



“A RANDOMIZED CONTROLLED TRIAL OF OPEN CARPAL TUNNEL RELEASE SURGERY VS LOCAL STEROID INJECTION FOR CARPAL TUNNEL SYNDROME”

Medical Science

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ABSTRACT

BACKGROUND: Carpal tunnel syndrome (CTS) is the most prevalent form of peripheral nerve entrapment and a leading cause of occupational impairment. Non-surgical and surgical treatment options are the two basic types of treatment. Steroid injection does not improve symptoms like surgery according to the previous researches. Nevertheless, additional research is required to further evaluate the comparative studies.

OBJECTIVES: To compare the clinical and functional results of open carpal tunnel release (CTR) surgery VS local steroid injection (LSI) for carpal tunnel syndrome.

METHODS: This is prospective randomized, single blind, controlled study. Forty patients who were clinically and electrophysiologically confirmed to have idiopathic CTS were enrolled in the study after informed consent. Patients were randomized and assigned into 2 groups of 20 patients each. Group-1 was managed by open carpal tunnel release and Group-2 was managed by single injection of steroid. Patients were followed every 4 weeks up to 24 week. They were assessed clinically and functionally based on Boston Carpal Tunnel Assessment Questionnaire (BCTQN).

CONCLUSION: In our study we used Boston Carpal Tunnel Assessment Questionnaire (BCTQN), due to its ease of administration and responsiveness to clinical change, which can be considered as a valuable tool to evaluate functional outcome. Our findings suggest that both local steroid injection and surgical decompression are effective treatments in alleviating symptoms in primary CTS at 24 weeks follow-up. Surgery group had statistically significant improvement in comparison with steroid injection in terms of objective functional score in the 24 weeks follow-up, although clinical relevance of those differences remains to be defined. Hence we conclude, The steroid injection is a feasible non-expensive and effective therapy in most of the cases of CTS on the other hand surgical release is a day care, safe and effective treatment even in mild to moderate CTS. But cost effectiveness, cost benefit analysis and surgery related morbidity should be evaluated in further clinical trials with larger sample size and longer follow up period.

KEYWORDS

Carpal Tunnel Syndrome, Open Surgical Carpal Tunnel Release, Steroid Injection Carpal Tunnel, Boston Carpal Tunnel Assessment Questionnaire.

1.INTRODUCTION

Carpal tunnel syndrome (CTS) is a peripheral neuropathy characterized by pain, numbness and paresthesia that accounts for about 90% of all entrapment neuropathies.¹ These symptoms usually occur on the thumb, index, middle and ring fingers. Carpal tunnel syndrome is caused by compression of the median nerve by transverse carpal ligament as it crosses the wrist through the carpal tunnel, the peak age of development for CTS is 45-60 years.² The most common causes for CTS are genetic Predisposition, repetitive wrist movements, obesity, autoimmune disorders, pregnancy and hypothyroidism.³ Its prevalence in general adult population ranges from 2.7-5.8%. It is 3 times more common in woman than men in the age group of 45-50yrs. The signs and symptoms depend upon the severity of condition, initially due to sensory component of the nerve and the late due to motor component. The symptoms are usually worse at night. Gold standard for diagnosis is the combination of the clinical findings and the electrophysiological study.⁴ Nerve conduction studies in CTS show extended sensory and motor latencies and diminished conduction velocity. Treatment modalities include both surgical and non surgical methods. In less symptomatic situations, conservative treatments like splinting are more popular.⁵ Local steroid injection (LSI) is used as a last resort if splinting and NSAIDs etc have failed. CTS is due to intrinsic or extrinsic compression of the median nerve within the carpal tunnel. Steroids relieve local ischemia and reduce synovial swelling or vascular congestion in the carpal tunnel.⁶ When conservative therapy fails to relieve the symptoms of carpal tunnel syndrome, loss of sensitivity, weakness or atrophy, or significant involvement in nerve conduction investigations, surgery is often the chosen option. Surgery is usually reserved for patients with severe symptoms. The basic principle of carpal tunnel surgery is to increase the volume of the carpal tunnel temporarily by dividing transverse carpal ligament to release the pressure on the median nerve.⁸ Two surgical approaches are used to establish the release of the transverse carpal ligament: open and endoscopic treatment. For individuals with idiopathic carpal tunnel syndrome, open Carpal tunnel release (CTR) has long been recommended as the preferred surgical treatment for releasing compression on the median nerve in the wrist. The steroid injection is a feasible non-expensive and effective therapy in most of the cases of CTS on the other hand surgical release is a day care and definitive management even in severe cases. Mild CTS should be treated non-operatively, whilst moderate CTS can be treated either non-operatively (wrist splinting or steroid injecting

