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The Effect of Surgical Decompression on Neuropathic Pain in Carpal Tunnel Syndrome

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Abstract

Background: Carpal tunnel syndrome (CTS) is a complex disorder associated with localized compression of the median nerve at the carpal tunnel. It is an important cause of pain, neurologic symptoms and functional limitation of the wrist and hand.

Methods: This is a hospital based propspective study. Patients with 18 to 80 years of age carpal tunnel syndrome patient attending department of orthopaedics, hand surgery unit, SMS, Jaipur as OPD/ IPD patients ' basic will be included in study group after taking informed written consent. Patients with fracture, metastatic disease and those with met exclusion criteria are not included in study.

Results: Out of 77 cases ;phallen test is positive in 70 cases in negative in 7 case in pre operative. In post operative case phallen test is posive in 9 case and negative in 68 cases.Results show that phellan test have p value is less than 0.001 which is significant Phallen test have good sensisivity in diagnosis of CTS .

Conclusion: The cases are treated by surgical decompression of carpal tunnel. This procedure almost always relieves the signs and symptoms and also halts the progression of damage to the median nerve. If properly performed after a correct diagnosis, carpal tunnel surgery in devoid of major complications and is a rewarding surgery.

Keywords: CTS, Phallen test, Progression.

Introduction

Carpal tunnel syndrome (CTS) is a complex disorder associated with localized compression of the median nerve at the carpal tunnel. It is an important cause of pain, neurologic symptoms and functional limitation of the wrist and hand. It is considered the most common nerve compression disorder of the hand. Carpal tunnel syndrome constitutes a major part of the occupational upper-extremity disorders and is associated with

considerable health care and indemnity costs.[1]Carpal tunnel syndrome (CTS) is the most common entrapment neuropathy of the median nerve at the wrist.[2] In the general population, CTS is regarded as a common disease, and the prevalence of CTS is estimated to be 0.9-4.6% as confirmed by clinical and electrophysiological findings.[3] CTS have been associated with trauma, diabetes, rheumatoid arthritis, acromegaly, hypothyroidism, and pregnancy. It has also been associated with vibration and certain activities involving repetitive and forceful movements of the hands [4]

The widespread use of computers and the evolution of technology have caused carpal tunnel syndrome to become the affliction of the 90's and possibly the next century. Carpal tunnel syndrome cases are already at epidemic stages. Projections show that among people who work on computers, the percentage of people who suffer symptoms of CTS could go up from 10% before the turn of the century to 50% by 2010. Even now, in studies, an average of 30% of people complained of suffering from symptoms that indicate Carpal Tunnel Syndrome[5]

The worldwide incidence of CTS among computer users (both vocational and recreational) is estimated to be about 15-25%. By this estimate nearly 6 million Indian computer users may be injured already. An ongoing study on Repetitive Strain Injury in Bangalore since February 2001 has found that out of 1300 IT professionals, 75% were found to have at least one symptom of established CTS.A recent study of 200 computer professionals in Hyderabad, India stated that a large number of repetitive strain injury cases developed in a relatively short duration of one and half years .CTS is more common in omen [6]

The aim of this study was to evaluate NP in patients with CTS and the change in NP after surgery and to identify risk factors for persistent NP after surgery through an observational consecutive clinical study.

Material & Methods

Study Design: Hospital based prospective study

Study participant: Patient who met the inclusion criteria and report at department of Orthopaedics, Hand surgery unit, SMS Hospital, Jaipur would be participants .

Study Place: Deptt. Of Orthopaedics, Hand surgery unit, SMS Hospital

Sample Size: 83

Study duration: April 2018 to April 2019 and follow up to November 2019.

Inclusion Criteria

- age of 18 to 80 yr
- No history of fracture
- Patient consenting to be included in study
- Absence of other neurovascular disease

Exclusion Criteria

- Skeletal immature
- Presence of other neurovascular disease
- Presence of fracture
- refusal to participate

Plan of Action

This is a hospital based propspective study. Patients with 18 to 80 years of age carpal tunnel syndrome patient attending department of orthopaedics, hand surgery unit, SMS, Jaipur as OPD/ IPD patients ' basic will be included in study group after taking informed written consent. Patients with fracture, metastatic disease and those with met exclusion criteria are not included in study. Selected patients will undergo pre-operative X-Ray- AP and lateral view and all other routine investigations. They will then be considered for

surgery and will be followed for twelve months post operatively. Patient's functional and clinical results will be evaluated using DASH scoring system. After that data will be collected and result will be analysed.

