RESEARCH ARTICLE

Comparison of physiotherapy with and without intra-articular corticosteroid injection for treatment of frozen shoulder: A comparative study

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Abstract

Objective: To compare the combination of corticosteroid injection and physiotherapy with physiotherapy alone in patients of frozen shoulder in terms of SPADI score.

Methods: This study included 80 patients of either gender from PMC and affiliated hospitals of Faisalabad with ages between 18-55 years having frozen shoulder of either gender with more than 1 month duration. Patients having frozen shoulder secondary to trauma, cerebrovascular accident and taking steroid injections were excluded. Combination of corticosteroid injection and physiotherapy was performed in combination therapy group (n=40) and physiotherapy alone was performed in Single therapy group (n=40).

Results: A total of 80 patients, 30(37.5%) males and 50(62.5%) females were selected for the study. Each group, combination therapy and single therapy had 40 patients each.

The combination therapy group included 18(45.0%) males and 22(44.0%) females whereas the single therapy group comprised of 12(39.9%) males and 28(70%) females.

The treatment method was independent of duration of disease (p= 0.251 for χ^2= 1.317). After six weeks of treatment, the t-test applied on SPADI score showed that combined treatment is better than the single treatment method (p= 0.016). However, both treatment methods were found same after stratification of duration of disease.

Conclusion: Combination of corticosteroid injection and physiotherapy is more effective than the physiotherapy alone in resolving the shoulder pain and disability of shoulder.

Keywords: Frozen shoulder, Cerebrovascular accident, physiotherapy, corticosteroid injection.

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Introduction

Frozen shoulder, a very common presentation encountered in the surgical as well as orthopaedic departments, is actually a syndrome in which movement at the shoulder joint is restricted, both with active and passive motion.[1] This condition resolves in 1 to 3 years and is usually managed conservatively.[2] According to most of the consultants and pathologists, inflammation of synovial membrane is the reason of pain and hence the condition under discussion. The joint-capsule becomes less distensible and adhesions are formed inside the joint space involving the head of the humerus.[3]

Frozen shoulder affects almost 4% of the population and about 36% of diabetes patients, more commonly women in the their 50s.[4] Among the various modes of treatment of this condition are only taking rest; use of NSAIDs, regular mobilization with physio, oral and/or intra-articular steroids, hydro-dilatation, capsular release and suprascapular nerve blockage.[5]

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Physiotherapy is commonly used as it is cheaper and non-invasive.[6] It involves exercise, therapy and pain reducing and controlling techniques.[7] Pain can be affectively controlled by steroids and NSAIDs. Steroid provides effect and rapid reduction in the pain. In cases of capsulitis, intra-articular steroids along with exercise provide significant reduction in the pain and swelling and improvement in the movements.[1]

In a study conducted by Maryam M et al shoulder pain and disability index score (SPADI)[8] after 6 weeks of treatment in group of combination of corticosteroid injection and physiotherapy was found to be 23.14±20.05 and in physiotherapy alone group, it was 40.56±20.55.[3]

Frozen shoulder is one of the common problem presenting in tertiary care hospitals. In routine practice physiotherapy alone is used as a first line of treatment for frozen shoulder. When physiotherapy becomes ineffective, health care providers move to the other treatment modalities. This study was conducted to compare the results of two modes of treatment, physiotherapy alone or physiotherapy in combination with intra-articular steroid injection for frozen shoulder.

Patients and Methods

The comparative study was performed in the

orthopaedics department of the PMC affiliated Hospital, Faisalabad, 80 patients meeting the inclusion criteria were studied. Inclusion criteria were described as follows: 'All patients of either gender of age ranging between 18-55 years, having frozen shoulder (as per operational definition), with duration of symptoms > 1 month and having SPADI score > 30 at presentation. Using WHO sample size calculator[9] for 2 means with the population mean of = 40.56,[3] Test value of population mean = 23.14,[3] Pooled standard deviation = 20.3, Power of study = 80% and Level of significance = 5%. The sampling technique used was non-probability consecutive sampling.

The objective of the study was to compare the combination of corticosteroid injection and physiotherapy with physiotherapy alone in patients of frozen shoulder in terms of SPADI score. Hypothesis for this study was that the combination of intra-articular glenohumeral steroid injection and physiotherapy is better than physiotherapy alone in patients with frozen shoulder in terms of mean SPADI score.

