

OUTCOME OF CARPAL TUNNEL SYNDROME OPEN SURGICAL DECOMPRESSION IN MISRATA CENTRAL HOSPITAL DURING THE YEAR OF 2015

By

Osama Rafieda, Nordeen Elgasseir, Khalid Elbita
Misurata Medical Centre-Misurata-Libya

ABSTRACT

Carpal tunnel syndrome, the most common peripheral entrapment neuropathy, is caused by compression of median nerve at the wrist. Treatment options include the use of NSAIDs, local steroid injections, night splints, as well as physical therapy and surgical release. The aim of this study was to assess the outcome of surgical decompression via mini-palm incision. A Prospective case series evaluating the outcome of mini-palm incision surgical decompression of carpal tunnel syndrome in Misrata Central Hospital during the year 2015. 51 cases (out of 55 cases operated during the study period) were included in the study, as they committed to follow-up or respond to our calls at two weeks and at three months. The other four cases were excluded, as they neither attended nor responded to our calls at three months. The outcome of treatment was evaluated in terms of wound healing problems, in addition to other possible complications. Patient satisfaction at three months was noted. Complications occurred in three cases; one case showed a minimal improvement of symptoms at two weeks and at six weeks, and was re-operated and incomplete decompression was found. Two cases had developed superficial wound infection that was treated with oral antibiotics and healed with no consequences. 48 cases (94.12%) had no clinically evident complications.

At three months postoperatively, 49 patients (96.08%) indicated that they were happy and satisfied with their surgery results. The patients (3.92%) said that they are fairly satisfied. Open surgical decompression through mini-palm incision is an easy, effective and safe method of treatment as evidenced by the obtained excellent outcomes.

KEY WORDS: Carpal tunnel Syndrome, Outcome, Surgical Decompression.

INTRODUCTION

Carpal Tunnel Syndrome (CTS) is a clinical disorder resulting from compression of median nerve in the carpal tunnel at the wrist. It was first described by Sir James Paget in 1854, but the term was coined later by Moersch (1,2). It is the most common peripheral entrapment neuropathy (3,4). It affects most often those aged 30-60 years old, it is much more common in women than in men. Aged, overweight, and physically inactive individuals are more likely to develop carpal tunnel syndrome.

Female gender, obesity, cigarette smoking, and vibrations associated with job tasks have been identified as risk factors to develop carpal tunnel syndrome in industrial workers. Most patients complain of numbness or parasthesia (or both) in the lateral three and half fingers. Pain rarely prevents patient from sleep but it may awaken the patient from sleep after few hours. Many patients complain of finger stiffness upon arising in the morning. Discomfort or numbness, or both, may be incited by activities requiring sustained wrist flexion for long periods. Discomfort and pain may radiate from the hand up the arm to the shoulder or

*Correspondence and reprint request: Osama Rafieda
E-mail: orufaida@yahoo.com*

neck (1-5). Atrophy and weakness of muscles innervated by median nerve indicates severe long-standing disease and is rare in most cases of recent onset. Diagnosis is basically clinical utilizing provocative tests and supported with electrodiagnostic studies.

Provocative tests

Tinel's sign: Percussing the median nerve at the wrist reproduces electric or tingling sensation radiating to median nerve supplied fingers.

Phalen's test: Elbow is maintained in extension, wrist is passively flexed for a while, reproduction of electric or tingling sensation radiating to median nerve supplied fingers within 60 seconds of wrist flexion indicates positive test.

Durkan's test: Direct compression is applied to the median nerve for 30 seconds, in positive test, symptoms are reproduced.

Phalen's test is most sensitive and Tinel's sign is most specific and least sensitive among the three tests. Durkan's test is more sensitive and more specific than the other tests⁽¹⁾.

ELECTRODIAGNOSTIC STUDIES

These techniques are reliable confirmatory tests, which include nerve conduction velocity study and electromyography. A distal motor latency of more than 4.5 ms and a sensory latency of more than 3.5 ms are considered abnormal. Asymmetry of sensory conduction velocity > 0.5 m/s vs. opposite side, and asymmetry of motor conduction velocity > 1 m/s vs. opposite side are abnormal results suggesting the diagnosis. EMG may show signs of nerve damage, including increased insertional activity, positive sharp waves, fibrillations at rest, decreased motor recruitment and complex repetitive discharges. These studies are of 90% sensitivity and 60% specificity for CTS. False negative results are reported to be 10% in several studies.

