decision-making for surgery. 14 patients in this study have co-morbidities, 4 of which have a poor outcome, with at least one associated predisposing condition. There are reports of diabetic patients exhibiting a trend towards less pain relief postoperatively.¹¹ Mild cases were treated conservatively and advised CTR on initial presentation only for severe cases, comparable to our study. Even Kaplan et al. found five factors important in determining the success of non-operative treatment, including 1). age \geq 50 yrs. 2) Symptoms > 10 yrs. 3) Constant paresthesia. 4) Stenosing flexor tenosynovitis. 5). Positive Phalen's test < 30 sec. The success rate was >80% if \leq 2 factors were present.¹² Our study didn't use corticosteroid injection in the conservative treatment of CTS, which is usually associated with added cost and longer time to surgery.⁴ Among 29 pts, bilateral CTR was done in 4 pts, 21 pts had a right hand, and 4 pts had left CTR. Bahar mani et al. treated 14 pts CTR each on both hands and right hand while only 6 cases had left hand CTR.³ Positive effects of surgical CTS release were demonstrated by Huisstede et al. as in our study.¹³ A positive impact of surgery,

with a clinical success rate between 75% and 90%, shown by Louice et al. Wintman et al. showed that postoperative satisfaction is greater in patients with preoperative night symptoms and activity-induced paresthesia compared with those patients with pain, constant numbness, and weakness.^{14,15} Our satisfactory post-op outcome of 86% was better than 75% and 66% in the other two studies.^{3,6} DM and thumb base arthritis is one of the reasons for poor satisfaction.⁵ Older patients had less severe symptoms and greater satisfaction at follow-up.⁶ A satisfactory outcome was reported in 86% of patients at 6 weeks follow-up, better than Bahar-Moni et al. study.³ The factors associated with poor satisfaction and development include numbness, bilateral symptoms, day pain, thenar atrophy, severe preoperative symptoms, old age, repetitive forceful work, and diabetes.^{5,6} Early symptomatic relief after CTR is a good predictor of patient satisfaction in the short and long term.⁵ The BCTQ-S showed improvement in 86% of people after WALANT CTR. These findings should be expected because BCTQ-S is a measure of symptom severity which recovers rapidly after surgery, as seen in Atroshi et al. and Levine et al. studies.^{16,17} The study reports complication rates up to 12-20%.¹ Evers et al report 1.6% complications, including wound infection and dehiscence.¹⁸ In the other two studies, the infection rate was 0.4% and 2.9%.^{19,20} Evers et al report 1.6% complication, including wound infection and dehiscence.¹⁸ Our study's 0% infection rate is that we used a preoperative single shot of antibiotic, and the procedure was performed in the main operating room, while Leblane experienced 0.4% infection after CTR performed in a minor procedure room.¹⁹

LIMITATIONS

This study has limitations: Firstly, we did not analyze other diseases with finger numbness, cervical spondylosis, or cubital tunnel syndrome. Secondly, conditions associated with thumb movement, such as de Quervain's disease or history of hand fracture, were not assessed. Thirdly the major limitation of this study is the small sample size.

CONCLUSION

The WALANT tech is a simple, safe, and reliable technique that can be performed with standard surgical equipment. The patient tolerance is high, and the procedure is compatible with the current trend in the surgery. Performing such surgeries without monitored anaesthesia care could drastically decrease medical costs. There is a significant improvement in clinical and subjective outcomes after CTS surgery.

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CONTRIBUTORS

1. **Naseer Hassan** - *Concept & Design; Data Acquisition; Data Analysis/Interpretation; Drafting Manuscript; Critical Revision; Supervision; Final Approval*
2. **Raza Hassan** – *Data Analysis Interpretation; Critical Revision; Supervision*
3. **Muhammad Usman** – *Concept & Design; Data Analysis/Interpretation; Critical Revision; Final Approval*
4. **Farooq Azam** - *Data Acquisition; Drafting Manuscript; Supervision*
5. **Hamayun Tahir** – *Data Acquisition; Drafting Manuscript; Supervision*
6. **Zahid Irfan Marwat** – *Data Analysis/Interpretation; Supervision*
7. **Momina Saleem** – *Data Analysis/Interpretation; Supervision*



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