Original Article

Outcome of Manipulation under Anesthesia in Treatment of Frozen Shoulder with and without Steroid Injection in Terms of Range of Motion

Shujaat Hussain, Tayyab Mahmood, M. Iqbal Buzdar and M. Iqbal Mustafa

ABSTRACT

Objective: This study was conducted to compare the mean difference in the range of motion (ROM) between manipulation under anesthesia (MUA) with and without intra-articular injection of steroid in patients of Frozen Shoulder (FS).

Design: Randomized controlled trial study.

Duration and Place: This study was conducted at the Orthopedic Department, BV Hospital Bahawalpur from May 15th, 2016 to October 14th, 2017

Materials & Methods: A total of 156 patients of 30 to 75 years of age with FS were included in the study. Patients with metabolic bone disease and osteoporosis were excluded. Pre-operative measurements of the ROM (flexion, abduction, external rotation and internal rotation) of FS were taken in all patients. Selected patients were placed randomly into 2 groups i.e. Group A (MUA without steroid) & Group B (MUA with steroid), by using lottery method.

Results: The mean age of women in group A was 55.65 ± 8.13years and in group B was 55.23 ± 8.26years. Out of these 156 patients, 36.54% were male and 63.46% were females with ratio of 1:1.74. Post-manipulation, the results have shown that there was significant improvement (p-value<0.05) in ROM in group B (MUA with steroid injection) compared to group A (MUA without steroid injection).

Conclusion: In combined treatment (MUA with steroid injection) ROM is significantly improve as compared to in single treatment (MUA) in FS.

Key Words: Flexion, adhesive capsulitis, intra-articular injection, rehabilitation.

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INTRODUCTION

Shoulder joint is hyper mobile joint ofhuman body.[1] Due to this hypermobility, shoulder joint may become unstable but glenoid labrum, ligaments, tendon and rotator cuff muscles give the stability of joint [2,3]. If the capsule of shoulder joint islax, ROM becomes more and the joint in turn may dislocate. On the other hand if the capsule becomes tight the ROM decreases and the joint is very much held together and cannot dislocate.[5] The main component of FS is loss of motion and pain of shoulder joint for a specific period [4].

The incidence of FS in general population is about 2%.[4] Individuals between age of 40-70 years are most commonly affected. The Risk factors are female sex, age older than 49 years, diabetes mellitus[40], cervical disc disease, prolonged immobilization, hyperthyroid-dism, stroke, myocardial infarction, Dupuytren's disease, autoimmune disease and trauma [6,7]. Etiology of FS is unknown but one of predisposing factors is virus[8]. As the shoulder loses its motion, even normal activities like changing dress, phone calling, or other working become difficult.[9] Studies suggest that about 50% of people with frozen shoulder continue to experience symptoms up to seven years after the condition starts. However, with appropriate treatment it is possible to shorten the period of disability[10]. The aim of treatment is to get pain free joint with full range of motions. The treatment depends upon, how severe frozen shoulder is and how far it has progressed.[11]

Various modalities of treatment have been proposed and are in practice. These include non-steroidal anti-inflammatory drugs (NSAID), oral corticosteroids, physiotherapy, intra-articular steroid injection, distension arthrography, manipulation under anesthesia (MUA), open surgical release and arthroscopic capsular release.[4,5,11,12] Each modality can be determined by using different shoulder scoring system e.g. Constant Shoulder Score (CSS), University of Pensyvania Shoulder Scale and Functional Assessment

Department of Orthopaedic Surgery, Quaid-e-Azam Medical College/B.V.Hospital Bahawalpur.

Correspondence: Dr. Shujaat Hussain , Associate Professor, Department of Orthopaedic Surgery, Quaid-e-Azam Medical College /B.V. Hospital Bahawalpur.
Contact No: 0300-9681219
Email: drshujaathussianortho@gmail.com

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Questionnaire.[10,13] Meta-analysis has been done to assess score.[14]

Most noninvasive therapeutic strategies are based onstretching or rupturing the tight capsule by manipulative physical therapy with success rate for achieving good to fair results nearing 100.0%.[15] The good result of physical therapy with intra-articular corticosteroid injections, with or without hydraulic distension, ranges from 44.0% to 80.0%.[16,17]. MUA and arthroscopic or open release, are a popular form of therapy especially for resistant frozen shoulder. The published success rate for this therapy varies 69% to 97.0%.[18,19]. MUA alone or with combination with intraarticular steroid injection is easy, effective, inexpensive and less time consuming treatment modality.[20] Role of physiotherapy is very important for success.[21] This study was conducted to compare the mean difference in the range of motion (ROM) between manipulation under anesthesia (MUA) with and without intra-articular injection of steroid in patients of Frozen Shoulder (FS).