^[9-12] or with surgery ^[13]. There is no consensus as to the clinical distinction between mild and moderate CTS or how the latter should be treated ^[14]. For patient with mild to moderate CTS, the dilemma of whether to opt for surgery or steroid injection remains. Hence Our objective of this study was to compare the clinical and functional results of open carpal tunnel release surgery (CTR) vs Local Steroid Injection (LSI) for carpal tunnel syndrome (CTS)

2. MATERIALS AND METHODS :

2.1 Source Of Data

The study was conducted on 40 patients with clinically and electrophysiologically confirmed idiopathic Carpal Tunnel Syndrome (CTS) from Jan 2020 to Aug 2021, in Department of Orthopaedics, INHS Sanjivani, Naval Base, Kochi.

2.2 Inclusion Criteria

1. Age: Above 18 years of either sex
2. All three of the following must be present:
 - a. Intermittent paraesthesia
 - b. Nocturnal hypoaesthesia, dysaesthesia or paraesthesia (including on waking)
 - c. A positive provocation test (e.g. Tinel's, Phalen's, Durkan's pressure or hand elevation test)
3. Symptoms present for atleast 3 months
4. Patients must have failed a trial of night splints for atleast 2 weeks

2.3 Exclusion Criteria

1. Severe Cts
 - a. Thenar Muscle Wasting Or
 - b. Reduced Light Touch Sensation In Median Nerve Distribution (compared To Opposite Unaffected Side Or Unaffected Finger)
 - c. Severe Cts Grade In Ncs Study
2. Previous Carpal Tunnel Surgery Or Steroid Injection
3. Cts Secondary To:
 - a. Wrist Deformity, Trauma Or Mass
 - b. Pregnancy
 - c. Hypothyroidism
 - d. Inflammatory Arthropathy
4. Clinical or neurophysiological evidence of generalized or other peripheral neuropathy (e.g. ulnar nerve) or cervical radiculopathy
5. Patients in whom the base line questionnaire cannot be completed

due to cognitive difficulties

2.4 Study Population And Study Groups

Clinically diagnosed cases of carpal tunnel syndrome (CTS) were considered eligible for inclusion in this study. Nerve conduction studies (NCS) were conducted to provide an objective measure of electrophysiological severity. Nerve conduction study results were classified as mild, moderate, and severe CTS. The neurodiagnostic criteria were based on the American Academy of Neurology summary¹⁵ statement, which further classified the abnormalities as follows: (i) mild abnormality, that is, abnormal comparative tests or prolonged median distal sensory latency (> 3.5 ms) but normal median distal motor latency (DML); (ii) moderate abnormality, that is, prolonged median DSL and DML (> 4.2 ms); and (iii) severe abnormality, that is, absence of median sensory nerve action potential or absent compound muscle action potentials. patients meeting the inclusion and exclusion criteria are selected for the study. All the patients were explained about the aims of the study, the methods involved and an informed written consent was obtained before being included in the study. Patient enrollment was followed by the opening of an envelope containing treatment assignments for each wrist, with the appropriate therapy being given immediately. The number of wrists randomly allocated to surgery or local steroid injection was used in an intent-to-treat analysis. The patients were randomly divided into 2 study groups of 20 patients each.

If Patients have bilateral hand symptoms, then the hand with the more severe symptoms was included in the study and treated with either surgery or steroid injection as per randomisation. After the treatment of hand with more severe symptoms If patient opts for treatment of the lesser affected hand then after taking fresh consent from the patient, the same protocol of randomisation and management was followed.

2.5 Clinical Assessment

A careful history was elicited from the patient to reveal the symptoms such as paresthesia, night awakening, tingling/numbness, pain, duration and the severity of the condition. The patients were then assessed clinically to evaluate their general condition and the local condition with provocative test and neurological examination.

