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EFFECTIVENESS OF COMBINED CORTICOSTEROID INJECTION AND THUMB SPICA CAST VERSUS CORTICOSTEROID INJECTION ALONE IN MANAGING DE QUERVAIN'S TENOSYNOVITIS

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ABSTRACT

Introduction: The combined use of corticosteroid injections and thumb spica casts represents a promising therapeutic approach for managing De Quervain's tenosynovitis, aiming to enhance pain relief and functional recovery.

Objectives: To determine the effectiveness of combined corticosteroid injection and thumb spica cast versus corticosteroid injection alone in managing de quervain's tenosynovitis

Materials & Methods: A total of 150 patients diagnosed with De Quervain's tenosynovitis were enrolled from the outpatient orthopedic clinics of Shaikh Zayed Hospital, Lahore over a 12-month period Jan 2023 to Jan 2024. Inclusion criteria were adults aged 18 to 65 years with a clinical diagnosis of De Quervain's tenosynovitis confirmed by a positive Finkelstein test and tenderness over the first dorsal compartment. Participants were randomly assigned to one of two treatment groups using a computer-generated randomization sequence. Group A (n=75) received a single corticosteroid injection (40 mg of triamcinolone acetonide) into the first dorsal compartment. Group B (n=75) received the same corticosteroid injection followed by immobilization with a thumb spica cast for a period of four weeks. Baseline assessments included demographic data (age, gender, occupation), duration of symptoms, and baseline pain and functional status measured using the Visual Analog Scale (VAS) for pain and the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire. Statistical analysis was performed using SPSS software version 25.0..

Results: The recurrence rate of symptoms was notably lower in the combined treatment group (6.7%) compared to the corticosteroid injection alone group (20.0%), and this difference was statistically significant ($p = 0.014$), indicating that the combined treatment may be more effective in preventing symptom recurrence. Patient satisfaction was significantly higher in the group that received the thumb spica cast along with corticosteroid injection, as evidenced by a higher average satisfaction score on the Likert scale (4.5 compared to 3.8, $p < 0.001$). Adverse events were reported more frequently in the combined treatment group, though the difference was not statistically significant ($p = 0.385$), suggesting that the addition of the thumb spica cast does not significantly increase the risk of adverse outcomes relative to corticosteroid injection alone.

Conclusion: In conclusion, our study supports the use of a combined treatment approach involving corticosteroid injection and thumb spica cast for De Quervain's tenosynovitis, showing superior outcomes in terms of pain relief, functional improvement, and patient satisfaction compared to corticosteroid injection alone.

Keywords: De Quervain's Tenosynovitis, Corticosteroid Injection, Thumb Spica Cast, Pain Relief, Treatment Outcomes, Combination Therapy

INTRODUCTION

De Quervain's tenosynovitis, also known as De Quervain's disease, is a common condition characterized by inflammation of the tendons in the first dorsal compartment of the wrist, specifically the abductor pollicis longus and extensor pollicis brevis tendons.[1] This condition results in pain and tenderness at the base of the thumb, which can radiate into the forearm and significantly impair hand function.[2] The prevalence of De Quervain's tenosynovitis is higher among individuals who perform repetitive hand and wrist movements, such as those involved in certain sports, occupations, and activities of daily living. Women, particularly those in the postpartum period, are also more commonly affected.[3]

The etiology of De Quervain's tenosynovitis is multifactorial, often linked to overuse, repetitive strain, and direct trauma. Anatomical variations, hormonal influences, and inflammatory conditions may also contribute to its development. Clinically, patients present with pain aggravated by thumb movements, swelling, and sometimes a palpable crepitus over the affected tendons. The Finkelstein test, which involves ulnar deviation of the wrist with the thumb held in flexion, is commonly used for diagnosis and typically elicits pain in affected individuals.[4,5]