New cases were evaluated thoroughly including a detailed history, presenting complaints, initial treatment taken prior to consultation along with measure taken by the patient to get relief. A proforma was made to make entry of all relevant information of such cases.

Clinical examination included inspection regarding thenar atrophy and associated skin changes and atrophy of fingers index, middle and thumb. Thenar atrophy was appreciated by comparing the thenar eminences or both sides. Hypoesthesia in median nerve distribution was noticed by comparing the light touch sensation with the normal side. Two point discrimination tests was carried out and compared on both sides. Hyperaesthesia to pin prick in the distribution of median nerve as demonstrated by comparing the patient's reaction to pin prick with that to pin prick on the normal little finger. Paraesthesia lone in the same distribution was recorded.

Statistical Analysis The data will be compiled in MS Excel in the form of master chart. The data will be analysed as per aim & objective. Inference will be drawn with the use of appropriate significant test (chi square test for qualitative data & unpaired t test for quantitative data). For significance 0.05 will be considered as cut off point.

Results

Out of 77 case 57 case are between 30to 60 age. its show that CTS is more common in 30-60 age group and maximum case were above 50 yr of age. Males are38.96% and female are 61.04%.its show that CTS is more common in female than male.Out of 83 hands; right hands are 55 [71.43%] and 16 are left side [20.78%] and 6 case were bilateral. Study results showed that CTS is more common in right hands or dominant hand

Table 1 : Phallen Test

	Pre Op.		Post Op.	
	Number	Percentage	Number	Percentage
Positive	70	90.90	9	11.69
Negative	7	9.09	68	88.31
Total	77	100.00	77	100.00
P value	P<0.001 (S)			

Table 1 showed that out of 77 cases ;phallen test is positive in 70 cases in negative in 7 case in pre operative. In post operative case phallen test is posive in 9 case and negative in 68 cases. Results show that phellan test have p value is less than 0.001 witch is significant Phallen test have good sensisivity in diagnosis of CTS

Table 2: Reverse Phallen Test

	Pre Op.		Post Op.	
	Number	Percentage	Number	Percentage
Positive	63	81.81	8	10.39
Negative	14	18.81	69	89.61
Total	77	100.00	77	100.00
P value	P<0.001 (S)			

Reverse phellan test is positive in 63case[81.81%] and post op positive in 8 case [10.39%]with P value is less than 0.001. Show that this test is significant in diagnosis of CTS. Results show that phellan test is more sensitive than reverse phallen test

Table 3: Tinel Test

	Pre Op.		Post Op.	
	Number	Percentage	Number	Percentage
Positive	62	80.51	7	9.09
Negative	15	19.48	70	90.91
Total	77	100.00	77	100.00
P value	P<0.001 (S)			

Table 3 show about tinel test in 77 case both pre and post operatively there are 62 case were positive tinel test pre op and post op in 7 9.09%

Negative in 15 case 19.48% pre op and 70 case 90.91% case negative post op.P value is less than 0.001 which is significant

Table 4: Pinch Test Thumb - IF

	Pre Op.		Post Op.	
	Mean	SD	Mean	SD
Pinch TestThumb – IF	3.49	0.57	3.87	0.89
Range	2.7-5		2.1-5.5	
P value	P<0.001 (S)			

Table 4 show about pich test of thumb and index finger both pre and post op in 77 case with mean value is 3.49 with s.d 0.57 and rangin from 2.7 to 5 pre operatively and post op mean value is 3.87 and ranging from 2.1to 5.5. P VALUE is less than 0.001 witch is significant.results show that post op pinch grip is improved.

Table 5: Pinch Test Thumb - LF

	Pre Op.		Post Op.	
	Mean	SD	Mean	SD
Pinch TestThumb - LF	1.19	0.27	1.39	0.51
Range	0.8-1.9		0.4-2.5	
P value	0.004 (S)			

Table 5 show pinch strength of thumb and index finger .in pre op of 77 cases mean of pinch is 1.19 and ranging from 0.8to 1.9 .in post of cases mean of pinch grip is 1.39 with ranging from 0.4 to 2.5. p value is 0.004 which is significant.post operative improvement was seen in pinch strngth

Table 6: Grip Power

	Pre Op.		Post Op.	
	Mean	SD	Mean	SD
Grip Power	16.76	1.96	17.84	3.01
Range	12-20.1		9-23	
P value	0.012 (S)			

Table 6. show grip in 77 case both pre and post op .pre op mean value is 16.76 and standard deviation is 1.96 and ranging from 12.0 to 20.1. in post mean is 17.84 and ranging from 9 to 23 with S.D 3.01.P value IS SIGINIGICANT witch is less than 0.012. Out of 77 case in 7 case grip power is decrease .they are taken in worsened grp.