2.6 Functional Assessment

Symptoms and function were measured using Boston Carpal Tunnel Assessment Questionnaire¹⁶; this is a validated patient orientated scale specific for CTS. It has two parts: a symptom severity scale (SSS) consisting of 11 questions and a function status scale (FSS) with 8 questions. Each question is scored from 1 to 5, and the mean is calculated for each subscale. The change in SSS score and FSS score are used for calculating outcome. It has been recommended by the American Academy of Orthopedic Surgeons as the disease- specific instrument used to assess patients' responses to CTS treatment for research.¹⁷

2.7 Study Group II (local Steroid Injection)

All participants allocated to receive a steroid injection will receive the standard injection offered at their site. Steroid injections were performed by a single physician in which local steroid injections of 40mg methylprednisolone of 1ml mixed with 1ml of 2% lignocaine was injected into the carpal tunnel. The wrist was positioned on a hard surface in slight dorsiflexion and the needle was advanced at a 30 degree angle to the skin, medial to the palmaris longus tendon. The needle was with drawn and repositioned if the patient reported paraesthesia. After injection the patient was asked to flex and extend the fingers for 30 seconds to promote diffusion of the methylprednisolone.

2.8 Study Group II (carpal Tunnel Release Surgery)

Surgical decompression of the carpal tunnel was carried out. The procedure was done under local anesthesia (2% plain lignocaine). A 2.5 to 3 cm longitudinal incision was made proximally on the ulnar border of the palmaris longus where it intersects the distal wrist crease. The incision was made along the axis of the ring finger in order to avoid injuries to the palmar cutaneous branch and the recurrent motor branch of median nerve. The transverse carpal ligament was divided proximally and distally under direct vision until the median nerve had been fully decompressed. One week after surgery patients were assessed by the operating surgeon for surgical complications but this assessment was not included as primary or secondary outcome measure.

2.9 Post Procedure Period

Study Group-1: local dressing done.

Study Group-2: Regular wound dressing were done. Oral antibiotic regimen was continued for 3-5 days after the surgery. Suture or staple removal was done at 10-12th post-operative day.

They all had a physician directed postoperative therapy program, which included tendon gliding exercises, strengthening, and stretching. Supervised therapy for surgical patients was used only if patients had difficulty regaining motion or strength or had unusual pain complaints after surgery.

2.10 Follow Up

The Patients were followed up at regular intervals of 4 weeks up to 24 weeks to assess clinically and functionally based on Boston Carpal Tunnel Assessment Questionnaire. Physiotherapy exercises were taught and patients were encouraged to continue muscle strengthening exercises.

If symptoms recur following either the injection or surgery, participants should contact research team. This patients will be considered as a case of relapse. Fresh NCS will be done to confirm the severity and discuss further treatment options. This may include even carpal tunnel release surgery.

2.11 Statistical Methods:

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean $\pm$ SD (Min-Max) and results on categorical measurements are presented in Number(%). Significance is assessed at 5% level of significance.

The following assumptions on data is made, Assumptions:

1. Dependent variables should be normally distributed,
2. Samples drawn from the population should be random, Cases of the samples should be independent

Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Z test for 2 population proportions used to find the significance of study parameters expressed in proportions. Level's test for homogeneity of variance has been performed to assess the homogeneity of variance. Data was tested for normality by Kolmogorov-Smirnov test. Chi-square has been used to find the significance of study parameters on categorical scale between two groups.

Statistical software:

The Statistical software namely SAS 9.2, SPSS 16.0, socscistatistics calculators, and MedCalc 9.0.1 were used for the analysis of the data and Microsoft word and Excel have been used to generate tables

3.RESULTS

Study design: A Comparative two group study

Table 1: Age distribution of patients studied

Age in years	STERIOD GROUP		SURGERY GROUP	
	No.	%	No.	%
20-30	3	15.0	2	10.0
31-40	9	45.0	11	55.0
41-50	7	35.0	7	35.0
51-60	1	05.0	0	00.0
Total	20	100.0	20	100.0
Mean$\pm$SD	37.4 $\pm$ 6.87		37.1 $\pm$ 5.19	

Samples are age matched with Student t test. The t-value is 0.15429. the p-value is .439098. The result is not significant at $p < .05$. Mean age of this study is 37.25 ± 5.99

Demographic details		STERIOD GROUP		SURGERY GROUP		TOTAL PARTICIPANTS	
		No	%	No	%	No	%
gender	Female	16	80.0	17	85.0	33	82.5
	Male	04	20.0	03	15.0	07	17.5
	Total	20	100.0	20	100.0	40	100.0
laterality	unilateral	12	60.0	14	70.0	26	65.0
	bilateral	08	40.0	06	30.0	14	35.0
	total	20	100.0	20	100.0	40	100.0
dexterity	right	14	70.0	13	65.0	25	62.5
	left	06	30.0	07	35.0	15	37.5

dexterity	Total	20	100.0	20	100.0	40	100.0
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Table 3: Occupation distribution in two groups of patients studied

