

Role of Ultrasound In The Management of De'Quervain's Disease

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Abstract

This prospective type of experimental study was carried out to determine the improvement of symptoms by ultrasound therapy in management of de'Quervain's disease. It was done in the department of physical medicine and rehabilitation in Dhaka medical college hospital during the period of 30th January 2008 to 30th July 2008. The diagnosis of de'Quervain's disease confirmed by history and clinical examination (Finkelstein test). 50 patients were selected and randomly divided into two groups. Group-A patients were treated with thumb splint, NSAIDs and ADL. Group-B patients were treated with thumb splint, NSAIDs, ADL and ultrasound therapy. Each patients was assessed by pain score, visual analogue scale (VAS), grading of tenderness and swelling. Mean age was 41.02 years. Female and male ratio was 7.5:1. Most patients occupation was housewife 40(80%) and had a precipitating factor as wringing of cloths 31(62%). History of recurrence was found in 7(14%). Most of the patients developed pain gradually 72%(36). Post treatment VAS score improved significantly in group B ($p < 0.05$), in group B 96%(24) and in group A 52%(13) patients had VAS score 0 to 4. Post treatment significantly ($p < 0.01$) higher number of patients were in swelling score. So in group B (84%) compared to group A (44%), 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) patient were completely cured (No pain, no tenderness and no swelling).

Key words: de'Quervain's disease, Ultrasound therapy, Finkelstein test, VAS (visual analogue score).

Introduction

de'Quervain's syndrome or de'Quervain's disease named for Swiss surgeon Fritz de'Quervain who first identified it in 1895, is an inflammation of the sheath or tunnel that surrounds two tendons that control movement of the thumb¹.

de'Quervain's (Say "duh-Kair-VAZ") disease is a painful inflammation of the tendons that control the thumb¹. This is one of the most common kinds of stenosing tenosynovitis of Abductor pollicis longus and Extensor pollicis brevis tendons that control movement of the thumb causing pain and swelling at the base of the thumb when forming a fist, grasping or gripping things or turn the wrist².

de' Quervain's tenosynovitis is considered a stenosing tenosynovitis of the first dorsal compartment involving the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons as they travel over the radial styloid. It may be more appropriate to consider this as a tendinosis rather than a tendinitis as pathologic specimens demonstrate collagen disorientation and mucoid changes rather than inflammation^{3, 4}.

People can get de'Quervain's disease when they hurt or use the thumb or wrist too much. such as carpenters, office workers, type writer, gardening, skiing, knitting, using a computer keyboard, wringing out of wet clothes and musician⁵. Common activities that need wrist and thumb can cause the problem. If you are pregnant or if you have diabetes or rheumatoid arthritis, you are more likely to get de'Quervain's disease. You can get the disease at any age. It is much more common in adults than in children. More women than men have de'Quervain's disease. It affects women 8 to 10 times more often than men. Most people who have de'Quervain's disease are women between the age of 30 to 50 years. There is no race predilection exists for de'Quervain's tenosynovitis. Mortality is not associated with de'Quervain's tenosynovitis⁶. Some morbidity may result as the patients experience progressive pain with limitation occurring in activities requiring use of the affected hand^{7, 8}.

The goal of treatment for de'Quervain's disease is to relieve the pain and swelling and restore normal function. Regarding management of de'Quervain's disease both medical and surgical treatment are applicable. In medical management of de'Quervain's disease along with thumb immobilization by a splint and anti-inflammatory drugs, ultrasound or other electro modality will accelerate the treatment⁹.

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Several studies were conducted in different countries in respect of management of de'Quervain's disease. But rule of ultrasound therapy in the management of de'Quervain's disease have found little evidence of its value.

Aims And Objective

General objective

To determine the improvement of symptoms by ultrasound in management of de'Quervain's disease.

Specific objective

1. To see the socio demographic and clinical pattern of study patients.
2. To observe the effects of ultrasound on pain in de'Quervain's disease.
3. To observe the effects of ultrasound in swelling over the thumb side of the wrist in case of de'Quervain's disease.
4. To see the functional improvement of patient's with ultrasound

Materials And Methods

Place of study : Department of Physical Medicine and Rehabilitation, Dhaka medical college hospital, Dhaka.