MATERIALS AND METHODS

This was randomized controlled trial conducted at department of Orthopedic, Bahawal Victoria Hospital, Bahawalpur, from 15thMay 2016 to 14thOctober 2017. Total 156 patients of FS syndrome were considered using probability, consecutive sampling. Patients were of both genders, aged 30-75 years. Patients having metabolic bone disease and osteoporosis, unfit for general anesthesia or having recently healed fractures were excluded from the study.

After approval from local ethical committee, informed, written consents were taken after explaining the aims, methods, reasonably anticipated benefits, and potential hazards of the study from all the participants. Subjects were informed that their participation is voluntary. Pre-operative measurements of the ROM of FS (flexion, abduction and external rotation) were taken in all patients with standard goniometer by researcher himself and were recorded on a specific proforma. All cases were selected randomly by pick up slips,(half slips labelled letter 'A' and half slips labelled letter 'B')and patient were placed in 2 groups A and B.Base line investigations like complete blood count, random blood sugar, Urine Complete Examination, Renal functions tests and ECG (where needed) were done in every patient on admission for anesthesia purposes. Antero-posterior and lateral X-rays of the affected shoulder were done in all patients.

All patients in Group A (n=78) were given general anesthesia and the frozen shoulder was manipulated in its full range of motion keeping in view the recommendations to keep short lever arm and manipulated in order of flexion, extension, abduction, external rotation and internal rotation. While all patients in Group B (n=78) were undergone all above steps along with that an intra-articular steroid (40 mg methyl prednisolone) was given through anterior approach (sub-acromion). After this all patients of both groups were made to undergo a regular physiotherapy session of 20 minutes daily for two weeks.

The follow up examination of all patients of both groups was conducted after two weeks of the procedure and ROM of FS was calculated (flexion, abduction, external rotation and internal rotation) was calculated with standard goniometer and was documented on specified performa.

The data collected was entered in computer software SPSS version 10. Mean and standard deviation were calculated for age and ROM (flexion, abduction, external rotation and internal rotation) in both groups before and after manipulation. Frequency and percentage were calculated for the qualitative variable like gender. Diagrams and tables were made. The outcome variable i.e. ROM (flexion, abduction, external rotation and internal rotation) were compared for any difference between both groups. P-value ≤ 0.05 was considered as significant.

RESULTS

A total 156 patients were included in the study. Mean age was 55.41 ± 8.17 years (range 30-75 years).The mean age of patients in group A was 55.65 ± 8.13years and in group B was 55.23 ± 8.26years.Seventy two (46.15%) patients were between age46 to 60 years, as in Table 1.Fifty seven (36.54%) patients were male and 99 (63.46%) patients were females with ratio of 1:1.74in both groups (Fig 1). Eighty nine (57%) patients were diabetic and 67 (43%) patients were non diabetics in both groups (Fig 2).

Table No.1: Age distribution for both groups (n=156).

Age (years)	Group A (n=78)		Group B (n=78)		Total (n=156)	
	No. of patients	%age	No. of patients	%age	No. of patients	%age
30-45	19	24.36	20	25.64	39	25.0
46-60	37	47.44	35	44.87	72	46.15
61-75	22	28.20	23	24.49	45	28.85
Mean ± SD	55.65 ± 8.13		55.23 ± 8.26		55.41 ± 8.17	

Table No.2: Pre-manipulation Range of motion in both groups.

Range of Motion	Group A (n=78)		Group B (n=78)		P-value
	Mean	SD	Mean	SD	
Flexion	83.41	22.34	83.74	21.49	0.9252
Abduction	65.13	17.61	64.98	17.18	0.9571
External Rotation	28.33	22.19	28.02	21.79	0.93
Internal Rotation	1.24	0.53	1.29	0.47	0.534

Pre-manipulation ROM (flexion, abduction, external rotation and internal rotation) has shown no significant difference between two groups as shown in Table 2

while post-manipulation, the results have shown that there was significant improvement (p-value<0.05) in ROM in group B (MUA with steroid injection) compared to group A (MUA without steroid injection) as shown in Table 3.

Table No.3: Post-manipulation Range of motion in both groups.

Range of Motion (degree)	Group A (n=78)		Group B (n=78)		P-value
	Mean	SD	Mean	SD	
Flexion	153.41	18.20	163.85	23.25	0.0021
Abduction	137.32	15.19	161.27	18.11	<0.0001
External Rotation	45.67	7.28	53.53	8.62	<0.0001
Internal Rotation	3.18	0.79	3.97	1.09	<0.0001