Table 7: MMT of APB

	Pre Op.		Post Op.	
	Mean	SD	Mean	SD
Grip Power	2.62	1.00	3.03	1.32
Range	1-5		0-5	
P value	0.008 (S)			

Table 7 show manual muscle test of abductor pollicis brevis pre and post operative in 77 cases . mean value is 2.62 with ranging from 1 to 5 and standard deviation is 1.in post op mean is 3.03 wiyh ranging from 0to 5 and s,d is 1.32. p value is 0.008 which is significant. Post operatively in 7 cases power of APB not improved overall strength is improved

Table 8: DASH Score

	Pre Op.		Post Op.	
	Mean	SD	Mean	SD
DASH Score	27.36	2.23	25.43	5.70
Range	22-31		13-40	
P value	0.003 (S)			

Table 8 show pre and post operative DASH score in 77 cases pre op mean value is 27.36 with ranging from 22 to 31 and standard deviation is 2.23

In post op mean value is 25.43with ranging from 13 to 40 and standard deviation is 5.70 in 77 cases .in most of patients post op neuropathic pain is improved

Table 9: A/S With Night Pain

	Number	Percentage
S Positive	56	72.73
Negative	11	14.29
Total	77	100.00

Table 9 show association of night pain in CTS patient in 77 casesin 11 case out of 77 is not associated .result show that's in patient having night pain were better improved.

Discussion

In this study, we found Phalens test to be a reliable and reproduceable evidence of carpal tunnel syndrome, giving us a clue to further evaluate the patient on line of a diagnosis of carpal tunnel syndrome.

The Reverse Phalen test was also performed in this series and was fond to be positive in 67 out of 83 hands (87.01%). This test was also found to be a consistent and reliable test for cases of carpal.

According to Graham Lister, occasionally, when the Phalen test is negative the reverse test is positive producing numbness and tingling in median nerve distribution by placing the nerve on stretch.

Phalen (1966) [8] also found that sustained extension of the wrist aggrevates the symptoms of carpal tunnel syndrome.

Tinels test was positive in 64 out of 83 hands (83.12%) and negative in 13 out of 83 hands (16.88%).

In Phalen's series (1966), Tinel's test was positive in 452 cases (73%) and was absent in 169. Tinels sign was found positive in 13 of 24 (54.1%) hand by Tanzer (1959); In 14 of 25 instances (56%) of Linschield (1967) : In 360 hands (66)% by Phalen in another series of 1970.

In the diagnosis of carpal tunnel syndrome, Phalen's test was found to be more reliable being positive in 70 cases (90.9%) as compared to Tinel test and reverse phallen test.

Treatment

Sound management of CTS depends on an identification of the cause of the compression (Sunderland 1978).

In this study only surgical treatment of CTS is included

Surgical treatment

In this series, 77 cases were treated by surgical treatment which comprised open carpal tunnel release using the inter thenar incision.

Indication for surgery included

(i) Patient not responding to conservative treatment

(ii) Severe sensory loss leading marked functional impairment

(iii) Thenar atrophy

(iv) Markedly prolonged conduction velocities

Right wrists were involved in 55 cases (71.43%) and left wrist were involved in 16 cases (20.78%) treated surgically. In six case both wrist were involved and both were treated surgically. Right wrist with long history and marked thenar atrophy was operated first followed by left wrist at a later date.

Garland et al (1957) said that it was best to avoid operating on both sides for bilateral symptoms at the same time unless they are very severe. Phalen (1966) also recommended operating one wrist at a time in bilateral cases.[8]

Conclusion

The cases are treated by surgical decompression of carpal tunnel. This procedure almost always relieves the signs and symptoms and also halts the progression of damage to the median nerve. If properly performed

after a correct diagnosis, carpal tunnel surgery in devoid of major complications and is a rewarding surgery.

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