Period of study : Six months. From 30th January 2008 to 30th July 2008.

Type of study : A prospective experimental study.

Patient selection

Inclusion criteria

1. The patients having pain and swelling over the thumb side of the wrist, difficulty in gripping, with positive Finkelstein test.
2. Age of the patients should be ≥ 30 years and ≤ 50 years.

Exclusion criteria

1. Patients who have pain and swelling at the base of the thumb due to fracture of the styloid process of radius (Radiological finding).
2. Presence of any contraindication for application of ultrasound (Unhealthy skin, anaesthetic area, vascular insufficiency, tuberculosis, osteomyelitis).
3. Patients with OA first carpometacarpal joint.
4. Patient with uncontrolled DM.
5. Those who are resident outside Dhaka city.

Study population

For the study, 50 patients were selected irrespective of sexes seeking treatment in the physical medicine and Rehabilitation department, Dhaka medical college hospital, Dhaka. The diagnosis of de'Quervain's disease was confirmed by history and clinical examination (Finkelstein test).

The selected patients were randomly divided into two groups-Group-A and Group-B. The patients in Group-A were treated with thumb splint, NSAID and ADL. On the other hand, the patients in Group-B were treated with thumb splint, NSAID, ADL and Ultrasound (dose and intensity of

UST with duration was 0.2-0.8 wt/cm² for 5 minutes, 3MHz)

The follow-up of the patient was done at an interval of 3 days for at least four weeks. Each of the patient was assessed by following parameters, e.g. pain score, visual analogue scale (V.A.S), grading of tenderness and swelling, Finkelstein test.

Data Processing and Analyzing

Using computer software SPSS (Statistical Package for Social Sciences) and EPI-Info 6.4 version data were processed and analyzed. The test statistics to be used for analysis of data were 't' test. Chi-square Test. Fisher's Exact Test (for comparison of data presented in categorical scale) For any analytical test the level of significance was p value <0.05 was considered significant.

Results

Table I. Age of the study patients

Age (years)	Group A (n=25) No. (%)	Group B (n=25) No. (%)	Total	P value
30-40	13 (52.0)	12 (48.0)	25 (50%)	>0.50ns
41-50	12 (48.0)	13 (52.0)	25 (50%)	
Mean \pm SD	40.48 \pm 6.33	41.56 \pm 8.23	41.02	>0.50ns
Range	30.00 50.71	30.00 50.00	30-50	

25 patients (50%) were between 30-40 years and 25 patients were in 41-50 years. the mean age was 41.02 years. there was no significant association of age between the two study groups (Table 1).

Table II. Sex distribution of the study patients

Sex	Group A (n=25) No. (%)	Group B (n=25) No. (%)	Total	P value
Male	0	6 (24.0)	6 (12%)	<0.01**
Female	25 (100.0)	19 (76.0)	44 (88%)	

there were 44 female (88%) and 6 male (12%) in the study and female male ratio was 7.5:1. Sex distribution show significant association between the study groups ($P<0.01$) (Table 2).

Table III. Occupation of the study patients

Occupation	Group A (n=25) No. (%)	Group B (n=25) No. (%)	Total	P value
Housewife	22 (88.0)	18 (72.0)	40 (80%)	>0.10ns
Service Holder	2 (8.0)	6 (24.0)	8 (16%)	
Student	1 (4.0)	1 (4.0)	2 (4%)	

Most patient's occupation were housewife 40 (80%). Others were service holder (Banker, Nurse, computeroperator, tea maker, teacher) 8 (16%) and students 2 (4%) (Table 3).

Table IV. Precipitating factors in the study patient

Factors	Total (n=50)	Percentage (%)
Wringing of cloth	31	62%
Lifting heavy object	5	10%
Repetitive grasping	6	12%
Cervical spondylosis	1	2%
Diabetes mellitus	3	6%
Pregnancy	2	4%
Trauma	2	4%

de'Quervain's disease was more found in female who had a precipitating factor as wringing of cloths 31 (62%) (Table 4).

