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Original research article

Managment of de Quervain tendinitis using corticosteroid injection (CSI) with or without thumb spica cast (TSC)

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Abstract

Aim: To compare the corticosteroid injection (CSI) with or without thumb spica cast (TSC) for de Quervain tendinitis.

Material and methods: The study was conducted in the Department of Orthopaedics, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India from January 2017 to December 2018. Total 200 patients with de Quervain tenosynovitis and pain on the radial side of the wrist, tenderness at the first dorsal compartment, a positive Finkelstein test, and a pain score greater than 6 were include in this study. The patients were assigned to either TSC + CSI or CSI groups using a random block sequence. All patients in CSI + TSC and CSI groups received 40 mg of methylprednisolone acetate (1 cc) with 1 cc lidocaine 2% by M.M.-K. Using an insulin needle (25 or 27 gauge) in the first dorsal compartment at the point of maximal tenderness. The patients in the CSI + TSC group received a fiberglass TSC as well.

Results: The intent-to treat analysis was applied to compare the primary and the secondary outcomes between the CSI + TSC (60 cases) and the CSI (60 cases) groups. Success rate was significantly better in the CSI + TSC group. At the first follow-up visit, the treatment was successful in 58 out of 60 patients in the CSI + TSC group (96.67%) and 48 out of 60 patients (81.67%) in the CSI group (P ¼ .037). the treatment was successful in 58 out of 60 patients in the CSI + TSC group (96.67%) and 48 out of 60 patients in the CSI group (81.67%) (P ¼ 027). The VAS in the CSI + TSC group was 9.7 ± 0.92 before treatment, 0.27± 0.77, 4 weeks after treatment, and 0.44± 0.65 at the final visit (P < .001). The VAS score for the CSI group was 9.1 ±1.5 before treatment, 1.7 ±1 4 weeks after treatment, and 2.3 ±1.7 at the final visit, which were statistically significant (P<.001). The VAS scores changes from the pre treatment visit to the 6-month post-treatment visit were 8.6± 1.7 and 7.3 ±2.3, respectively, suggesting that both treatments were successful in reducing pain. CSI + TSC was, however, significantly more effective in reducing pain (P<.001).

Conclusion: The combined technique of corticosteroid injection and thumb spica casting was better than injection alone in the treatment of de Quervain tenosynovitis in terms of treatment success and functional outcomes.

Keywords: VAS, de Quervain tenosynovitis, casting, steroid injection

Introduction

De Quervain's disease is a common cause of wrist pain which may be quite disabling. It occurs typically in adults 30 to 50 years old, and women are affected six to ten times more frequently than men.[1] This disease was first described by Fritz de Quervain, a Swiss physician who reported five cases in 1895 and eight additional cases in 1912.[2] The term stenosing tenosynovits of the first dorsal compartment of the wrist is frequently used for this condition.[1,2] This compartment at the radial side of the wrist includes the abductor pollicis longus and extensor policis brevis tendons which are affected by inflammation and thickening of their sheath, resulting in impaired gliding of the tendons in the narrow and constricted bro-osseous

compartment.[3,4] It is caused by overuse and repetitive activities of the wrist in ulnar deviation, thumb in abduction and extension, or may be associated with rheumatoid arthritis or pregnancy.[5] The exact etiology of the disease has not been well described yet. Literature focused on overuse of the wrist as the major etiologic factor for the disease.[6,7] Repetitive ulnar deviation while the metacarpophalangeal joint of the thumb is in flexion, like typing, lifting etc., is considered to result such clinical problem.[4,7] Cumulative trauma from repetitive strain is triggering the pathologic changes.[4,5,8] Symptoms comprise of pain or tenderness at the radial styloid at times radiating to the thumb, shoulder or forearm. On physical examination there might be swelling at the radial styloid with tenderness and crepitation's on palpation.[9-11] In typical cases Finkelstein's test is positive.[8,7] The Finkelstein's test is performed as the patient clenches the first with thumb inside and ulnar deviates the hand at the same time. Patient with De Quervain's tenosynovitis feels pain at the affected site.[1,9] Non-surgical treatment, comprising of local corticosteroid injections, bracing, physical therapy, and thumb spica cast, is mostly rewarding.[1,8,9,11] This approach is most successful within the 1st six weeks after onset of the disease. There is no consensus on the best protocol for wrist immobilization.[9]

The conventional treatments are nonsurgical, including rest, massage, diathermy, casting, oral analgesics, and local steroid injection.[12] If nonsurgical treatments fail, surgical treatment is recommended.[13] Although the exact mechanism of the effects of corticosteroid injection (CSI) is not understood,it is preferred over nonsurgical treatments such as splints, strapping, rest, and massage.[14,15] A Cochrane review of de Quervain tenosynovitis demonstrated that methylprednisolone injection relieves the signs and symptoms of the condition faster than other nonsurgical treatments. Injection, however, may be complicated by postinjection flare, infection, atrophy of subcutaneous fat, local depigmentation, and tendon rupture.[16]

Material and methods

The study was conducted in the Department of Orthopaedics, Vardhman Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India from January 2017 to December 2018. after taking the approval of the protocol review committee and institutional ethics committee.