Occupation	STERIOD GROUP		SURGERY GROUP	
	No	%	No	%
Farmer	1	5.0	1	5.0
Housewife	8	40.0	10	50.0

Private Business	2	10.0	1	10.0
Government servant	1	5.0	2	10.0
Labourer	0	0.0	1	5.0
Student	2	10.0	1	5.0
Teacher	3	15.0	2	10.0
Car driver (chronic car user)	3	15.0	2	10.0
Total	20	100.0	20	100.0

Table 4: Boston Carpal Tunnel Questionnaire in carpal tunnel syndrome patients before and after in Steroid injection group and Operation group

BCTQN	STERIOD GROUP			SURGERY GROUP			I vs II
	Before	After	P value	Before	After	P value	
SSS	Normal	00	10	The value of t is -12.695149. The value of p is < .00001. The result is significant at $p < .05$.	00	15	The value of t is -19.689737. The value of p is < .00001. The result is significant at $p < .05$.
	Minimal (0.1-1)	00	03 (0.8)		00	03 (0.6)	
	Mild (1.1-2)	03 (1.7)	04 (1.6)		02 (1.8)	02 (1.4)	
	Moderate (2.1-3)	07 (2.8)	02 (2.4)		08 (2.6)	00	
	Severe (3.1-4)	08 (3.6)	01 (3.4)		09 (3.7)	00	
	Extreme (4.1-5)	02 (4.3)	00		01 (4.2)	00	
FSS	Normal	00	10	The value of t is -14.236104. The value of p is < .00001. The result is significant at $p < .05$.	00	16	The value of t is -18.424325. The value of p is < .00001. The result is significant at $p < .05$.
	Minimal (0.1-1)	00	04 (0.7)		00	02 (0.7)	
	Mild (1.1-2)	02 (1.8)	03 (1.7)		02 (1.8)	02 (1.5)	
	Moderate (2.1-3)	09 (2.7)	02 (2.4)		07 (2.6)	00	
	Severe (3.1-4)	07 (3.7)	01 (3.3)		08 (3.5)	00	
	Extreme (4.1-5)	02 (4.4)	00		03 (4.3)	00	

Table 5: Clinical data in carpal tunnel syndrome patients before and after in Steroid injection group and Operation group

Clinical data	STERIOD GROUP(I)			SURGERY GROUP(II)			Clinical improvement observed		I vs II
	Before	After	P value	Before	After	P value	Group I No. (%)	Group II No. (%)	
Paresthesia	20(100)	4(20)	<0.0001	20(100)	1(5)	<0.0001	16/20(80)	19/20(95)	0.15
Night awakening	7(35)	0(0)	<0.0036	6(30)	0(0)	<0.0078	7/7(100)	6/6(100)	0.90
Tingling/numbness	13(65)	5(15)	<0.011	11(55)	0(0)	<0.0001	08/13(61.5)	11/11(100)	0.02
Hand-forearm pain	5(25)	2(10)	<0.42	4(20)	0(0)	<0.034	03/05(60)	04/04(100)	0.15
Hypo/hyperesthesia	5(25)	2(10)	<0.42	4(20)	1(5)	<0.157	03/05(60)	03/04(75)	0.63
Tinel sign	20(100)	4(20)	<0.0001	20(100)	0(0)	<0.0001	16/20(80)	20/20(100)	0.034
Phalen test	20(100)	2(10)	<0.0001	20(100)	0(0)	<0.0001	18/20(90)	20/20(100)	0.14

This Study was Conducted in INHS Sanjivani, Kochi Period of study was 18 months from Jan 2020 to Aug 2021. Forty (40) patients were included in this study; They were 33 females and 7 males, their mean age was 37.25 ± 5.99 (26–51 years) with unilateral CTS (26 wrists) and bilateral CTS (14 wrist). Majority were Right sided CTS in 25/40(62.5%). Their duration of illness was 6.75 ± 1.8 (4–11 months). Most of patients home makers 18/40(45%). According to the electrophysiological studies and clinical examination there were 29 patients with moderate CTS and 11 patients with mild CTS. They were randomly assigned into two groups. At baseline there was no statistical difference in demographic data, clinical data and Functional score based on BCTAQ between two groups. In group I (CTR) they were 16 females and 04 males, their age was 37.4 ± 6.87 years (26–51 years) and disease duration 6.8 ± 1.8 months (4–10 months). In group II (CTR) they were 17 females and 03 males, their age was 37.1 ± 5.19 years (26–45 years) and disease duration 6.7 ± 1.8 years (4–11 months).