Table V. Pre and post treatment tenderness score in the study patients

Tenderness score	Group A (n=25) No.(%)	GroupB (n=25) No.(%)	Total	P value
Pretreatment				
T1	4 (16.0)	1 (4.0)	5 (10%)	>0.05ns
T2	13 (52.0)	20 (80.0)	33 (66%)	
T3	8 (32.0)	4 (16.0)	12 (24%)	
Posttreatment				
T1	19 (76.0)	22 (88.0)	41 (82%)	
T2	6 (24.0)	3 (12.0)	9 (18%)	

Table-5, shows pre and post treatment tenderness score in the two study groups. In most cases tenderness score in both the groups was T2 (52% vs 80%), followed by T3 (32% vs 16%) and T1 (16% vs 4%).

However, at post treatment, the situation improved quiet

However, at posttreatment, the situation improved quiet remarkably. None of the patients in either group had tenderness score T3, most of the patients had tenderness score T1 (76% vs 88%)

Table VI. Pre and post treatment VAS score in the study patients

VAS score	Group A (n=25) No. (%)	Group B (n=25) No. (%)	P value
Pretreatment			
5	11 (44.0)	13 (52.0)	>0.10ns
6	6 (24.0)	6 (24.0)	
7	0	3 (12.0)	
8	8 (32.0)	3 (12.0)	
Mean VAS Score	6.2	5.8	

Posttreatment			
0	4 (16.0)	8 (32.0)	<0.05*
2	0	4 (16.0)	
3	6 (24.0)	8 (32.0)	
4	3 (12.0)	4 (16.0)	
5	10 (40.0)	1 (4.0)	
6	1 (4.0)	0	
8	1 (4.0)	0	
Mean VAS Score	3.4	2.1	

In group-A, Pre treatment Mean VAS score was 6.2, after treatment it was 3.7, the improvement was $(6.2-3.7=2.5)$ 40.3%. In group-B Pretreatment Mean VAS score was 5.8 and after treatment it was 2.1, so the improvement was $(5.8-2.1=3.7)$ 63.79%. At post treatment VAS score improved significantly in group B ($P<0.05$) (Table 6).

Table VII. Pre and post treatment swelling score in the study patients

Swelling score	Group A (n=25) No. (%)	Group B (n=25) No. (%)	Total	P value
Pretreatment				
S0	4 (16.0)	12 (48.0)	16 (32%)	<0.01**
S1	9 (36.0)	12 (48.0)	21 (42%)	
S2	12 (48.0)	1 (4.0)	13 (26%)	
Mean Swelling Score	1.32	0.56		
Posttreatment				
S0	11 (44.0)	21 (84.0)	32 (64%)	<0.01**
S1	14 (56.0)	4 (16.0)	18 (36%)	
Mean Swelling Score	0.56	0.16		

In group-A, Pretreatment Mean Swelling score was 1.32, after treatment it was 0.56, the improvement was $(1.32-0.56=0.76)$ 57.57%. In group-B Pretreatment Mean Swelling score was 0.56 and after treatment it was 0.16, so the improvement was $(0.56-0.16=0.40)$ 71.42% (Table 7).

Table VIII. Pre and post treatment pain score in the study patients

Pain score	Group A (n=25) No. (%)	Group B (n=25) No. (%)	Total	P value
Pretreatment				
2	17 (68.0)	18 (72.0)	35 (70%)	>0.50ns
3	8 (32.0)	7 (28.0)	15 (30%)	
Mean Pain score	2.32	2.28		
Posttreatment				
0	4 (16.0)	8 (32.0)	12 (24%)	<0.01**
1	2 (8.0)	10 (40.0)	12 (24%)	
2	18 (72.0)	7 (28.0)	25 (50%)	
3	1 (4.0)	01 (02%)		
Mean Pain score	1.64	0.96		

In group-A, Pretreatment Mean Pain score was 2.32, after treatment it was 1.64, the improvement was $(2.32-1.64=0.68)$ 29%. In group-B Pretreatment Mean Pain score was 2.28 and after treatment it was 0.96, so the improvement was $(2.28-0.96=1.32)$ 58.92%.

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Posttreatment pain score showed significant improvement ($P<0.01$) in group B patients compared to group A. Most of the group B patients showed pain score 0 and 1 (72%) compare to group A (24%) (Table 8).

