Intra-articular Corticosteroid with Physiotherapy Versus Physiotherapy alone for the Treatment of Frozen Shoulder: A Randomized Controlled Trial

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ABSTRACT

Objective: To compare the treatment outcome of combination of corticosteroid injection with physiotherapy and physiotherapy alone in patients with adhesive capsulitis in term of shoulder pain and disability index (SPADI) score.

Methods: This was a randomized controlled trail conducted using probability simple random sampling technique at the Department of Orthopedic Surgery, Fatima Jinnah Medical University, Sir Ganga Ram Hospital, and King Edward Medical University, Mayo Hospital Lahore from February 2106 to September 2018. All patients of frozen shoulder fulfilling the inclusion criteria were randomly divided into two groups as A & B by lottery method. Pre treatment shoulder pain and disability index (SPADI) was calculated. Group-A was given intra-articular corticosteroid and physiotherapy while group-B received only physiotherapy. Post intervention SPADI score of both groups were calculated 6-week after the treatment on follow-up in the out-patient department. Independent sample t-test was used to compare the SPADI score between two groups and p-value <0.05 was taken significant.

Results: Out of the total 80 patients in both groups(40 in each group), the mean age of the patients in group-A was 45.18±7.29year while in group-B it was 43±7.43year. The mean duration of the symptoms in group-A was 3.29±1.62month while in group-B it was 3.25±1.69year. In group A, SPADI score at baseline was 71.68±7.67 while in group B it was 71.88±6.74 (p-value=0.902). After 6-week SPADI score in group A was 36.7±5.28 while it 39.78±5.89 in group B. It was found statistically significant in both group (p value 0.016). For age and gender stratification with SPADI score at baseline and 6-week we found statistically significant difference.

Conclusion: Combination therapy of corticosteroid injection with physiotherapy was effective treatment in patients with adhesive capsulitis in pain relieve and reduction in disability index.

Key words: Adhesive capsulitis, corticosteroid injection, frozen shoulder, physiotherapy, shoulder pain and disability index(SPDI).

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INTRODUCTION

Frozen shoulder is a clinical syndrome characterized by painful restriction of both active and passive movements.[1] It often results in self-limiting condition that resolved within 1 to 3 year.[2] The reported incidence is 4% in the population with as high as 36% in diabetic patients. Females are affected more than males in their 5th and 7th decade of life.[3] Data reported about its pathophysiology include inflammation of the synovial membrane and joint capsule losing its normal distensibility and results in adhesion between head of humerus and joint capsule.[4]

This disease can be treated with physiotherapy to restore the range of motions and to relieve the pain.[5] Physiotherapy is employed as multi model approach including exercise, manual therapy and technique to relieve the pain. [6-9] Addition of intra-articular steroid provide early pain relief and achieve shoulder range of motion(ROM).[1] Frozen shoulder represents a common problem associated with disability and is mainly treated with oral drugs and physiotherapy as first line of treatment. When physiotherapy is ineffective, other treatments are employed to achieve the desire results.

We hypothesized that corticosteroid injection and physiotherapy in combination gave better results than

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physiotherapy alone in treating frozen shoulder. The results of this study will help us to identify the first line treatment modality for patient with adhesive capsulitis.

METHODS

This was a randomized controlled trail conducted using probability simple random sampling technique at the Department of Orthopedic Surgery, Fatima Jinnah Medical University, Sir Ganga Ram Hospital, and King Edward Medical University, Mayo Hospital Lahore from February 2106 to September 2018. Our sample size was 80 patients. All patients age between 18 to 55year, either gender, having frozen shoulder with glenohumeral joint movements <25% comparative with other shoulder of more than three months duration and with shoulder pain and disability index (SPDAI) score >30 diagnosed on history and clinical examination were enrolled. Our exclusion criteria were frozen shoulder secondary to the inflammation, trauma, septic arthritis, cerebrovascular event and previously treated patients with corticosteroid injection and physiotherapy.

After taking ethical approval from hospital ethical committee, all patients were explained about the study purpose and informed written consent was obtained. Data was obtained using proforma. Patients were randomly divided into two groups as A & B by lottery method. All patients shoulder pain and disability (SPADI) was calculated. Group-A was given intra-articular corticosteroid 80mg/2ml with 3ml 2% xylocaine in 5cc syringe with transcutaneous electrical nerve stimulation, active range of motion (ROM) and ice application in 10 session. Group-B received physiotherapy as transcutaneous electrical nerve stimulation, active range of motion (ROM) and ice application in 10 session. SPADI score was calculated 6-week after the treatment on follow-up in the out-patient department.

Data was entered and analyzed using SPSS version 21.0.Quantitative variables like age, duration of the disease and SPADI score was presented as mean and standard deviation. Qualitative variables like gender and side of the shoulder was presented as frequencies and percentages. Independent sample t-test was used to compare the SPADI score between two groups and *p* value <0.05 was taken significant. Variables like age, gender and duration of disease were controlled by stratification. Post-stratification independent sample t-test was applied.

