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LOCAL STEROID INJECTION OR SURGERY IN THE MANAGEMENT OF CARPAL TUNNEL SYNDROME; THE POSSIBLE PREDICTIVE FACTORS FOR THE CHOICE OF TREATMENT

Avadis A Muradian

MB,ChB, FICMS, Lecturer, Orthopaedic Surgeon, Department of Surgery, College of Medicine, University of Basrah, Basrah, Iraq.

Abstract

A total of 178 patients with 202 affected hands were studied prospectively for the management of carpal tunnel syndrome (CTS). Eighty six patients (105 hands) were treated with local steroid injection and 92 patients (97 hands) treated by surgical decompression, the follow up period ranged from 1 to 42 months. The period of relief and the risk of symptoms relapse after each management technique was evaluated. Of the total 86 hands (89%) treated surgically were free of symptoms at the follow up period, only 12 hands (11%) treated by local steroid injection were symptom free after more than one year of follow up. The results showed that local steroid injection have long term effect in the hands with mild symptoms, most were free from daily activity related pain and paresthesia with a duration less than 6 months and with mild median nerve compression in electro diagnostic studies. Surgical release provides better long period of recovery with low rate of relapse, in those hands with severe symptoms and nerve compression that lead to continuous night and daily activity complain, regardless of the duration of symptoms.

Introduction

Carpal tunnel syndrome is a painful disabling condition that causes functional impairment and loss of sleep in the severe cases, several methods of treatment have been suggested and studied, the initial choice is questionable that may be influenced by various factors; such as the severity of the symptoms, its duration, age, occupation, and the electro diagnostic severity[1-4]. Local steroid injection and surgical release are the common methods of treatment in CTS[5,6]. Most of the studies considered that local steroid injection is a less invasive nonsurgical management of CTS but the majority demonstrated a temporary response, rarely permanent relief, followed by high rates of recurrence[7-10], justified in a certain situations, also it may serve a diagnostic tool to exclude other conditions that mimic CTS, and as a predictor of the response to surgery[3,6,11,12].

It is widely accepted that surgical release of the median nerve is one of the most often performed treatment for CTS with superior outcome to those nonsurgical treatments, most of the patients experienced sustained functional improvement after surgery, with a low recurrence rates[13-15].

The aim of this study is to determine the best initial necessary method of treatment of this syndrome from the identification of the selected factors and the most accurate indications that may be predictive for rapid and the long term response.

Materials and Methods

From June 2002 to March 2006, only 178 patients (164 women, 14 men) with CTS could be followed after management, and were included in this present study at Basrah general hospital. The average age of the patients was 42 years (range from 22 to 60). In 24 patients(13%) both hands were treated giving a total of 202 hands. The duration of symptoms ranged from 2 to 136 months (average 34 months).

Diagnosis of the CTS was based on the clinical history especially for the night pain and paresthesia(NPP), and the daily activity related disabilities(DAD), physical examination tests were performed in all, and the electro diagnostic studies were done in 180 hands (89%).

The local steroid injection in the carpal tunnel at the distal wrist crease was done in 86 patients(105 wrists). Patients were evaluated for the symptomatic relief obtained and for the relapse although the period was variable; at 2 weeks, 6 weeks, 12 weeks, and some at 6 and 12 months intervals. In 26 wrists more than one local steroid injection was performed. After the assessment of the results, the patients who had severe or worsening of the symptoms during the follow up period were subjected to surgery.

Surgical decompression was performed in 92 patients (97 wrists), by the release of transverse carpal ligament through mid palmar curved longitudinal incision. Postoperatively, all the patients were assessed for the quality of satisfaction and rapidity of the improvement from symptoms and for the residual disabilities at 1 week (time of change of the dressing), 2 weeks (time of the sutures removal), 6 weeks, 3 months, and 6 months intervals. All the patients were advised avoiding heavy manual work after operation for at least one month. As usual, only the patients with no improvement or with residual disabilities and those who developed CTS in the other hand return to us during the follow up period.

Results

In 86 patients (48%) with 105 hands who were treated by local steroid injection the average age was 39 years (range from 22 to 60), with average duration of symptoms 21 months (range 2 to 72) , and the associated conditions shown in Table I .

Table I: Associated Conditions in local steroid injection group.

