

Role of Orthographic Distension for Treatment of Frozen Shoulder

ABDUL QAYYUM BAIG¹, INAM UR RAHIM², OMER KHALID FAROOQ³, MUHAMMAD SAARIM SHAHID⁴, TARIQ AZIZ⁵

¹Assistant Professor Orthopaedic Surgery, Islam Medical College, Gujranawala

²Associate Professor Orthopaedic Surgery, Islam Medical College, Gujranawala

³Assistant Professor Orthopaedic Surgery, Avicenna Medical & Dental College, Lahore

⁴Medical Officer Orthopaedic Surgery, Avicenna Medical & Dental College, Lahore

⁵PGR Ortho, Avicenna Medical & Dental College, Lahore

Correspondence to Dr. Omer Khalid Farooq, Email: omerkfarooq@gmail.com Cell: 0322-8009308

ABSTRACT

Background: Frozen shoulder, also known as adhesive capsulitis, is a common condition in which shoulder capsule swells and stiffens, restricting its mobility.

Aim: To see outcome of arthographic distension (AD) for the treatment of frozen shoulder in terms of pain reduction and improvement in oxford shoulder score (OSS).

Study duration: The study duration was 6 months.

Methods: By using non-probability consecutive sampling, a total of 150 patients with frozen shoulders were taken in this study. The outcome was measured as pain (visual analogue scale) and OSS before procedure and one month after post AD. SPSS version 20 was used for data entry and its appropriate analysis.

Results: Mean pain before and after one month of treatment was 8.20 ± 1.11 and 2.88 ± 1.24 respectively, the mean difference was 5.32 ± 1.39 . The improvement in pain was significant when applied to paired sample t-score, p -value < 0.001 . The mean OSS was 14.40 ± 6.12 (before treatment), 37.29 ± 4.76 (after treatment) and the mean difference in one month was 22.89 ± 6.61 . The improvement in OSS was significant when applied to paired sample t-test, p -value < 0.001 . We conclude that using arthographic distension (AD), we found lesser pain and higher OSS at one month.

Conclusion: In future we can alter our practice and adopt this treatment option to gain early recovery of the patients with frozen shoulder.

Key words: Arthrographic distension; oxford shoulder score; frozen shoulder.

INTRODUCTION

Frozen shoulder or adhesive capsulitis¹ is a musculoskeletal condition that is characterized by a spontaneous onset of pain with gradual progressive loss of shoulder function.² In general population its prevalence is reported 3% to 5% and up to 20% in those with diabetics.³ Despite the availability of more advanced imaging modalities, x-rays remain the first imaging test to be performed in the investigation of any shoulder pain. However, with their increasing availability, ultrasound and magnetic resonance imaging have, in recent years, become first line techniques for the diagnostic imaging of the shoulder⁴. The common treatments include shoulder exercise, physiotherapy (shoulder stretching), corticosteroid injection, AD, manipulation under anesthesia and arthroscopic capsular release^{5,6}. Non-surgical means are usually the first line of choice followed by surgical intervention in those who fail to respond^{2,5}. A study reported the usefulness of AD and concluded that after one-month post AD 55% patients improved their functional outcome and gained normal (40-48) OSS. The mean pain after one month of treatment [3.1(2.4-3.9)] was significantly reduced when compared with mean pain before treatment [7.1(6.5-7.7)], p -value < 0.01 .⁷ Mean reduction in pain score was 4 ± 0.075 . The mean OSS was also significantly improved at one month after AD [36.5 ± 1.4775 (33.5-39.4)]. When compared with pretreatment OSS mean score [22.3 ± 1.035 (20.1-24.4)], p -value < 0.01 and mean improvement in OSS was 14.2 ± 0.4 .⁷ The rationale of this study is to see role of AD for treatment of frozen shoulder in terms of pain reduction and improvement in OSS till one

month after treatment. An international descriptive case series favors AD for the treatment of frozen shoulder⁷ but no local study is available. This study will help us to generate evidence regarding role of AD in our own population, as in our clinical practice we do not use this treatment modality despite that procedure takes just ten minutes and allows patients to go home immediately. If we find lesser pain and higher OSS at one month then in future, we will alter our practice and patients with frozen shoulder shall be treated with hydro dilatation.

MATERIAL AND METHODS

The study was conducted at Department of Orthopaedics Ghurki Hospital Lahore. The study design was quasi experimental and non-probability consecutive sampling technique. The duration of study was 6 months (from July, 2016 to Jan, 2017). A sample size of 150 cases is calculated with 95% confidence level; 9 ± 0.07 and taking expected mean \pm S.D of mean improvement in OSS i.e. 14.2 ± 0.4 for treatment of frozen shoulder.

All patients aged 18-60 years of either gender with confirmed diagnosis of frozen shoulder for more than 6 months on fresh digital x-rays. were included in the study.

Exclusion criteria

1. Patients having diabetes mellitus (BSR > 180 mg/dl)
2. Patients with prior AD.
3. Previous fracture or dislocation of the affected shoulder.
4. Radiological evidence of tumor and osteoarthritis.
5. Previous surgery of the affected shoulder.
6. Pregnant female.