Treatment options include NSAIDs, night splints, physical therapy, local steroid injections and surgical release. Patients with intermediate or advanced CTS are probably better treated with early surgical release (1).

The Mini-palm incision open decompression uses an incision that begins just distal to the distal wrist flexion crease and slightly ulnar to the midline of the wrist, and extends distally three cms in line with third web space. Transverse carpal ligament is exposed, the parallel palmar fascia fibers and hypothenar fat are retracted. TCL and then the distal two cms of antebrachial fascia are divided with Metzenbaum scissors. If median nerve is adherent to the divided radial TCL leaf, external neurolysis may be needed. Incision is then closed and compressive dressing is applied (1).

MATERIALS AND METHODS

A Prospective case series evaluating the outcomes of mini-palm incision surgical decompression of carpal tunnel syndrome. During the period from 01 January 2015 to 31 December 2015, 55 cases of carpal tunnel syndrome were treated in Misrata Central Hospital by surgical decompression via mini-palm incision, 51 cases were included in the study as they committed to follow-up or responded to our calls at two weeks and at three months. The other four cases were excluded as they neither attended nor responded to our calls at three months.

Results of provocative tests (Tinel's, Phalen's & Durkan's) and electrodiagnostic studies (EMG/NCV) were documented. Operative findings were compared to results obtained from both clinical tests and electrodiagnostic studies.

The outcome of treatment was evaluated in terms of wound healing problems and other possible complications. Patient satisfaction at three months was also noted.

RESULTS

The youngest patient was 24-year-old, while the oldest was 73-year-old, both were females. The only male patient was 37-year-old. The mean age was 47.96 years. About 64% of patients were between 41 and 60 years old. (Table 1).

Table 1: Age distribution.

age	≥30	31-40	41-50	51-60	61-70	≤71
%	2.4%	11.22%	18.35%	15.29%	4.8%	1.2%

Fifty patients were females (98.04%), while only one was male (1.96%), forty patients were married (78.43%), 10 were single (19.61%), and one patient was a widow (1.96%).

Four female patients described themselves as non-working women (7.84%), while 25 were housewives (49.02%), and 21 were working women (41.18%). The male patient worked in construction (1.96%).

Regarding symptoms, 48 patients (94.12%) suffered from pain, while three patients (5.88%) had no pain symptoms. Forty patients (78.43%) suffered nocturnal pain. Fifty patients (98.04%) experienced tingling. 17 patients (33.33%) suffered from sleep disturbance. (Figure 1).

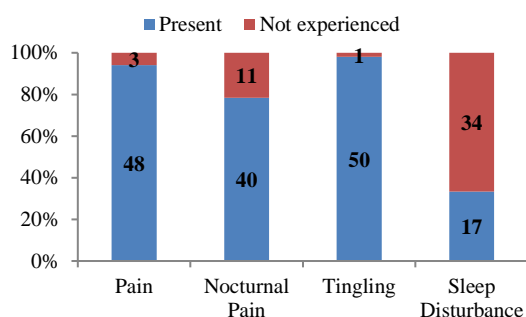


Figure 1: Patient symptoms.

The involved side was the right in 21 patients (41.18%), the left in nine patients (17.64%) and bilateral in 21 patients

(41.18%). The operated side was the right in 33 patients (64.71%), and the left in 18 patients (35.29%). (Figure 2). Among 21 cases with bilateral disorder, 12 chose right side (57.14%), and nine chose left side (42.86%). (Figure 2).

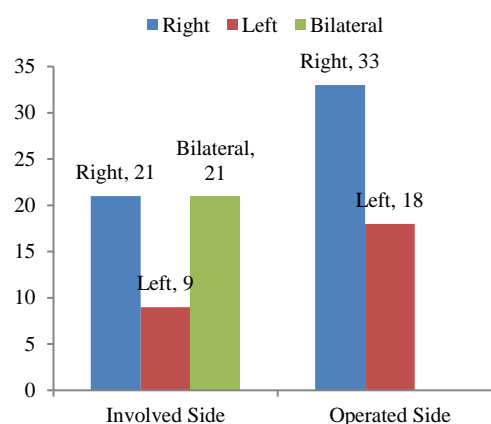


Figure 2: Involved side and operated side.