Condition	No. of Patients
Lactation	11
Pregnancy	12
Diabetes mellitus	2
Rheumatoid arthritis	1
Hyperthyroidism	1
Thenar atrophy	1

Only 91 hands (87%) were referred to electro diagnostic studies. Bilateral local steroid injections was performed at different stages in 19 patients (22%), in the right 53(62%) and in the left 14 (16%). After the follow up period which ranged from 1 to 38 months, 12 hands (11%) were asymptomatic after more than 12 months, 33 hands (32%) had initial relief followed by relapse of the symptoms within 3 months, 47 hands(45%) within 6 months and in 13 (12%) the symptoms relapsed within 12 months. The Analyzed results were demonstrated in tables II, III & IV. Patients with resolution of the symptoms

of more than 12 months were with average duration of symptoms of 6 months (range 2 to 16). Only 4 hands (6%) had continuous nocturnal and daily activities pain and paresthesia. The electro diagnostic criteria in 9 hands was mild nerve compression in 6 hands(67%).

Table II: Results of the treatment according to the duration of complain.

Patients response	**No. of hands**	**Average duration (months)**	**No. of patients**
For 3 months	33 (32%)	42	26(30%)
For 6 months	47 (45%)	27	39(45%)
For 12 months	13 (12%)	10	11(13%)
More than 12 months	12 (11%)	6	10(12%)
Total	105		86

Table III: Results of treatment according to the severity of night and daily activity related disabilities

Patients response	**No. of hands with NPP and DAD**	**Total No. of hands**
For 3 months	31 (44%)	33
For 6 months	29 (41%)	47
For 12 months	6 (9%)	13
More than 12 months	4 (6%)	12
Total		105

Table IV: Results of the treatment according to the severity of the electro diagnostic study.

Patients response	EMG severity (No. of hands)			Total. No of hands
	Mild	Moderate	Severe	
For 3 months	2(7 %)	5(18%)	21(75%)	28(31%)
For 6 months	12(29%)	16(38%)	14(33%)	42(46%)
For 12 months	7(58%)	3(25%)	2(17%)	12(13%)
More than 12 months	6(67%)	2(22%)	1(11%)	9(10%)
No. of hands				91

The patients with recurrence of the symptoms within 3 months were with average duration of symptoms of 42 months (range 18 to 72), 31 hands (44%) had continuous nocturnal and daily activity pain and paresthesia, and 21 hands (75%) had severe nerve compression. Forty seven hands (45%) showed initial improvement within a period of 6 months and followed by relapse. The average duration of their symptoms was 27 months (range 8 to 60), 29 hands (41%) had constant day and night pain and 12 hands (29%) had mild nerve compression in the electro diagnostic studies. In 13 hands(12%) the symptoms relapsed within 12 months after initial relief, the average duration of their complain was 10 months (range 8 to 14), 6 hands (9%) had continuous day and night pain and paresthesia and with mild nerve compression in 7 wrists(58%).

Surgical release was performed in 97 wrists of 92 patients, the average age of the patients was 42 years (range 22 to

61), with average time of complain till surgery was 47 months (range 3 to 136). Electro diagnostic tests were done in 89 wrists (92%). Table V shows the associated conditions.

Table V: The associated conditions in operative group.

Condition	No. of Patients
Lactation	9
Pregnancy	3
Diabetes mellitus	2
Rheumatoid arthritis	2
Hyperthyroidism	2
Thenar atrophy	5

Bilateral surgery was carried out in 5 patients (5%) at different periods, 64(70%) in the right and 23(25%) in the left. All the patients operated on for at least approximately 3 months from their complain. The follow up period was 3 to 42 months.

Postoperatively, 86 hands (89%) had complete resolution of the symptoms, and was immediate relief within 1 months in 63 hands (65%), delayed after 1 months in 23(24%), and only 11 hands (11%) showed no improvement.

Tables VI, VII, VIII showed the analyzed results. In those 86 hands(89%) with complete improvement, the average duration of the complain was 46 months (range 3 to 120), continuous severe nocturnal pain and daily activities disturbances was presented before surgery in 70 hands(81%), in the electro diagnostic studies 65 hands(82%) had severe nerve compression. In the 11 of the hands(11%) the symptoms remained unchanged, the duration of their complain ranged between 24 to 136 months(average 49) constant night and daily activity symptoms was presented in 9 hands (82%), in 8 hands (80%) there was severe nerve compression.

Table VI: Results of surgery according to the duration of complain.

Patients response	No. of hands	No. of patients	Average duration (months)
No recovery	11(11%)	10	49
Recovery	86(89%)	82	46
Early	63(65%)	61	47
Late	23(24%)	21	45

Table VII: Results of surgery according to the severity of the symptoms

Patient response	No. of hands with (NPP and DAD)	Total
No recovery	9(82%)	11
Recovery	70(81%)	86
Total		97

Table VIII: Results of surgery according to the severity of electro diagnostic studies.