Methodology

Total 120 patients with de Quervain tenosynovitis and pain on the radial side of the wrist, tenderness at the first dorsal compartment, a positive Finkelstein test, and a pain score greater than 6 were include in this study. The patients who had CSI during the previous 6 months, previous surgery, a history of severe trauma, or wrist fracture, pregnant patients and those with rheumatoid arthritis, findings associated with diseases related to the nervous system were excluded from the study. The history of sensitivity to lidocaine or corticosteroids, and infection or other dermatological lesions at the treatment site. The patients were assigned to either TSC + CSI or CSI groups using a random block sequence. All patients in CSI + TSC and CSI groups received 40 mg of methylprednisolone acetate (1 cc) with 1 cc lidocaine 2% by M.M.-K. using an insulin needle (25 or 27 gauge) in the first dorsal compartment at the point of maximal tenderness. The patients in the CSI + TSC group received a fiberglass TSC as well. The patients in both groups were advised to reduce physical activities and rest as much as possible. No specific analgesics were prescribed. The cast was removed after 4 weeks, and the patients were encouraged to move their wrist and fingers. No formal therapy was prescribed.

The treatment success rate, as the primary outcome, was assessed according to the presence or absence of pain on the radial side of the wrist, tenderness at the first dorsal compartment, and the results of a Finkelstein test. The treatment was considered to be successful when all 3 criteria were negative, and unsuccessful when at least 1 criterion remained positive. For all patients with persistent findings 4 weeks after treatment, the same treatment was performed the second time and a visit 4 weeks subsequently was arranged. Functional outcome and pain intensity, as the secondary outcomes, were assessed using the Quick Disabilities of the Arm,

Shoulder, and Hand (QuickDASH) and a visual analog scale (VAS) where 0 indicated no pain and 10 indicated unbearable pain at the time of the visit.

Results

Both groups were similar with regards to demographic characteristics, dominant hand, affected hand, and occupation status (Table 1). The intent-to treat analysis was applied to compare the primary and the secondary outcomes between the CSI + TSC (60 cases) and the CSI (60 cases) groups. Success rate was significantly better in the CSI + TSC group. At the first follow-up visit, the treatment was successful in 58 out of 60 patients in the CSI + TSC group (96.67%) and 48 out of 60 patients (81.67%) in the CSI group (P ¼ .037). The treatment was repeated for all the patients with unsuccessful results. All 14 unsuccessful patients in both groups who were treated for the second time were seen 4 weeks later, and all of them had successful results. These 14 patients had successful results at the 4-month follow-up. In the final follow-up visit (6 month after treatment), the treatment was successful in 58 out of 60 patients in the CSI + TSC group (96.67%) and 48 out of 60 patients in the CSI group (81.67%) (P ¼ .027). All the patients unresponsive to treatment had both pain and tenderness at the first dorsal compartment. Both groups were similar regarding to the VAS and Quick DASH scores for the pre-treatment visit (P > .05). The VAS in the CSI + TSC group was 9.7 ± 0.92 before treatment, 0.27± 0.77, 4 weeks after treatment, and 0.44± 0.65 at the final visit (P < .001). The VAS score for the CSI group was 9.1 ±1.5 before treatment, 1.7 ±1 4 weeks after treatment, and 2.3 ±1.7 at the final visit, which were statistically significant (P<.001). The VAS scores changes from the pre treatment visit to the 6-month post-treatment visit were 8.6± 1.7 and 7.3 ±2.3, respectively, suggesting that both treatments were successful in reducing pain.