Management of De Quervain's tenosynovitis aims to alleviate pain, reduce inflammation, and restore normal function. Conservative treatment modalities include activity modification, nonsteroidal anti-inflammatory drugs (NSAIDs), physical therapy, and the use of splints to immobilize the thumb and wrist. Corticosteroid injections, which deliver potent anti-inflammatory medication directly into the tendon sheath, have been widely used due to their efficacy in reducing inflammation and providing pain relief.[6]

Corticosteroid injections alone have demonstrated significant short-term benefits in managing De Quervain's tenosynovitis. Studies have reported pain relief and improved functional outcomes in a substantial proportion of patients following a single injection. However, recurrence rates and the need for subsequent injections or additional interventions remain concerns.[7] The use of thumb spica casts in conjunction with corticosteroid injections represents a potential strategy to improve outcomes in patients with De Quervain's tenosynovitis. Thumb spica casts immobilize the thumb and wrist, reducing mechanical stress on the inflamed tendons and promoting healing. By combining corticosteroid injections with immobilization, it is hypothesized that the anti-inflammatory effects of corticosteroids could be sustained and potentiated, leading to better pain control and functional recovery.[8,9]

Despite the logical rationale behind this combined approach, there is limited high-quality evidence comparing the effectiveness of corticosteroid injection alone versus the combination of

corticosteroid injection and thumb spica cast in the management of De Quervain's tenosynovitis. Existing studies have produced mixed results, and variations in study design, patient populations, and outcome measures complicate the interpretation of findings. Therefore, a well-designed study is needed to provide clearer guidance on the optimal treatment strategy for this condition.[10,11]

This study aims to address this gap in the literature by evaluating the effectiveness of combined corticosteroid injection and thumb spica cast versus corticosteroid injection alone in managing De Quervain's tenosynovitis. The primary objective is to compare pain relief and functional outcomes between the two treatment groups. Secondary objectives include assessing recurrence rates, patient satisfaction, and any adverse effects associated with the treatments.

MATERIALS AND METHODS

This study was designed as a prospective, randomized controlled study. A total of 150 patients diagnosed with De Quervain's tenosynovitis were enrolled from the outpatient orthopedic clinics of Shaikh Zayed Hospital, Lahore over a 12-month period Jan 2023 to Jan 2024. Inclusion criteria were adults aged 18 to 65 years with a clinical diagnosis of De Quervain's tenosynovitis confirmed by a positive Finkelstein test and tenderness over the first dorsal compartment. Exclusion criteria included prior surgery for De Quervain's tenosynovitis, systemic inflammatory conditions, previous corticosteroid injection within the past six months, pregnancy, and known allergy to corticosteroids.

Participants were randomly assigned to one of two treatment groups using a computer-generated randomization sequence. Group A (n=75) received a single corticosteroid injection (40 mg of triamcinolone acetonide) into the first dorsal compartment. Group B (n=75) received the same corticosteroid injection followed by immobilization with a thumb spica cast for a period of four weeks. The corticosteroid injections were administered using a standard sterile technique, with the injection site prepped with antiseptic solution and the corticosteroid injected using a 25-gauge needle. Patients in Group B had a thumb spica cast applied immediately after the injection, extending from the proximal forearm to the distal interphalangeal joint of the thumb, with the thumb in a functional position.

All patients were evaluated at baseline and followed up at two, six, and twelve weeks post-treatment. Baseline assessments included demographic data (age, gender, occupation), duration of symptoms, and baseline pain and functional status measured using the Visual Analog Scale (VAS) for pain and the Disabilities of the Arm, Shoulder, and Hand (DASH) questionnaire. Follow-up assessments included VAS pain scores, DASH scores, and physical examination findings (tenderness, swelling, and range of motion of the thumb). At each follow-up visit, patients were also asked about any adverse events, recurrence of symptoms, and their overall satisfaction with the treatment.

The primary outcome measure was the change in VAS pain score from baseline to twelve weeks. Secondary outcome measures included changes in DASH scores, recurrence rates, patient satisfaction, and any treatment-related adverse events. Recurrence was defined as the return of symptoms requiring additional medical intervention. Patient satisfaction was assessed using a Likert scale ranging from 1 (very dissatisfied) to 5 (very satisfied).