RESULTS

Out of the total 80 patients in both groups, the mean age of the patients in group-A was 45.18±7.29year while in group-B it was 43±7.43year. The mean duration of the symptoms in group-A was 3.29±1.62month while in group-B it was 3.25±1.69 year.Out of the total 80 patients there were 10 (12.5%) patients of age between 26-35yearyear, 28 (35%) were age between 36-45year 42 (52.56%) were range between 46-55year.The demographic data of both groups are shown in table I. In group-A, 22 (55%) patient had 1-3 months duration, while 18 (45%) patients had 4-6months duration while in group-B, 27 (67.5%) has 1-3 months duration of disease while 13 (12.5%) patients had 4-6 months duration of disease (*p* value 0.251)

The mean duration of the symptoms in group-A was 3.29±1.62month while in group-B it was 3.25±1.69year. In group A, SPADI score at baseline was 71.68±7.67 while in group B it was 71.88±6.74 (p-value=0.902). After 6-week SPADI score in group A was 36.7±5.28 while it 39.78±5.89 in group B. It was found statistically significant in both group (p value 0.016). For age and gender stratification with SPADI score at baseline and 6-week we found statistically significant difference.(table II)

Table I. Demographic data of gender, age

Variables	Group A n=40 (%)	Group B n=40 (%)	Total N=80 (%)
Gender			
• Male	18 (45%)	12 (30%)	30 (37.5%)
• Female	22 (55%)	28 (70%)	70 (62.5%)

Age in years (Mean±SD)	45.18±7.29	45.18±7.29	
Side of the shoulder			
• Right side	24 (60%)	17 (42.3%)	41 (51.2%)
• Left side	16 (40%)	23 (52.7%)	39 (48.8%)

Table II: SPADI score among both groups according to age and gender of the patients

Age of the patients	SPADI Score	Groups		p-Value
		Corticosteroid injection with physiotherapy	Physiotherapy Alone	
26-35year	At baseline	74.5±10.32	76.5±2.12	0.825
	After 6-week	38±6.63	40.5±6.36	0.645
36-45year	At baseline	72.08±7.99	73.78±6.89	0.53
	After 6-week	35.54±4.77	39.53±5.87	0.61
46-55year	At baseline	70.11±6.04	70.17±6.51	0.972
	After 6-week	36.95±5.14	39.87±6.14	0.107
Male	At baseline	71.28±8.17	73.67±6.12	0.396
	After 6-week	36.28±5.94	39.5±6.69	0.177
Female	At baseline	72±7.41	71.11±6.95	0.663
	After 6-week	37.05±4.8	39.89±5.64	0.65

DISCUSSION

Shoulder pain is frequently met in orthopedic surgery and has a prevalence between 7% to 26% in general populations. It has the natural history of self-resolving to re-occurring and require physiotherapy, conservative treatment with physiotherapy and intra-articular steroid. It represents relevant health problem for clinician, employees and health insurance companies.[6, 10] In daily life activities it has very vital role in performing simple to complicated work. It has complex pathoanatomy. Reduction in shoulder range of motion is a serious clinical presentation. Adhesive capsulitis is a syndrome defined as "idiopathic painful restriction of shoulder movements resulting in global restriction of glenohumeral joint" [11-13]

The condition can be self-limiting ranging from 1 to 3 year but can also be symptomatic in 20- 50% patient for up-to to 10years.[2] Several treatments for adhesive capsulitis have been advocated over the time, and the superiority of one treatment over the other is not proven. The aim of treatment is pain reduction and preservation of shoulder range of motion. The common practice for adhesive capsulitis includes benign neglect, treated as supervised physical therapy with non-steroid anti-inflammatory drugs(NSAIDs), intra-articular corticosteroids, distention arthrography, close manipulation and surgical or arthroscopic capsular release.[14]

In our study, majority(52.5%) were aged between 46-55year and adhesive capsulitis was more common in females(62.5%) than male(37.5%) while Mariyum[3] reported average age of 53 year in her study. Right was involved in 51.3% patients. SPADI score after 6 weeks was 36.7±5.28 and 39.78±5.89 in corticosteroid with physiotherapy and physiotherapy alone respectively. One systematic review reported good effects of corticosteroid with physiotherapy in the management of adhesive capsulitis and are consistent with the results of our study.[15] Mariyum[3] reported SPADI score in patients treated with physiotherapy and corticosteroid as 23.14 versus physiotherapy alone as 40.56. Her study reported successful treatment with physiotherapy and corticosteroid in combination which favors the results of our study.

Current et al[16] in his placebo trial reported that SPADI score at 6th week was significantly improved in patients treated with physiotherapy and corticosteroid from baseline score of 46.5. Their results were promising with single injection of intraarticular corticosteroid in managing pain and disability with adhesive capsulitis. The improvement was faster in this group compare to patients treated with physiotherapy. VanderWindt[17] observed mean change of 39±2.7 improvement of SPADI score in patients treated with physiotherapy with corticosteroid than physiotherapy alone in which score was 14±2.7.

Ryans [18] conducted a randomized controlled trial of intraarticular triamcilone with physiotherapy versus physiotherapy alone in patients with adhesive capsulitis. At 6th week he observed significant improvement clinically and should disability score questionnaire in patients who received intraarticular corticosteroid (*p* value<0.004). He also reported that physiotherapy improved external rotation at 6th week (*p* value <0.002). Arsalan[19] has longer follow up of 12th week in patients treated with adhesive capsulitis treated with intra articular corticosteroid with physiotherapy and reported the similar good results.

Our study sample was small and follow up was short. The intra articular injection was given only once. Further studies are recommended to address all such queries.

CONCLUSION

Combination of corticosteroid injection and physiotherapy was more effective than the physiotherapy alone in resolving the shoulder pain and disability. It can be employed as a better treatment modality in early relief of frozen shoulder and more successful in relieving patient discomfort in terms of SPADI score than physiotherapy alone.

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Authorship and contribution Declaration

Tanveer Afzal, Conception and design of the study, acquisition of data,
Asad Ali Chaudhry, Revised the manuscript critically for important intellectual content,
Syed Faraz Ul Hassan Shah Gillani, acquisition of data
Akkad Rafiq, Drafted the manuscript

Usman Zafar Dar, Final approval of the version for publication

Nadia Sultan, interpreted the data