TAJ June 2023; Volume 36 Number-1

ISSN 1019-8555
The Journal of
Teachers Association
RMC, Rajshahi

Original Article

Comparative Study between Intralesional Steroid Injection and Thumb Spica Splint in the Treatment of De Quervain's Disease

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Abstract

Background: De Quervain's disease (DQ) is painful tenosynovitis involving APL & EPB tendons caused by overuse or repetitive activity. Various modalities of treatment of DQ in western population including local corticosteroid injection, splinting or both. However, there is no data regarding the efficacy of these two modalities in Bangladesh. Therefore, the purpose of the study is to compare the effects of intralesional corticosteroid injection and thumb spica splint in the management of De Quervain's disease in this population.

Methods: This randomized clinical trial was conducted with 60 adult patients either male or female diagnosed as a case of De Quervain's disease (moderate to severe pain) attending outpatient department of Physical Medicine and Rehabilitation in DMCH forsix month's period. The patients were randomly assigned into two groups by lottery, i.e. Group-A: Intralesional methyl prednisolone acetate 0.5 ml (20mg) + 0.5 ml of 2%lidocaine, Group-B: Thumb Spica Splint. Intralesional corticosteroid injections were given with 1cc syringe between the synovial sheath and the tendons, during the initial visit. Group-B patients were advised to use Thumb Spica splint continuously. The patients of both groups were advised to follow the ADL instructions for the affected hand as much as possible. Outcome was measured by Visual Analogue Scale (VAS) and Patient Rated Wrist Evaluation (PRWE) scale. Every patient was assessed every week for 6 weeks. The level of significance was assessed with the help of paired t-test and chi-square test where necessary.

Results: Among the 60 patients (30 in each group), highest numbers of patients were found to be in 41-45 year-age group (35%) followed by 28.33% in 46-50 years group with mean age of 41.77±5.43 years. Male-to-female ratio was 1:7.6. More than half of the patients (53%) had been suffering from the disease in their right hand, 42% in left hand and 5% in both hands. There was no significant difference in pretreatment VAS &PRWE scores between two groups. They show significant mean changes in each of the three follow ups between the two groups of patients (p=<0.001). Intralesional methylprednisolone acetate injection provided pain relief in 83.33% of patients compared to 36.67% in splint group.

Conclusion: Intralesional steroids are more effective to relief pain & discomfort than thumb Spica splint in management of moderate to severe De Quervain's disease.

Keywords: Intralesional Steroid Injection, Thumb Spica Splint, De Quervain's Disease

TAJ 2023; 36: No-1: 41-47

Introduction

The first dorsal compartment of the wrist contains the abductor pollicis longus and extensor pollicis brevis tendons. These tendons run beneath a sheath over the dorsal aspect of radial styloid process, along the inferior portion of the anatomic snuff box. Shear and repetitive micro trauma in this area can result in a stenosing tenosynovitis referred to as de Quervain's syndrome.[1]

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Swiss surgeon Fritz de Quervain's first described this condition in 1895.[2]

The patient is usually a woman aged 40-50 years who complains of pain on the radial side of the wrist. There may be a history of unaccustomed activity such as pruning roses or wringing out clothes. Sometimes there is a visible swelling over the radialstyloid and the tendon sheath feels thick and hard. Tenderness is most acute at the very tip of radialstyloid. The pathognomonic sign is elicited by Finkelstein's test. The examiner places the patient's thumb across the palm in full flexion and then, holding the patient's hand firmly, turns the wrist sharply into adduction. In a positive test this is acutely painful; repeating the movement with the thumb left free is relatively painless. Resisted thumbex tension (hitch-hiker's sign) is also painful.[3] In a large community-based study from the United Kingdom the prevalence of de Quervain's tenosynovitis was 0.5% for man and 1.3% for women and was associated with considerable impact on daily activities and health seeking behavior.[4] The usual cause is repetitive twisting of the wrist. It may occur in pregnancy, and it also occurs in mothers, who hold their babies with the thumb outstretched.[5]