Table-IX. Final outcome of treatment in the study patients

Outcome	Group A	Group B	Total	P value
	(n=25)	(n=25)		
	No. (%)	No. (%)		
Completely cured	4 (16.0)	8 (32.0)	12 (24%)	
Moderate/mild reduction of symptoms	21 (84.0)	17 (68.0)	38 (76%)	>0.10n

Table 9 shows final result of treatment in the two groups of patients. In group A, 4 (16%) and in group B, 8 (32%) patients were completely cured (no pain, no tenderness, no swelling) and moderate/mild reduction of symptoms in group A was in 21 (84%) and in group B was in 17 (68%). The cure rate did not show statistically any significant variation between the two study.

Discussion

In a 3-armed study, Weiss¹⁰ studied use of corticosteroid injection and splinting together and separately to determine their clinical effect. They observed a 67% improvement with injection alone, 57% improvement with both injection and splinting and 19% improvement with splinting alone. In our study, with splinting regarding treatment of de' Quervain's disease, the completely cured rate was 16%.

Lane⁹ separated their study population into minimal, moderate and severe illness based on clinical symptoms. They identified a success rate of 88% with use of NSAIDs and splint in patients with minimal symptoms but only a 32% success rate with moderate to severe symptoms. There were out of 300 patients 246 females and 54 males with 38 cases of bilateral involvement. The patients mean age was 46 and 65% of the cases involved the dominant hand. Leao L⁸ showed in his study, 32 wrist in 29 patients, 27 (84%) of the patients were female and 5 (16%) were male. In our study, 44 (88%) were female and 6 were male (12%). Which coincide with our study.

Leao L⁸ showed in his study, 16 of the patients were engaged in domestic work, 5 were employed as book keeper, typist, 4 were nurses and 2 were weavers. We found in our study, there were 40 (80%) housewife who engaged in domestic work. 3 person were employed as computer operators (6%), 2 were nurses (4%), 2 were bankers (4%). Of the remaining 3, their was a student, a tea maker and a teacher.

Leao L⁸ showed in his study, the right side was involved 18 times (56%) and the left side 14 times (44%). Involvement the right side was 26 times (52%), left side was 22 times

(44%) and both side was 2 times (4%), in our study Right side was involved more in our study, because in our country household activities were done more manually than mechanically in relation to civilized world.

Diop AN¹¹ in their retrospective study from February 2005 to July 2006 included 22 patients of de' Quervain's disease it was 20 women and 2 men. The average age was 42 years with extreme 28 and 56. The housewives were 11 in number. 7 women were in the peri-partum, 5 lactating and was the last third of pregnancy. Involvement was bilateral in one cause.

In our study, de'Quervain's disease was more found in female who had a precipitating factor as wringing of cloths 31 (62%), some developed this condition due to lifting heavy objects such as baby 5 (10%) and repetitive grasping 6 (12%). Diabetes mellitus 3 (6%) and pregnancy 2 (4%) also precipitated the condition. Trauma 2 (4%) played a role in developing de'Quervain's disease.

Ultrasound have both diagnostic and therapeutic implication in de'Quervain's disease. Role of ultrasound in de'Quervain's disease in diagnostic purpose is well established and a lot of research work done throughout the world. But role of ultrasound in therapeutic purpose as a thermo-therapy in de'Quervain's disease is not yet established and we found no research work regarding ultrasound therapy for therapeutic purpose. So to establish the effectiveness of ultrasound therapy in de'Quervain's disease needs a lot of evaluation and research work. In our study, in group-B, out of 25 patients, only 8 (32%) patients were completely cured and the number of moderate/mild reduction of persistent symptoms were 17 (68%). So from our study it is obvious that ultrasound may be a treatment option of de'Quervain's disease but its effectiveness is not established or significant which needs more evaluation.

From our study we can conclude that patient having symptoms of de'Quervain's disease, getting treatment as early as possible with ultrasound therapy is effective.

As the number of patients studied were very small, the duration of study was short, limitation of patient's counseling and patient's education to obey the ADL properly, no firm conclusion could be drawn from this study. The information collected needs verification by larger studies on this subject. Considering the information gathered from this small study, it could be concluded that thumb splint, ultrasound, NSAID, ADL and thumb splint, NSAID, ADL-may be a treatment option of de'Quervain's disease. But it is not statistically significant which needs more evaluation.

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