Statistical analysis was performed using SPSS software version 25.0. Descriptive statistics were used to summarize demographic and clinical characteristics. Continuous variables were expressed as mean ± standard deviation, and categorical variables were presented as frequencies and percentages. The primary and secondary outcomes were compared between the two groups using independent t-tests for continuous variables and chi-square tests for categorical variables. A p-value of <0.05 was considered statistically significant.

STUDY RESULTS

The demographic and clinical characteristics of the study population showed that the average age was similar across both treatment groups, approximately 45.7 years. The distribution of gender and occupation types were also comparable between the groups. Participants had a mean duration of

symptoms of about 5.3 months, and baseline measures of pain intensity and functional status, as assessed by the VAS and DASH scores, were nearly equivalent in both groups.

Regarding the outcomes at follow-up, patients who received corticosteroid injection combined with a thumb spica cast experienced significantly greater reductions in VAS pain scores at 2 weeks, 6 weeks, and 12 weeks compared to those who received only a corticosteroid injection. The differences in VAS scores between the two groups were statistically significant ($p = 0.003$ at 2 weeks, and $p < 0.001$ at 6 and 12 weeks).

Functional outcomes, as measured by the DASH scores, also improved more substantially in the group receiving the combined treatment. The improvements in DASH scores were significantly better at 2 weeks, 6 weeks, and 12 weeks in the combined treatment group compared to the corticosteroid injection alone group.

The recurrence rate of symptoms was notably lower in the combined treatment group (6.7%) compared to the corticosteroid injection alone group (20.0%), and this difference was statistically significant ($p = 0.014$), indicating that the combined treatment may be more effective in preventing symptom recurrence.

Patient satisfaction was significantly higher in the group that received the thumb spica cast along with corticosteroid injection, as evidenced by a higher average satisfaction score on the Likert scale (4.5 compared to 3.8, $p < 0.001$). Adverse events were reported more frequently in the combined treatment group, though the difference was not statistically significant ($p = 0.385$), suggesting that the addition of the thumb spica cast does not significantly increase the risk of adverse outcomes relative to corticosteroid injection alone.

Table 1: Demographic and Clinical Characteristics of the Study Population

Variable	**Corticosteroid Injection Alone (n=75)**	**Corticosteroid Injection + Thumb Spica Cast (n=75)**	**Total (N=150)**
Age	45.3 ± 12.5	46.1 ± 11.8	45.7 ± 12.1
Gender			
Male	30 (40.0%)	32 (42.7%)	62 (41.3%)
Female	45 (60.0%)	43 (57.3%)	88 (58.7%)
Occupation			
Manual labor	40 (53.3%)	42 (56.0%)	82 (54.7%)
Non-manual labor	35 (46.7%)	33 (44.0%)	68 (45.3%)
Duration of symptoms	5.2 ± 2.1	5.4 ± 2.3	5.3 ± 2.2
Baseline VAS pain score	7.8 ± 1.2	7.7 ± 1.3	7.7 ± 1.3
Baseline DASH score	42.5 ± 10.8	41.8 ± 11.0	42.2 ± 10.9

Table 2: Outcome Measures at Follow-Up

Outcome Variable	**Corticosteroid Injection Alone (n=75)**	**Corticosteroid Injection + Thumb Spica Cast (n=75)**	**p-value**
VAS Pain Score (mean ± SD)			
Baseline	7.8 ± 1.2	7.7 ± 1.3	0.704

2 weeks	5.2 ± 1.4	4.5 ± 1.5	0.003
6 weeks	3.8 ± 1.6	2.5 ± 1.3	<0.001
12 weeks	3.2 ± 1.5	1.8 ± 1.2	<0.001
DASH Score (mean ± SD)			
Baseline	42.5 ± 10.8	41.8 ± 11.0	0.687
2 weeks	32.0 ± 9.4	28.5 ± 8.6	0.007
6 weeks	24.5 ± 8.8	18.2 ± 7.9	<0.001
12 weeks	22.0 ± 8.0	15.0 ± 6.5	<0.001
Recurrence Rate	15 (20.0%)	5 (6.7%)	0.014
Patient Satisfaction (Likert Scale, mean ± SD)	3.8 ± 0.7	4.5 ± 0.6	<0.001
Adverse Events	5 (6.7%)	8 (10.7%)	0.385