The term stenosing tenosynovitis is a misnomer because the pathophysiology of de Quervain's disease does not involve inflammation since on histopathological examination mainly degeneratve changes such as myxoidde generation fibrocartilagenous metaplasia and deposition of mucopolysaccharide are seen.[6] Clinical differential diagnosis of de Quervain's tenosynovitis includes osteoarthritis of the first carpometacarpal joint (Finkelstein's manoeuvre can also be positive, intersection syndrome, ganglia, and radial sensory nerve entrapment in the foerarm (ie, Wattenberg syndrome).[7] There is no consensus in the management of the disease and the treatment modalities like rest massage, cold and heat application, diathermy are not effective in the disease. However, the non- surgical treatment like bracing, physical therapy, thumb spica and local corticosteroid injections are most effective. Surgical treatment includes surgical release of the first dorsal compartment of the wrist (excising or dividing the strip of the covering sheet of the tendon). Surgical release has been reported to be curative in 91% of patients, but it has been associated with higher costs and sometimes surgical complications.[8] A thumb spica splint is used to immobilize the first dorsal compartment tendons with a commercially available splint or depending on patients comfort a custom molded orthoplast device. The splint maintains the wrist in 15 to 20 degrees of extension and the thumb in 30 degrees of radial and palmer abduction. The IP joint is left free and motion at this joint is encouraged. The patient wears the splint during the day for 6 weeks, splinting may continue longer, depending on response to treatment. The splint can be discontinued during the day if symptoms permit and if daily activities are gradually resumed. However, a few studies have compared the efficacy of corticosteroid injection versus thumb spica splint. The present study was conducted toexamine and compare the efficacy of corticosteroid injection versus thumb spica splint in the treatment of de Quervain's tenosinovitis.

Objectives

To compare the effect of intralesional corticosteroid injection and thumb spica splint in the management of De Quervain's disease.

Methods

This randomized clinical trial was conducted with 60 adult patients either male or female diagnosed as a case of De Quervain's disease (moderate to severe pain) attending outpatient department of Physical Medicine and Rehabilitation in DMCH for six months period. The patients were randomly assigned into two groups by lottery, i.e. Group-A: Intralesional methyl prednisolone acetate 0.5 ml (20mg) + 0.5 ml of 2%lidocaine, Group-B: Thumb Spica Splint. Intralesional corticosteroid injections were given with 1cc syringe between the synovial sheath and the tendons, during the initial visit. Group-B patients were advised to use Thumb Spica splint continuously. The patients of both groups were advised to follow the ADL instructions for the affected hand as much as possible. Outcome was measured by Visual Analogue Scale (VAS) and Patient Rated Wrist Evaluation (PRWE) scale. Every patient was assessed every week for 6 weeks. The level of significance was assessed with the help of paired t-test and chi-square test where necessary.

Inclusion criteria:
Age: 31 to 50.
Both sexes.
Moderate to severe pain according to VAS score and/or swelling over the radial side of either wrist.
Difficulty in wrist movements eg, gripping, wringing, twisting etc.
Positive Finkelstein's test (moderate to severe tenderness).

Exclus

ion criteria

Trauma.
Fracture around the wrist.
Deformity.
Osteoarthritis first carpo metacarpal joint.
Skin lesions around the affected wrist.
Rheumatoid hand.
Systemic metabolic disease- Diabetes Mellitus, thyroid disease.
Chronic inflammatory diseases- Rheumatoid arthritis, Seronegative spondyloarthropathy.
Previous Intralesional steroid injection around the wrist.
Any neurological conditions

Study Procedure

Patients with wrist pain attending the outpatient department of Physical Medicine& Rehabilitation DMCH, were registered as a population for the study. A thorough history was taken from the registered patients and clinical examination of the patients were done which includes general examination, musculoskeletal and neurological examination of upper limbs, examination of cervical region and wrist joint to find out the cause of wrist pain. Past history of illness and any systemic diseases were inquired cautiously. Patients were included in the study according to inclusion & exclusion criteria. A detailed idea about the nature of study, purpose of the study and intervention were delivered to each patient.

All symptoms and signs of each participant were recorded accordingly, and clinical diagnosis was made. Investigations such as complete blood count, random blood sugar, C reactive protein, rheumatoid factor, S. creatinine, thyroid stimulating hormone, and X-ray of affected wrist B/V were done. Thus, diagnosis of De Quervain's disease was confirmed. Each participant was allocated to either group A or group B by randomization using the lottery method. The ratio was 1:1. Pre-intervention and post intervention pain score & tenderness were evaluated by visual analogue scale (VAS) and tenderness index respectively. Similarly, functional status was assessed by using Patient Rated Wrist Evaluation (PRWE) questionnaire. Written informed consent was taken before entering into trial. The follow up of the patients were done after 2 weeks (1st follow up), after 4 weeks (2nd follow up), and after 6 weeks (3rd follow up). All the data were collected and recorded systematically in the data sheet. The data were entered into statistical software. After data cleaning and verifying the consistency, data analysis was done by SPSS 15 version for windows 10.