Operational definitions used were: Any shoulder pain of one month duration along with restriction of active and passive range of motion in the glenohumeral joint and 25% as compared to contra lateral shoulder in at least 2 directions: abduction, internal and external rotation, with normal X-rays of the affected glenohumeral joint. SPADI questionnaire (attached as annexure) with thirteen variables of two categories A: pain and B: disability was used. Pain was scored on 10cm scale (visual analogue scale) and SPADI is scored 0-100 by averaging the scores of 2 subscales. It was measured at presentation and then at 6 weeks of post treatment. Patients having frozen shoulder secondary to inflammation, degeneration, trauma, septic arthritis and cerebrovascular accident and those who had steroid injection therapy and/or physical therapy in six months were not included.

After obtaining the approval from the Ethics Review Board of the institution approval, patients were selected randomly and placed in two groups, A and B. Group A received combination of intra-articular corticosteroid injection (mixture of 2ml methylprednisolone and 1 ml lignocaine 2%) and physiotherapy (transcutaneous electrical nerve stimulation, active ROM exercises and ice application in 10 sessions). Group B received physiotherapy alone. Physiotherapy was performed by a trained physiotherapist. SPADI score was assessed after 6 weeks of treatment as per operational definition. Follow up was done on telephone.

Data was analyzed in SPSS 16 with descriptive statistics mean and standard deviation of numerical values for age, duration of disease and SPADI score was evaluated. Frequency and percentage was calculated for qualitative variables as gender and side of frozen shoulder. SPADI score was compared by using independent sample t-test between both groups. p-value < 0.05 was considered significant. Effect modifiers like age, gender and duration of disease were controlled by stratification and independent sample t-test was used to see the statistical significance.

Results

For the whole sample of 80 patients, 30 (37.5%)males and50 (62.5%) females, the age range was between 29 and 55 years with a mean age of 45.18±7.29 years. The minimum and maximum duration of the disease was one and six months respectively

The combination therapy group comprised of 40 patients of whom 18(45.0%) were males and 22 females. Minimum and maximum age was same as for the whole sample. The mean age and the duration of disease was 43.95±7.43 years and 3.33±1.58 months respectively.

Of the 40 patients in the single therapy group, there were 12(30.0%) males and 28(70.0%) females. The age range was 30-55 years with a mean of 46.4±7.02 years. The mean time period of the disease was 3.25±1.69 months.

The number of patients with right sided frozen shoulder was 41 (51.3%), 24 (60%) and 17 (42.5%) among the whole sample, combination therapy group and single therapy group respectively. Similarly, the frequencies of left sided frozen shoulder was 39 (48.8%), 16 (40.0%), and 23 (57.5%).

The number of patients with the duration of 1-3 months and 4-6 months were 49 (61.25%) and 31 (38.75%) respectively for the whole sample, 22 (55%) and 18 (45%) respectively for combination therapy group, and 27 (67.5%) and 13 (32.5%) respectively for single therapy group.

The association between the duration of disease and the treatment method was tested using χ^2 test. The hypothesis of independence of these two attributes was accepted with p-value = 0.251 for $\chi^2 = 1.317$. A t-test was

Table-1: SPADI score among both groups.

SPADI score	Group		p-value
	Corticosteroid injection + physiotherapy	Physiotherapy alone	
At baseline	71.68±7.67	71.88±6.74	0.902
After 6 weeks	36.7±5.28	39.78±5.89	0.016

Table-2: SPADI score among both groups according to duration of disease.

Duration of disease	SPADI score	Group		p-value
		Corticosteroid injection + physiotherapy	Physiotherapy alone	
1-3 months	At baseline	72±8.44	71.93±7.25	0.974
	After 6 weeks	36.73±5.75	39.37±5.74	0.116
4-6 months	At baseline	71.28±6.82	71.77±5.8	0.835
	After 6 weeks	36.67±4.81	40.62±6.34	0.058

applied on SPADI scores obtained after six weeks from the two treatment groups. The data were tested for normality with Shapiro-Wilk test and found normal for both samples obtained from combined treatment and single treatment method with p= 0.075 and 0.099 respectively. The two groups differed significantly at 5% level of significance with a p= 0.016 in favour of combined treatment group showing the combination method to be superior to the single treatment technique Table-1.