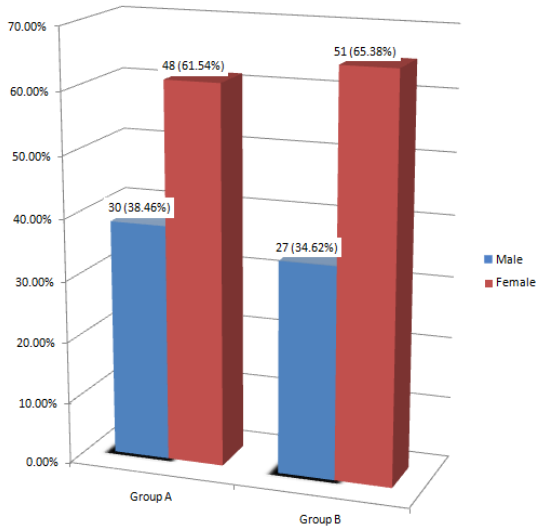

Figure No.1: %age of patients according to Gender in both groups

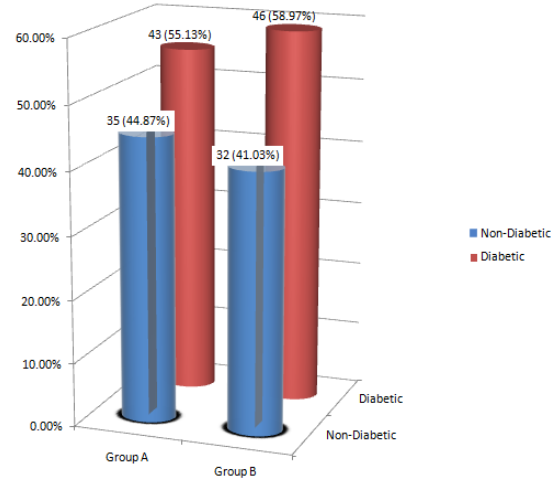

Figure No.2: %age of patients according to Diabetes Mellitus in both groups

DISCUSSION

Frozen shoulder is a self-limiting disease that improves over an 18 to 24month period. In 2004, Diercks and Stevens[23]describedabout increase in constant shoulder scores with time when it was treated with ‘‘supervised neglect.’ FS does notappear on X-rays. Occasionally on MRI can confirm findings of frozen shoulder, but is often not needed.[25]

Corticosteroid injection decreases inflammation and reduces in capsular fibrosis. This allows enhancement of joint motion and reduces the functional recovery time[26.]

In this study the mean age of patients was 55.41 ± 8.17 years which was very much comparable to studies of Saqlain HA et al[20] and Wang JP et al[27] who had found a mean age of 54 and 55 years respectively. In Khan JAet al[28]study mean age is 50 years in his study which is a little lower compared to this study. In FS above 40 years of age adhesive capsulitis is common and below 40 years of age it is needed to investigate for any medical problems. No racial predilection has been described in the literature.[29,30]In our study, majority of patients 63.46% were female and 36.54% were males with ratio of 1.74:1. These results coincide with results of many previous studies which have shown the incidence of FS two times greater amongst men than women[12, 19, 22]. A blinded, randomized trial with a 1 year follow-up, by Kivimaki J et al[31] evaluated 125 patients with a frozen shoulder to determine the effect of manipulation under anesthesia. Patients were randomly assigned to either a manipulation group or a control group. In manipulation group ROM was better with small difference then controlled group but in term of shoulder pain there was no difference in 2 groups in total follow-up. Small differences in the range of movement were detected in favor of the manipulation group. Ng CY et al[32] conducted a prospective trial to evaluate the efficacy of MUA followed by early physiotherapy in FS syndrome. For disability, pain and ROM,DASH (disability of arm shoulder hand) score and VAS (visual analogue score) score were also calculated and it was found that combined MUA and physiotherapy decreases pain and increases recovery and function of shoulder in FS disease[32].

In this study, the results shows that there was significant improvement (p-value<0.05) in range of motion in group B (MUA with steroid injection) compared to group A (MUA without steroid injection). These findings contradict with the results of Kivimaki J et al[33] who had found no extra advantage of intra-articular steroid injection alongwith MUA for FS. Hazelman B et al[34] in his review has demonstrated the use of intra-articular corticosteroids injection and reported that success of treatment is totally dependant

on the disease duration. The ideal time of MUA is about 6 to 9 months after start of the symptom [35]. Results of MUA and steroid injection are better in many studies [33, 36] as described in this study. Repeated MUA with steroid injection can improve further in the symptom of FS, there is also role of good physiotherapy course after this modality[37, 38].Evidence from aggregated published RCTs showed that the effectiveness of glenohumeral joint distension was similar to that of intra-articular corticosteroid injection, as well as that of most of the current conservative management methods.[39.] The limitations we found in our study were the difficulty in communication with patients from remote area. There follow-up was difficult and physiotherapy advised had poor compliance. Such patients were found randomly in both groups so this did not affect our comparative results.

CONCLUSION

The treatment with manipulation under anesthesia and intra-articular steroid significantly improve range of motion in frozen shoulder.

Author's Contribution:

Concept & Design of Study:	Shujaat Hussain
Drafting:	Tayyab Mahmood, M. Iqbal Busdar
Data Analysis:	M. Iqbal, Shujaat Hussain
Revisiting Critically:	Shujaat Hussain, Tayyab Mahmood, M. Iqbal Mustafa
Final Approval of version:	Shujaat Hussain

Conflict of Interest: The study has no conflict of interest to declare by any author.

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