Forty-seven patients (92.16%) had no history of previous carpal tunnel decompression surgery, whereas one patient (1.96%) had the same operation done on the same side (revision surgery because of incomplete release), and three patients (5.88%) had history of carpal tunnel decompression surgery for the contralateral side. Furthermore, 10 patients (19.61%) were diabetic, but only two of these patients were also hypertensive. One patient (1.96%) had Nephrotic Syndrome. Regarding conservative management prior to deciding surgical decompression, 46 patients (20.20%) used NSAIDs. Forty-four patients (86.27%) used vitamin B-Complex. Thirty-six patients (70.59%) used night splint. Eleven patients (21.57%) tried physiotherapy. Provocative tests in the study population showed approximately similar results. Phalen's test was positive in 44 patients (86.27%).

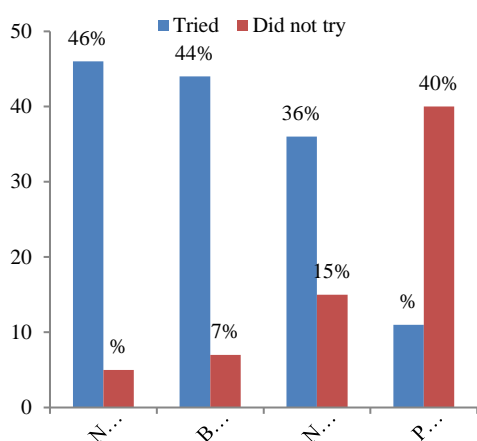


Figure 3: Conservative management.

Tinel's sign was found positive in 46 cases (90.20%). Durkan's test was found to be the most sensitive with 47 cases (92.16%) having a positive test and 4 cases (7.84%) having negative test. (Figure 4).

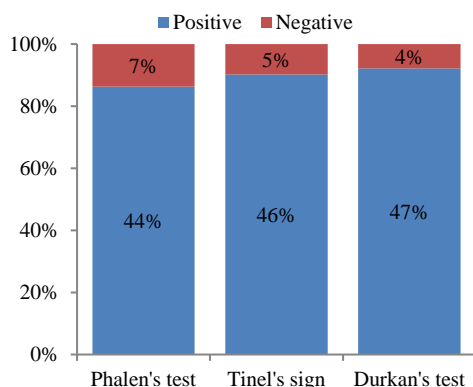


Figure 4: Provocative tests for carpal tunnel syndrome patients.

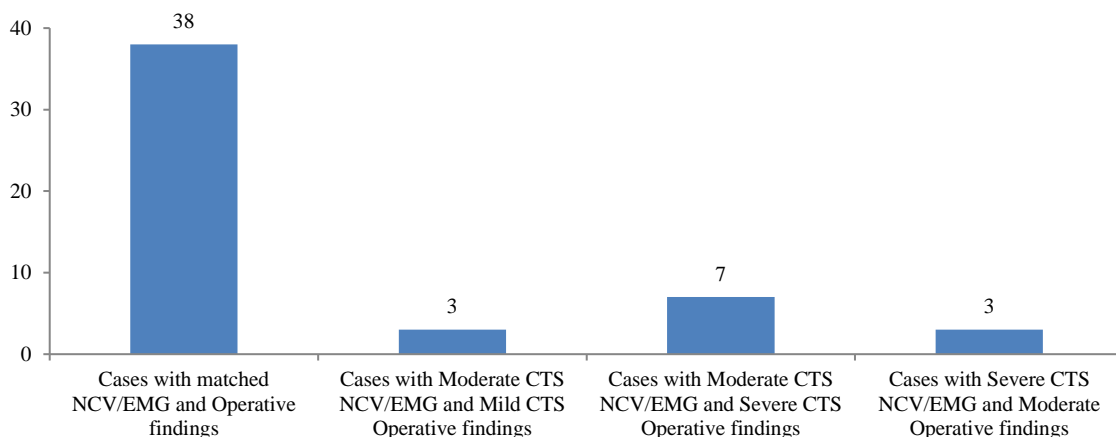


Figure 6: Correlation between NCV/EMG report and operative finding report.

In all the cases the electro diagnostic studies were positive for carpal tunnel syndrome; 27 cases (52.94%) had severe CTS on EMG/NCV study report. Operative findings showed that 31 cases (60.78%) had severe "severely tight TCL", and 3 cases (5.88%) had mild CTS. (Figure 5).