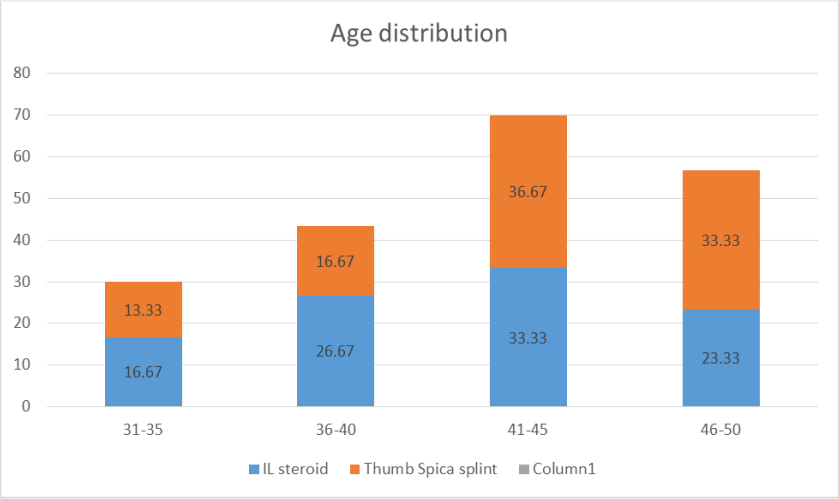
Data Processing and Analysis

Data was analyzed and presented in charts and figures by using SPSS (statistical package for the social science) 15.0 version. Level of significance was assessed with the help of paired t-test and chi-square test whether necessary. All results were expressed as means and standard deviations. A p value below 0.05 was considered to indicate statistical significance.

Results

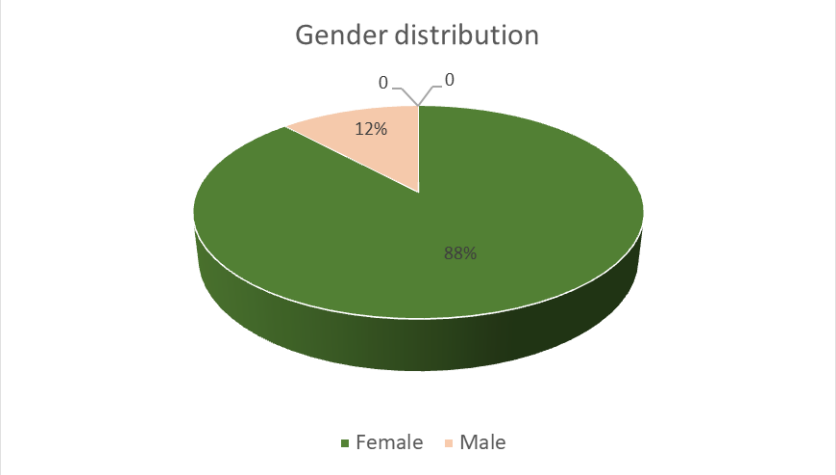
Sixty patients suffering from De Quervain tenosynovitis were included in this study. Age 31-50 years were included, among which were found to be in 41-45 years age group (35%) followed by 28.33% in 46-50 years group, with mean age of 41.77±5.43 years.

Figure 1: Age distribution of the patients



In this study, 7 males and 53 females were included having male to female ratio of 1:7.6. Figure 2 shows a pie chart of the gender distribution.

Figure 2: Gender distribution of the patients (n=60)



The following chart shows that more than half of the patients (53%) had been suffering in their right hand, 42% in left hand and 5% in both hands.