SPADI score at baseline and after 6 weeks were also compared between the two groups with respect to stratification of duration of disease as described in Table-2. However, the results showed no significant difference among two treatment methods at this level.

Discussion

It has been recorded that about 10 out of 1000 patients in the Out Patients Department in the primary healthcare settings present with shoulder complaints. This varies among different population groups from 6.9% to 26%. Shoulder pain disturbs the daily routine and ends in chronic state with complications.[6]

Adhesive capsulitis is defined in its purest sense as idiopathic painful restriction of shoulder movement resulting in global restriction of the glenohumeral joint".[10] In about more than half of the cases of frozen shoulder, patients condition improve with conservative management in about 1 to 3 years; some studies report that about 20% to 50% remain clinically active even till ten years.[2]

Many strategies of management of the disease under discussion have been described by consultants, these include physical therapy, NSAIDs, oral or intra-articular injection of steroids, arthrography, closed manipulation, open surgical technique, and arthroscopic capsular release. Among all the management plans, the target was to reduce pain and improvement of shoulder mobility.[10] Although, this disease or condition is very common, but no consensus on effective management plan is seen.[2]

In the past, physical therapists treated this condition, and later steroid injection therapy was started and many studies were conducted comparing physical therapy with steroid injections therapy.[3] Simple physical therapy was considered as the most suitable initial therapy in many studies. It has been seen that more than a third of total cases presenting to departments of physical therapy have some complaint regarding shoulder. Physical therapy is cost effective and cheap when compared to the cost of other management strategies.

If the physical therapy fails to improve the conditions, pain experts and/or surgical intervention are considered. The longer the history of pain, the more chance of the development of chronic pain; so the management best suitable for the individual cases should be started as early as possible to avoid chronicity.[7]

Our study showed that most of the cases were of 46-55 (52.5%) and frozen shoulder was more common in females (62.5%) than males (37.5%). In most of the patients right side of shoulder is involved (51.3%). In combination of corticosteroid injection and physiotherapy group, SPADI score was noted after 6 weeks of treatment as 36.7±5.28 and in only physiotherapy group it was 39.78±5.89.

Similar to the results of our trial, Blanchard V, et al reported that steroid injections in these patients compared with physical therapy for frozen shoulder have a better outcome and in a shorter duration.[11]

Mariyam M et al.[3] conducted a study in Iran similar to our trial. They observed that the average age of the patients was 53 years and most of the patients were females. Right sided shoulder is more involved than the left one. Average SPADI score after 6 weeks of treatment in corticosteroid and physiotherapy group was 23.14 and in physiotherapy alone group it was 40.56. They concluded that combination therapy is better than physical therapy therapy alone. These results match with the results of our study.

Carette S et al.[12] conducted the same trial and reported that on the 6th week of trial, SPADI score showed significant improvement in combination therapy versus physical therapy alone (mean improvement in score =

46.5) versus (mean improvement in score = 22.2). Supervised physical therapy alone with a single shot of steroid in the joint cavity showed significant improvement in movement, favouring our results.

Windt D et al.[13] conducted the same trial and observed that mean change in SPADI score in corticosteroid injection and physiotherapy was greater (39±27) than the physiotherapy alone (14±27). They concluded that the corticosteroid injection and physiotherapy works better than the physiotherapy alone. Similar is the case with our study.

Ryans I[14] et al. observed that after six weeks, the shoulder disability questionnaire showed better results in the steroid therapy group (P = 0.004). After physical therapy, passive external rotation improved significantly with a significant p-value. Better results with steroid injection and physical therapy combination were observed in our study.

Unlike other studies, Arslan S et al.[15] reported that they followed up the patients till two weeks and later again till twelve weeks but could not observe significant outcome.

Conclusion

Combination of corticosteroid injection and physiotherapy is more effective than the physiotherapy alone in resolving the shoulder pain and disability of shoulder. It can be used as a first line of treatment on frozen shoulder in future as it is more successful in improving patients discomfort in terms of SPADI score than the physiotherapy alone.

Disclaimer: None.

Conflicts of Interest: None.

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