Patient response	EMG severity (No. of hands)			Total
	Mild	Moderate	Severe	
No recovery	-	2(20%)	8(80%)	10(11%)
Recovery	2(3%)	12(15%)	65(82%)	79(89%)
Total				89

Discussion

The decision for the most accurate helpful method of management of the patients with CTS is very important and should be put in consideration which patient may respond well and to identify the predictive factors of the response to several types of therapy.

In this prospective study, the severity of symptoms, degree of the median nerve compression and the duration of the complain may serve as a measure of the response to each type of treatment.

After local steroid injections in 105 wrists, 89% of the hands offers transitory relief followed by recurrence (32% within 3 months, 45% within 6 months and 12% within 12 months) and only 11% of the hands were free of symptoms at more than 12 months, which were with mild symptoms, free from daily activities pain, mostly with mild and some with moderate median nerve compression in EMG, and that have been present within 6 months. These results were compared with the already published studies. Graham et al[6] reported a long term relief in 10% of his cases. Girlanda[10] in 8% and 90% becomes worse. In the Gelberman et al study[16], 22% of the hands were completely free of symptoms with relapse in 76%. Robert[11] reported that the recurrence can be expected in 65% to 90% of the patients.

On the review of the previous articles, they demonstrated that positive response to this type of treatment mostly in patients with mild symptoms and with mild median nerve compression, absence of sensory impairment and the duration of complain was variable between 3 to 12 months. The poorest results with high rate of relapse were in the hands with severe symptoms and nerve entrapment of more than 1 year duration and sometimes the response may be influenced by the techniques of the injection[1,17-19]. Several series stated that the injection of local steroid does not reduce the pressure on the nerve, it only reduce the inflammatory synovial swelling temporarily with relief of local ischemia or vascular congestion[7,9,20] and may be indicated in certain conditions such as in lactating females because of the difficulties of child care if surgery performed also in reversible situations such as in pregnancy, hypothyroidism and patients who refuse surgery[6,11].

Recent articles offered satisfactory long term symptomatic relief and functional improvement after carpal tunnel surgery which is the one of the more common elective minor operation. Tortland et al[17] concluded that patients with CTS treated by surgery were six times more likely to have resolution of the symptoms than those treated conservatively. In the Reale study[15], 90.8% of the hands treated by surgery were improved. Choi[21] had 87% improved within 3 months, 97% within 1 year and Adams[22] obtained improvement in 86% .

In our institution, similar observations were obtained. Complete improvement was seen in 89% of the hands and was early in 65%, delayed in 24%. In nearly 81% of the hands had severe constant pain and paresthesia at night and during the day time with disturbance in the

sensation and coordination of the fingers that disturbs the function.

In electro diagnostic studies, 82% had severe nerve compression as demonstrated by many authors that surgery is indicated in those with incapacitating severe symptoms causing disturbance of the daily activities or preventing from working with progressive aggravation and even in the pregnant women[18,23,24].

In this study, the duration of the complain ranged between 3 to 120 months or more. These results are in agreement with the recent articles that there is no significant association between the resolution of symptoms and the duration of the complain and the outcome was also successful for those who had symptoms of long duration[14,21,22,25] although others reported that the duration of complain prior to operation determine the outcome like symptoms lasting more than 3 years or 5 years indicates a poor prognosis after surgery[15,26,27].

Several studies addressed the failure rates between 2.2% up to 20%. This is considered because of inadequate diagnosis or surgical release and presence of thenar atrophy or systemic diseases[13,15,17,21,22,28,29]. In 11% of the hands in patients of this study, the symptoms did not resolve or remained unchanged after surgery, this was related mainly to the diagnosis and also to the thenar muscle wasting which was obvious in 5% of the cases.

In conclusion, this study also suggest that local steroid injection is a temporary pain relief procedure and it should be considered in patients mostly with mild intermittent symptoms (especially at night), free from daily work disabilities, with average of 6 months of suffering, of mild to moderate nerve compression and it is less effective in severe cases but may be indicated in specific conditions. It is concluded that surgery provides a useful recovery from the symptoms with low risk of recurrence in the majority of the patients and is of more effective in the patients with severe day and night symptoms especially in females with severe nerve compression that cannot avoid heavy daily manual working in our community. So early surgical release is indicated in these cases even at the time of initial diagnosis irrespective to the duration of the complain.

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