Figure 3: Affected side of the disease (n=60)

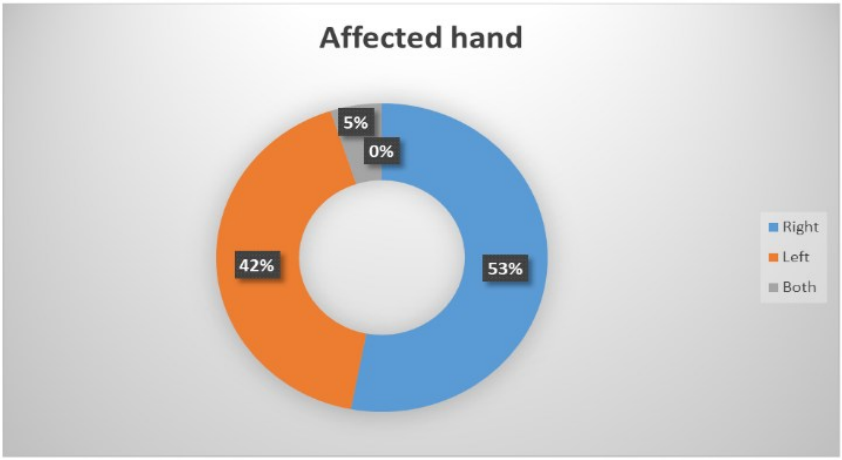


Table 1 shows that initially the visual analogue scale and Patient Rated Wrist Evaluation (PRWE) scores were very similar between two groups of patients before any intervention.

Table 1: Initial VAS and PRWE scores of study patients (n=60)

		VAS before Rx	Pain score before Rx	PRWE score before Rx	P value
IL steroid	Mean±SD	6.67±1.12	41.73±2.50	83.9±3.57	0.07
	Minimum	5	36	73	
	Maximum	8	45	87	
Thumb spica splint	Mean±SD	6.73±1.05	41.92±2.08	83.83±3.26	0.08
	Minimum	5	37	73	
	Maximum	8	45	87	

Visual analogue scale differences show significant mean changes in each of the follow ups between the two-treatment group of patients (0=<0.001) with Intralesional methylprednisolone acetate injection being the superior treatment option that provided pain relief in 83.33% of patients compared to 36.67% in splint group. Table 2 has the details.

Table 2: Mean VAS differences between successive follow-ups between two groups

Follow ups	Changes	Rx type	Mean±SD	P- value
1st follow up after 2 weeks	Mean VAS change	IL steroid	3.97±0.89	<0.001
		Thumb spica splint	5.38±0.62	
2nd Follow up after 4 weeks	Mean VAS change	IL steroid	2.98±0.90	<0.001
		Thumb spica splint	5.12±0.51	
3rd Follow up after 6 weeks	Mean VAS change	IL steroid	2.52±0.78	<0.001
		Thumb spica splint	4.12±0.83	

The following table 3 also shows significant mean difference in pain and function component of PRWE score and total PRWE score between successive follow-ups between two treatment groups with superiority of IL steroid injection and negative Finkelstein's test (83.33% vs 36.67).

Table 3: Mean pain and PRWE score differences between successive follow-ups between two groups

Follow ups	Changes	Rx type	Mean±SD	P- value
1st follow up after 2 weeks	Mean pain score changes	IL steroid	25.12±2.28	<0.001
		Thumb spica splint	42.17±1.03	
	Mean PRWE changes	IL steroid	40.43±3.83	<0.001
		Thumb spica splint	61.23±3.01	
2nd Follow up after 4 weeks	Mean pain score changes	IL steroid	17.13±1.73	<0.001
		Thumb spica splint	37.2±1.40	
	Mean PRWE changes	IL steroid	32.93±3.88	<0.001
		Thumb spica splint	49.5±3.09	
3rd Follow up after 6 weeks	Mean pain score changes	IL steroid	14.73±2.03	<0.001
		Thumb spica splint	31.07±2.067	
	Mean PRWE changes	IL steroid	27.13±3.27	<0.001
		Thumb spica splint	39.5±2.87	

Discussion

In the present study, sixty Finkelstein's test positive De Quervain tenosynovitis patients who were attending the outpatient department of Physical Medicine & Rehabilitation in Dhaka Medical College & Hospital, Dhaka were included between the age 31 to50 years, mean age of whom was 41.77±5.43 years.[2] Highest numbers of patients were between the age of 41 to 50 years, male were 7 (4 students and 3 typists) and female were 53 (49 housewives and 4 garments workers). Similar study with 60 patents, out of 31 was female and 29 were male, age between 10- 69 years were included among which highest number of patients was found to be in 40-49 years age group (32 patients).[10] A prospective randomized study where they found that steroid injection group showed 88.33% excellent results compared to only 36.67% in conservative group.