Patients were assessed before and after injection/surgery in each group according to clinical data (table 5) and functional parameters based on BCTQ (Table 4).

In the group I, there was statistical improvement in paresthesia, night awakening, tingling/numbness, provocative test like tinels and phalens test. Similarly group II showed statistical improvement, in above clinical parameters, in addition showed improvement even in hand-forearm pain. The improvement in hypo/hyperesthesia is not significant in both group I and II. Group II(surgery) on comparison to group I(steroid) showed statistically significant improvement ($p < 0.05$) in terms of tingling/numbness and Tinels sign at final

evaluation (24 weeks)

In the group I, mean SSS changed from 3.11 ± 0.77 at baseline to 0.85 ± 1.03 at final evaluation (24 weeks after the treatment) Mean FSS changed from 3.12 ± 0.77 at baseline to 0.8 ± 1.01 at final evaluation. In the group II, mean SSS changed from 3.10 ± 0.72 at baseline to 0.23 ± 0.46 at final evaluation and Mean FSS changed from 3.14 ± 0.75 at baseline to 0.23 ± 0.47 at final evaluation.

Both SSS and FSS scales improved after 24 weeks in both group I and II (Table 5). There was a significant difference within the groups with respect to SSS ($p < 0.0001$) in group I and ($p < 0.0001$) in group II. The comparison between SSS of surgery vs steroid was also statistically significant ($p=0.048$). Similar findings detected with respect to FSS within groups, ($p < 0.0001$) in group I and ($p < 0.0001$) in group II. The comparison between FSS of surgery vs steroid was also statistically significant ($p=0.03$).

Illustration 1 : (study Group 1)

Case 1: Steroid Injection By Standard Technique



Illustration 2 : (Study Group 2)**Case 2: Carpal Tunnel Release Through Palmar Incision****Case 3: Keloid Formation****DISCUSSION**

Carpal tunnel syndrome (CTS) is the most prevalent form of peripheral nerve entrapment and a leading cause of occupational impairment. Non-surgical and surgical treatment options are the two basic types of treatment. Steroid injection does not improve symptoms like surgery according to the previous researches. Nevertheless, additional research is required to further evaluate the comparative studies. The present study was undertaken to compare the clinical and functional results of open carpal tunnel release surgery (CTR) vs local steroid injection (LSI) for carpal tunnel syndrome. This study was conducted in INHS Sanjivani, Kochi Period of study was 18 months from Jan 2020 to Aug 2021. Forty (40) patients were included in this study which were randomly assigned to two groups, group I (LSI) and group II (CTR).

Our analysis of the study are as follows:

Age distribution:

Our study revealed the mean age of patients to be 37.25 ± 5.99 (26–51 years) years, the peak age of development for CTS is 45–60 years. We have slightly younger age group of patients compared to CTS in general population. Probably because of inclusion of even mild CTS in our study population.

Sex distribution:

In our study, the female predominance of about 82.5% of study population. It correlates with fact that carpal tunnel syndrome is more common in females.

Occupation:

Majority of our patients are housewives/home makers (50%). They are involve in multiple household chores regularly causing repeated irritation of median nerve and causing clinical symptoms.

We evaluated our results and compared them to those obtained by various other studies utilizing similar modalities of treatment. A study by Demirci S et al¹⁸, A non-randomised, retrospective comparison