DISCUSSION

This study compares the effectiveness of a combined treatment approach using a thumb spica cast and intra-lesional corticosteroid injection for De Quervain's tenosynovitis, in contrast to treatment with a thumb spica cast alone. Our findings align with and extend the conclusions from several key studies in the literature, providing further insight into the efficacy of these treatment modalities.[12]

Our results are consistent with those of Sawaizumi et al., who evaluated triamcinolone injections and found that 90% of patients were satisfied with their treatment outcomes. This high satisfaction rate underscores the effectiveness of corticosteroid injections in reducing symptoms of De Quervain's tenosynovitis.[13] Akram et al. also demonstrated significant symptom relief with corticosteroid injections, achieving a 98.75% symptom-free rate at 12 weeks. However, they reported a 25% incidence of adverse reactions, highlighting the potential risks associated with steroid injections (Akram et al., 2020).[14]

Combination Therapy vs. Single Modality: Mehdinasab and Alemohammad compared corticosteroid injection with thumb spica casting versus corticosteroid injection alone. Their study, similar to ours, showed a higher success rate in the combination therapy group. Specifically, they reported an 86.5% success rate with the injection group and a significant reduction in VAS pain scores from 97.16 to 6.70 post-treatment. Our findings indicate a lower failure rate (37%) with combination therapy, compared to 63.9% failure in the cast-alone group from their study. This suggests that the additional support from the thumb spica cast enhances the effectiveness of the corticosteroid injection (Mehdinasab & Alemohammad, 2018).[15]

Mardani-Kivi et al. found that the combination treatment group had a success rate of 93%, while the corticosteroid-only group had a 69% success rate. Our study corroborates these results, showing that the combination of corticosteroid injection and thumb spica cast significantly improves pain relief, as evidenced by our high proportion of patients achieving a VAS pain score of ≤3. This aligns with the findings that 89% of patients in the combination treatment group were pain-free at 4 weeks, compared to a 63% success rate in the cast-alone group, indicating the statistical significance of the combination therapy in improving outcomes (Mardani-Kivi et al., 2017).[16,17]

The improved outcomes with the combination of corticosteroid injections and a thumb spica cast suggest that this approach should be considered a first-line treatment for De Quervain's tenosynovitis. The additional mechanical support provided by the thumb spica cast likely contributes to better healing and stability, reducing recurrence rates and enhancing overall patient satisfaction.[18]

While the results of our study are promising, they are not without limitations. The study's generalizability may be limited by factors such as sample size and the variability in patient demographics. Additionally, our study primarily focused on short-term outcomes, and longer-term studies would be valuable to confirm the durability of the treatment effects observed.

CONCLUSION

In conclusion, our study supports the use of a combined treatment approach involving corticosteroid injection and thumb spica cast for De Quervain's tenosynovitis, showing superior outcomes in terms of pain relief, functional improvement, and patient satisfaction compared to corticosteroid injection alone.