An American study shows the treatment outcomes of 222 limbs from 199 patients were analyzed. Of the 222 patients, 187 patients were female, and 35 patients were male.[11] Of the reviewed cases, sufficient relief (ie, treatment success) was reached in 73.4% of the interventions within 2 injections. At the first injection, the median age of the treatment success group was 49.15 years.

A recent study from India shows among 100 patients 50 patients were treated with corticosteroid injection and 50 patients in group 2 were treated with splinting, cold compress and topical NSAID. [12] In the study female was 90 and male was 10. Mean age in group-1 = 34.5±7 (21-60); and group-2 = 36.1±8 (22-62); right wrist = 81, left wrist =19; The overall success rate was 90% in injection group and 60% in splinting group. Pain was experienced by 20 patients which lasted less than one day post-injection. Skin discolouration at injection sites were seen in 3 cases. There was significant difference between both groups (P<0.05) in terms of pain scores. There was no

adverse effect in splinting group. In another study from Bangladesh shows that among 50 patients, 25 patients were treated are thumb splint, NSAID, ADL and ultrasound.[13] In that study female was 44, male were 6; female: male was 7.5:1, Mean age was 41.02 years; housewives were 44; service holder was 10 and student were 2. After treatment pain score showed significant improvement ($p<0.01$) in group B patients (72%) compared to group A (24%). In group A, 16% (4) and in group B 32% (8) patients completely recovered.

An Iranian study where 73 patients of De Quervain's disease were seen. Among them females were 64, males were 9; mean age in years were 32.83±8.9 (23-50) in group A and 29.61 ±7.7 (21-61) in group B; right-handed 47 patients, left-handed 26 patients; success rate group A- 86.5% and group B- 36.1% were found.[14]

In another 30 patients were included among group A (therapeutic ultrasound) were 15, in group B (therapeutic ultrasound with thumb spica) were 15, female 18, male12; age group 31-50 years were maximum, occupation housewife, maid, computer operator, painter, right hand = 13% (43.33%), left hand 17 (56.7%). They found their left hand affected more than their right hand.[15]

A study of 67 patents with De Quervain's tenosynovitis were included. Among 33 were group A (corticosteroid injection with thumb spica) and 34 were group B (corticosteroid injection); mean age 44 ± 13 years; male 12 and female 47; occupation forceful work done by 35 patients; less demanding 16 patients and unemployed 8 patients; right hand43 patients and left hand 24 patients.[16] The treatment success rate was 93% incorticosteroid injection with thumb spica cast and 69% in corticosteroid injection.

In a study 87 patients were included with steroid and immobilization for 3 weeks, among 19 male and 64 female; right wrist 48 patients, left wrist 39 patients, average age was 45 years, 62% patients had satisfactory and 38% patients had unsatisfactory results.[17]

Similar study compared the use of a mixed steroid/lidocaine injection alone, animmobilization splint alone, and the simultaneous use of both in improving symptoms in De Quervain's disease.[18] Ninety-three wrists' patients were included in the study, with an average follow-up examination of 13 months. Complete relief of symptoms was noted in28 of 42 wrists receiving an injection alone, 8 of 14 wrists receiving both an injection and splint, and 7 of 37 wrists receiving a splint alone. No significant difference was noted between the injection alone and injection plus splint groups. A significant difference was seen between the injection alone and splint alone groups and the injection/splint and splint alone groups.

Another study reported 6 pregnancy-related cases of De Quervain's disease.[19] All started during pregnancy and pain completely resolved after cessation of breast-feeding in 2 patients. Three patients were treated with cortisone injection and splinting successfully. One patient who was breastfed late had partial relief from splinting. These results show that De Quervain's disease of pregnancy and lactation is a self-limited disease, often resolving after cessation of breast- feeding, and surgical release is not necessary. Cortisone injection provides excellent pain relief during this temporary painful period incontrast to the classic form of the disease.

Conclusion

This study revealed that patients with moderate to severe De Quervain's disease respond more favorably with intralesional steroid than thumb spica splint. Thumb spica splint can be used in De Quervain's diseases with mild pain. However, as the study is limited to sample size further studies with large sample size is recommended.

Limitations of the Study

All samples were collected from single tertiary care centers.
Follow up time was short.
The sample size was not so large.

Recommendations

Larger randomized control trials are recommended to finalize the comment before using these findings

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