between decompression and steroid injection, reported that while both surgery and steroid injections (patients were injected twice) provided short-term relief, open carpal tunnel release was superior by 6 months. They concluded that although steroid injection provides an improvement comparable with surgical decompression, this improvement is not long-lasting. The study by Ucan et al¹⁹ compared 3 intervention groups. The first group was treated with a neutral splint that should be worn 24 hours a day for 3 months. The second group also received the splint but was first injected with a local steroid. The third group was treated surgically with an open carpal tunnel release. At 6 months of follow-up, significant results on the symptom severity score were found in favor of the third group. Also at 6 months of follow-up, significant results in favor of the third group were found on the function capacity scale. Hui et al²⁰ reported Both carpal tunnel release and injection produced a significant improvement in symptoms at 20 weeks and the effect was sustained in patients who underwent decompression; Electrophysiologic outcomes also showed a significant improvement in the surgical decompression group. They concluded that Compared with steroid injection, open carpal tunnel release resulted in better symptomatic and neurophysiologic outcome but not grip strength in patients with idiopathic carpal tunnel syndrome over a 20-week period. Ly - Pen et al.,²¹ in a randomized clinical trial, compared the efficacy of surgical decompression vs. LSI in 163 patients with clinical diagnosis and neurophysiological confirmation of CTS, over a follow - up period of 2 years. Based on their results, both steroid and surgery group were effective in alleviating symptoms of CTS. However, surgery had an additional benefit. Ly-Pen et al²² found both surgery and steroid injection, achieve significantly good punctuations of the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36). Both therapeutic modalities are equally effective, but surgery seems better, in medium-term follow-up, in several subscales of SF-36. Ly-Pen D et al²³ study suggest that with longer follow-up, surgery may provide greater symptomatic relief than a single injection.

In our study, both the treatment modalities, non surgical local steroid injection (LSI) and surgical carpal tunnel release (CTR), provided short term relief alleviating the symptoms and improving the hand-wrist functions of CTS patients at final evaluation (24 weeks). This improvement was measured with the objective scoring based on BCTQ and clinical data. Both the treatment showed statistically significant improvement within the group in terms of SSS and FSS ($P < 0.0001$). The comparison between SSS of surgery vs steroid was also statistically significant ($p=0.048$). Similar findings detected with respect to the comparison between FSS of surgery vs steroid was ($p=0.03$). In both treatment groups, there was statistical improvement in paresthesia, night awakening, tingling/numbness, provocative test like tinels and phalens test at 24 weeks. group II (CTR) in addition showed improvement even in hand-forearm pain. Group II (surgery) on comparison to group I (steroid) showed statistically significant improvement ($p < 0.05$) in terms of tingling/numbness and Tinels sign at final evaluation (24 weeks).

Complications:

Reported complications included delayed wound healing in 2 (10%) patients in group II, while none in group I. keloid formation at wound site in 1 patient (5%) in group II, while none in group I. 3 patient (15%) had short term pain (3 to 5 days) over injection site associated with redness. Managed by tab ibuprofen BD for 5 days complications representing tendon rupture, nerve injuries, bleeding and infection were not encountered in both groups. there was no reduction in grip and pinch strength after open carpal tunnel release (CTR)

Limitation:

Short term follow-up of the patients could be considered as the biggest limitations of our study. Longer follow-up of the patients or multi-steps evaluation of outcome would further clarify the potential of both treatment in the management of CTS. The total sample size 40 patients is smaller sample size for comparing two treatment modalities in most prevalent clinical condition of CTS. Still our study will add to strength to further studies with larger study populations we have not looked into the relative long-term efficacy and cost effectiveness of the two treatments. The actual choice of treatment in daily practice will depend also on these unresolved issues. Another limitation that should be considered is that there are different injection techniques and different steroid preparations and dosages; it can be argued that alternative injection methods at even higher dosages of steroid may produce more benefit.

5.CONCLUSION

In summary, we found Boston Carpal Tunnel Assessment Questionnaire, due to its ease of administration and responsiveness to clinical change, can be considered as a valuable tool to evaluate functional outcome. Our findings suggest that both local steroid injection and surgical decompression are effective treatments in alleviating symptoms in primary CTS at 24 weeks follow-up. Surgery group has statistical significant improvement in comparison with steroid injection in terms of objective functional score in the 24 weeks follow-up, although clinical relevance of those differences remains to be defined. Thus, in patients with mild to moderate CTS, we advocate the use of local steroid injection for quick relief of symptoms and restoration of function. Surgery could be offered as definitive treatment in patient of mild to moderate CTS, Who accepts risks and complication associated with surgery and also to patients with relapse of symptoms after steroid injection.

Hence we conclude, The steroid injection is a feasible non-expensive and effective therapy in most of the cases of CTS on the other hand surgical release is a day care, safe and effective treatment even in mild to moderate CTS. But cost effectiveness, cost benefit analysis and surgery related morbidity should be evaluated in further clinical trials with larger sample size and longer follow up period.

Declarations

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Conflict of interest: None declared

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