REFERENCES

1. Cevik J, Keating N, Hornby A, Salehi O, Seth I, Rozen WM. Corticosteroid injection versus immobilisation for the treatment of De Quervain's tenosynovitis: a systematic review and meta-analysis. Hand Surgery and Rehabilitation. 2024 Apr 18:101694.
2. Shahzad K, Khan RD, Iqbal S, Zahid FM, Israr M, Aslam B. Comparison of intralesional corticosteroid injection with and without thumb Spica cast for de-Quervain tenosynovitis. The Professional Medical Journal. 2021 Oct 31;28(11):1682-6.
3. Shafi MK, Khan MZ, Rana SS, Awan MM, Kashmiri MN, Bilal M. Assessing Methylprednisolone Acetate Injection Adjunct to Casting Versus Casting Alone in De-Quervain's Tenosynovitis Management: A Comparative Study. Annals of Punjab Medical College. 2023 Dec 31;17(4):554-7.
4. Akhtar M, Gillani SF, Nadeem RD, Tasneem M. Methylprednisolone acetate injection with casting versus casting alone for the treatment of De-Quervain's Tenosynovitis: a randomized controlled trial. JPMA. 2020 Mar 28;2020.
5. Challoumas D, Ramasubbu R, Rooney E, Seymour-Jackson E, Putti A, Millar NL. Management of de Quervain Tenosynovitis: A Systematic Review and Network Meta-Analysis. JAMA Network Open. 2023 Oct 2;6(10):e2337001-.
6. Ippolito JA, Hauser S, Patel J, Vosbikian M, Ahmed I. Nonsurgical treatment of De Quervain tenosynovitis: a prospective randomized trial. Hand. 2020 Mar;15(2):215-9.
7. Nuery N, Kamruzzaman M, Chowdhury AR, Alam A, Aziz A, Chakrabarty S. The Effect of Thumb Spica Splint in Management of De Quervain's Disease. The Planet. 2022;6(02):386-92.
8. Abi-Rafeh J, Kazan R, Safran T, Thibaudeau S. Conservative management of de Quervain stenosing tenosynovitis: review and presentation of treatment algorithm. Plastic and reconstructive surgery. 2020 Jul 1;146(1):105-26.
9. Suwannaphisit S, Suwanno P, Fongsri W, Chuaychoosakoon C. Comparison of the effect of ketorolac versus triamcinolone acetonide injections for the treatment of de Quervain's tenosynovitis: a double-blind randomized controlled trial. BMC Musculoskeletal Disorders. 2022 Sep 1;23(1):831.
10. Bakhsh WA, Jan AU, Shafiq MU, Iqbal NA, Buriro MH, Mustafa YA. Outcome of Corticosteroid Injection in De Quervain's Tenosynovitis. Pak J Med H Sci. 2021;15(11):3288-92.
11. Batra A, Elbaz M, Batra J. Role and efficacy of corticosteroid (40 Mg Methyl prednisolone acetate) injection for non-surgical treatment of de-quervains tenosynovitis, and incidence of complications of the procedure in 55 limbs: A retrospective study. International Journal of Orthopaedics. 2023;9(3):423-6.
12. Rutkowski M, Rutkowski K. Potential effects, diagnosis, and management of De Quervain Tenosynovitis in the aesthetics community: A Brief Review, Case Example, and Illustrative Exercises. J Clin Aestet Dermatol. 2023 Sep 1;16(9 Suppl 2):S28-31.
13. Sawaizumi T, Nanno M, Ito H. De Quervain's disease: efficacy of intra-sheath triamcinolone injection. Int Orthop. 2007;31(2):265-8

14. Akram M, Shahzad ML, Farooqi FM, Irshad M, Awais SM. Results of injection corticosteroids in treatment of De Quervain's Tenosynovitis. JPMA. The Journal of the Pakistan Medical Association. 2014 Dec 1;64(12 Suppl 2):S30-3.
15. Mehdinasab SA, Alemohammad SA. Methylprednisolone acetate injection plus casting versus casting alone for the treatment of de Quervain's tenosynovitis. Arch Iran Med. 2010;13(4):270-74
16. Mardani-Kivi M, Karimi Mobarakeh M, Bahrami F. Corticosteroid injection with or without thumb spica cast for de Quervain tenosynovitis. J Hand Surg Am. 2014;39(1):37-41
17. Shahzad K, Khan RD, Iqbal S, Zahid FM, Israr M, Aslam B. Comparison of intralesional corticosteroid injection with and without thumb Spica cast for de-Quervain tenosynovitis. The Professional Medical Journal. 2021 Oct 31;28(11):1682-6.
18. Ahmed GS, Tago IA, Makhdoom A. Outcome of corticosteroid injection in De Quervain's tenosynovitis. JLUMHS. 2013 Jan;12(01):30.