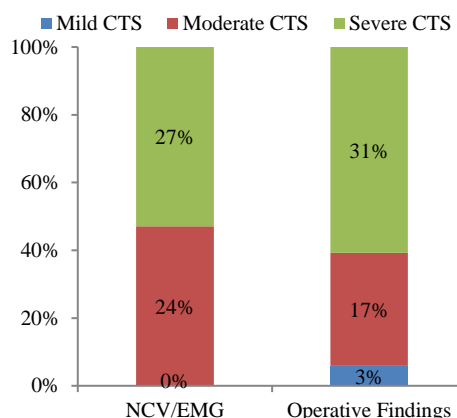


Figure 5: Electro diagnostic studies for carpal tunnel syndrome patients.

Comparison of NCV/EMG findings and operative findings showed 38 cases (74.51%) with matched NCV/EMG and operative findings. Three cases (5.88%) had moderate CTS NCV/EMG and mild operative findings. Seven cases (13.73%) had moderate CTS NCV/EMG and severe operative findings report. while three cases (5.88%) had severe CTS NCV/EMG and moderate operative findings. (Figure 6).

Correlation of Negative Provocative test to other tests, NCV/EMG and Operative findings is shown in (table 2): Eleven cases (21.57%) showed a minimum of one negative provocative test, of them, three cases had two negative provocative tests, while one case was presented with

three negative tests. At surgery, the transverse carpal ligament was found to be mildly tight in two cases, which showed a minimum of two negative provocative tests, one of these cases had all provocative tests negative.

Table 2: Correlation of Negative Provocative test to Other tests.

Case	Phalen's test	Tinel's sign	Durkan's test	NCV/EMG	Op. Finding
I	Negative	Positive	Negative	Moderate CTS	Mild CTS
II	Positive	Negative	Positive	Moderate CTS	Moderate CTS
III	Negative	Negative	Negative	Moderate CTS	Mild CTS
IV	Negative	Positive	Positive	Severe CTS	Severe CTS
V	Negative	Positive	Positive	Severe CTS	Severe CTS
VI	Negative	Positive	Positive	Severe CTS	Severe CTS
VII	Positive	Negative	Positive	Severe CTS	Severe CTS
IIIX	Positive	Negative	Negative	Moderate CTS	Moderate CTS
IX	Negative	Positive	Positive	Moderate CTS	Severe CTS
X	Positive	Negative	Positive	Moderate CTS	Moderate CTS
XI	Negative	Positive	Negative	Moderate CTS	Moderate CTS

The type of anesthesia used in the operation was regional "Bier Block" anesthesia in 47 cases (92.16%), local anesthesia in one case (1.96%), and general anesthesia (after failed regional anesthesia) in three cases (5.88%).

Some complications occurred in three cases; the first patient showed incomplete decompression, in addition to minimal improvement of symptoms at two and six weeks postoperatively. The other two cases developed superficial wound infection at six and eight postoperative days respectively. These two patients were diabetic females, who were treated with oral antibiotics and healed without notable side effects. Forty-eighth cases (94.12%) had no clinically evident complications (Figure 7). At three months postoperative, 49 patients (96.08%) reported that they were happy and satisfied with their surgery results. Two patients (3.92%) reported being fairly satisfied. Scar discomfort, deep wound infection, wound dehiscence, nerve and vascular

injuries, as well as stiffness, and complex regional pain syndrome were not reported.

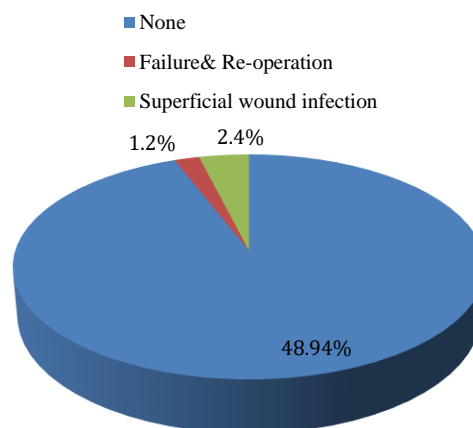


Figure 7: Complications.