CSI + TSC was, however, significantly more effective in reducing pain (P<.001). The VAS scores reduced 96.67% and 81.67% in the CSI + TSC and the CSI groups, respectively. The mean scores of Quick DASH in the pre-treatment visit were not significantly different between CSI + TSC and CSI, suggesting the patients in both groups had nearly similar pre-treatment function. In the CSI + TSC group, the mean score of Quick DASH was reduced from 8.6± 1.8 before treatment to 9.3 at 4 weeks follow-up and 11.2± 1.3 at final follow-up, which were significantly different (P<.001). In the CSI group, the mean Quick DASH score decreased from 85± 11 before treatment to 19 ±22 at 4-week follow-up and 20± 21 at final follow-up, which were significantly different (P<.001). The mean reduction of the Quick DASH score was higher in the CSI + TSC group (75± 18) than that of the CSI group (68 ±23), and the difference was significantly different (P<.001). The reduction rates in CSI + TSC and CSI were 95% and 81.67%, respectively. The repeated measure analysis of variance test indicated that the reduction rate of VAS and Quick DASH scores were statistically significant in both groups. The differences between the 2 groups were also statistically significant (P<.001). In general, the pain relief trend was in favour of the CSI + TSC group rather than the CSI group.

Table 1: Demographic Profile

	CSI+ TSC=60	**CSI=60**	**Both Groups=120**	**P value**
Age (mean + SD	42.5 ± 16	47 ± 17	45.2 ± 15.5	Not Significant
Gender				Not Significant
Male	20	32	52	
Female	40	28	68	
Occupation (hand work)				Not Significant

Forceful	39	38	77	
Less forcefull	15	16	31	
Unemployed	6	6	12	
Dominant hand				Not Significant
Right	43	47	90	
Left	17	13	30	
Affected hand				Not Significant
Right	49	39	88	
Left	11	21	32	

Table 2: VAS and QuickDASH score pre-treatment

	CSI + TSC	CSI	Both Groups	P value
VAS Pre-treatment (mean ± SD))	9.7 ± 0.92	9.1 ±1.5	9.3 ±11	Not Significant
Quick DASH Pre-treatment (mean ±SD)	8.6± 1.8	85± 11	85± 0.77	Not Significant

Discussion

The results of this study indicated that the CSI + TSC treatment method was superior to CSI alone with regards to success rate and functional outcomes. The CSI + TSC method was successful in 96.67% of the patients whereas CSI was successful in 81.67%. Weiss and colleagues[17] in a prospective study of 93 de Quervain patients, examined the efficacy of the use of CSI, a prefabricated thumb spica orthosis, and simultaneous CSI + thumb spica orthosis methods. They found that the treatment success rate was 67% in patients treated with CSI alone (28 of 42 cases), 57% in patients treated with CSI + orthosis (8 of 14), and 19% in patients treated with an orthosis alone (7 of 37). They recommended the use of CSI alone as an initial treatment. However, the difference between CSI + TSC and CSI methods was not statistically significant, and the patients were not matched according to demographic factors. Richie and Briner[15] performed a meta-analysis on de Quervain tenosynovitis and reported that the success rates were 83% for CSI, 61% for CSI + thumb spica orthosis, and 14% for orthosis alone. However, the number of reviewed studies was inadequate for a literature review because only 1 study out of 7 had compared the CSI+TSC and CSI methods and none of the studies were randomized clinical trials.[17] PetersVeluthamaningal and colleagues[18] in a Cochrane review, searched databases for randomized and controlled clinical trials assessing the efficacy of CSI in de Quervain tenosynovitis. Among 563 titles they came across only 5 studies of which only 1 study[19] followed the appropriate criteria. Eighteen patients (including pregnant and lactating women, not randomized and not blinded) were assigned into the CSI and orthosis groups, and the results indicated the superiority of CSI over orthosis.[19] They were unable to judge the efficacy of CSI over other treatment methods owing to a limited number of well-designed studies.[18] One major discrepancy between the results of the present study and those of other studies is that our results indicated that CSI + TSC was superior to CSI. Unlike the study by Weiss and colleagues,[17] we excluded the patients with concurrent medical conditions from our study and randomized the included patients. Although this may improve the homogeneity of the current study group, our results cannot be generalized to those excluded from the study. Another advantage of the present study was that the patients in both groups were similar according to age, sex, and occupation. Thus, the differences between the scores of the CSI + TSC and those of the CSI groups may have been related to the efficacy of the methods rather than interfering factors. Ilyas[12] reviewed the studies on CSI in the treatment of tenosynovitis and recommended CSI as the treatment of choice and suggested immobilization for the patients

with substantial discomfort. The objective of TSC in the treatment of de Quervain tenosynovitis is to reduce the ulnar deviation and thumb flexion and to rest the involved tendons.[11] One possible explanation for superiority of CSI + TSC over CSI is that TSC immobilizes the thumb and wrist, so the patient is obliged not to stress the abductor pollicis longus and extensor pollicis brevis tendons.

Conclusion

The combined technique of corticosteroid injection and thumb spica casting was better than injection alone in the treatment of de Quervain tenosynovitis in terms of treatment success and functional outcomes.

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