DISCUSSION

In the current study, the majority of patients were middle-aged, and most of them were females. Similar studies used

populations with only slightly different properties. For instance, in the study by Rahman et al (2014), 91.1% of patients were females with a mean age of 41.8 years (6). Furthermore, in a study conducted by Khan et al (2015), females represented 81% of the recruited patients (2). In another similar investigation females represented 87.5% of the study population with a mean age of 39 years (3), while Zyluk and Strychar (2006) included slightly smaller proportion of females (77%) in their study population, with a mean age of 48 years (7).

For females, occupation did not emerge as a significant risk factor among the current study population, as the obtained findings were almost similar for housewives and working ladies. Furthermore, pain and tingling were the major symptoms, night pain was frequent, while sleep disturbance was less frequently observed.

Bilateral involvement was as common as the sole involvement of right side. Severity of symptoms among bilateral disease cases suggests no or little effect of hand dominance, as patients almost equally chose the side on which to operate.

Diabetes represents the most common comorbidity. Diabetic patients require special attention for wound care, as they are known to be more susceptible to infection. Conservative management including (NSAIDs, vitamin B-complex supplements, night splint and physical therapy) appeared to have little or no assistance to patients with moderate/severe CTS.

Our study findings show that provocative tests are of good sensitivity to moderate/severe CTS with Durkan's test being the most sensitive. The combination of the two tests lowers the false negative rates to the minimum.

This study also shows that electrodiagnostic studies are very helpful to confirm

diagnosis and determine severity of carpal tunnel syndrome, and that when used in combination with the three-provocative test, they form a very accurate diagnostic tool in most of the cases as correlated to operative findings.

Complications of mini-palm incision open carpal tunnel decompression are minimal, diabetic patients seem to be more susceptible to these complications, especially wound infection. Short-term outcome is excellent with very high patient satisfaction rate. International studies also indicate that mini-palm open surgical decompression is a safe technique for treatment of carpal tunnel syndrome, with lower complication rates. Khan et al (2015), found that only 6% of their patients had residual pain at three months after surgery and 94% were satisfied with their treatments (2). Maliyappa et al (2014) found that only one hand out of 27 hands developed superficial wound infection that was treated conservatively (4). In addition, Rahman et al (2014) found that superficial wound infection occurred in two out of 382 cases (6).

CONCLUSION

Diagnosis of CTS is more accurate especially when combined with provocative clinical tests and EMG/NCV studies. Open surgical decompression through mini-palm incision is an easy, effective and safe method of treatment with excellent outcome.

REFERENCES

1. S. Terry Canale & James H. Beaty, CAMPBELL'S OPERATIVE ORTHOPAEDICS, 12th edition, Elsevier.
2. Abdul Aziz Khan, Haider Ali, Kishwar Ali, Gul Muhammad, Bushra Rashid, Naseem Gul, Khalid Khan Zadrán, Muhammad Mushtaq, Abdus Saboor, Sajjad Ali & Sajid Nazir Bhatti, OUTCOME OF OPEN CARPAL TUNNEL RELEASE

SURGERY, J Ayub Med Coll Abbottabad 2015;27(3):640-2.

3. Pradhan NMS; Khan JA; Acharya BM; Devkota P; Rajbhandari A, OUTCOME OF CARPAL TUNNEL RELEASE; A PROSPECTIVE STUDY, Nepal Orthopaedic Association Journal (NOAJ): Volume 1, Number 1, January 2010.

4. Maliyappa CC, George MA, Al-Marboi BK, OUTCOME ANALYSIS OF LIMITED OPEN CARPAL TUNNEL RELEASE; A PROSPECTIVE STUDY, J Orthop Traumatol Rehabil 2014;7:161-4.

5. Wolfe, Hotchkiss, Pederson, Kozin, GREEN'S OPERATIVE HAND SURGERY, 6th edition, Churchill-Livingstone.

6. K. u. Rahman et al, ASSESSING THE COMPLICATIONS AND EFFECTIVENESS OF OPEN CARPAL TUNNEL RELEASE IN A TERTIARY CARE CENTRE IN A DEVELOPING COUNTRY, International Journal of Surgery Case Reports 5(2014)209-211.

7. A. Zyluk and J. Strychar, A COMPARISON OF TWO LIMITED OPEN TECHNIQUES FOR CARPAL TUNNEL RELEASE, Journal of Hand Surgery (British and European Volume, 2006) 31B:5:466-472.