A total of 150 patients with frozen shoulder were taken in the study after meeting inclusion criteria. After taking an informed written consent the patients were enrolled from outpatient Department of Orthopaedics, Ghurki Hospital Lahore. Demographic profile of each patient such as name, age, sex and contact details were obtained. Before treatment, x-rays of the shoulder joint AP view were obtained. All the patients were explained the procedure of AD which was done under local anesthesia. A total solution of 10 ml of 80mg of triamcilon and lidocaine 1% was used to inject in the selected painful joint capsule. The additional 40ml of warm saline was distended into the joint capsule till the plunger became difficult to depress and patient complained of pain. The process of total capacity of 52ml was continued using few ml of saline regularly. All the procedure was done by a single orthopaedic consultant having more than 5years of experience. The outcome was measured as pain (on visual analogue scale) and OSS one-month post AD. Mean pain reduction and improvement in OSS was noted after one month of procedure. Data was recovered by researcher himself on a Performa.

Data analysis: SPSS version 20 was used for data entry and its appropriate analysis. Mean \pm standard deviation was used for quantitative variable such as patients age, pain and OSS (before, after one month) and change in OSS score. Frequency and percentage were used for qualitative variables like gender and grading of OSS (one month). Paired sample test was applied to compare mean pain and oxford shoulder score at baseline and at one month. p -value ≤ 0.05 was considered as significant. Data was stratified for age, gender and duration of disease to control the effect modifier. Post stratified paired sample t-test and Chi-square test (for grading of oxford shoulder score) was applied to see impact of effect modifiers. p -value ≤ 0.05 was considered significant.

RESULTS

The mean age of patients was 43.02 ± 10.77 years with minimum and maximum value of 18 and 60 years (Table-1). Mean pain before and after one month of treatment was 8.20 ± 1.11 and 2.88 ± 1.24 respectively and the mean difference was 5.32 ± 1.39 . The improvement in pain was significant when applied to paired sample t-test, p -value < 0.001 (Table-2). The mean oxford shoulder score was 14.40 ± 6.12 (before treatment), 37.29 ± 4.76 (after treatment) and the mean difference at one month was 22.89 ± 6.61 . The improvement in oxford shoulder score was significant when applied to paired sample t-test, p -value < 0.001 (Tab-3).

Table-1: Descriptive Statistics of age (years)

	Age (years)
Mean	43.02
S. D	10.77
Range	42.00
Minimum	18.00
Maximum	60.00

Table-2: Descriptive Statistics of Pain before and after treatment

	Pain before	Pain at 1 month	Pain (difference)
Mean	8.20	2.88	5.32
S. D	1.11	1.24	1.39
Range	3.00	5.00	7.00
Minimum	7.00	.00	3.00
Maximum	10.00	5.00	10.00

t-test = 46.977

p-value < 0.001

Table-3: Descriptive Statistics of Oxford shoulder score before and after treatment

	Oxford Shoulder Score		
	Baseline	At one month	Difference
Mean	14.40	37.29	22.89
S. D	6.12	4.76	6.61
Range	23.00	18.00	33.00
Minimum	4.00	28.00	8.00
Maximum	27.00	46.00	41.00

t-test = 42.39

p-value < 0.001

DISCUSSION

Adhesive capsulitis usually starts with one shoulder and commonly affects the contralateral side years after the onset of symptoms in the first shoulder, but it does not affect the same shoulder twice.² Frozen shoulder can be caused by many conditions, including rotator cuff tears, calcification within the tendons of the rotator cuff, stiff shoulder, sub acromial impingement, space-occupying lesions, degenerative changes, and rheumatoid arthritis.⁴ Previous study reported that the condition usually affects patients aged 40-70 years.⁹ Milgram *et al*⁸ compared 126 patients (76 women; mean \pm SD age, 55.0 ± 8.4 years; 50 men; mean \pm SD age, 54.7 ± 8.7 years)⁸. Males tend to be affected less frequently than females.¹⁰ In current study, the mean age of patients was 43.02 ± 10.77 years with minimum and maximum value of 18 and 60 years. There were 76(50.67%) male and 74(49.33%) female cases. Our study yields lesser mean age when compared with above study, but we found higher male to female ratio.

Management of frozen shoulder can be surgical or non-surgical.⁵ The common treatments includes shoulder exercise, physiotherapy (capsular stretching), and arthroscopic capsular release, corticosteroid injection and AD manipulation under anesthesia.^{5,7} Hydro dilatation therapy involves saline injection in the shoulder joint that takes 10 minutes and the patient can go home afterwards^{10,11}. Another study also published data in favor of AD with 55% patient's improvement. A study reported that the mean pain after 1 month of procedure was 3.1 (2.4-3.9). The mean OSS and pain on visual analogue scale was statistically significant at one month when compared to baseline, p -value < 0.001 ⁷. We also found significant difference with average pain after one month of treatment which was 2.88 ± 1.24 respectively; the average difference was 5.32 ± 1.39 . The mean OSS was 37.29 ± 4.76

(after treatment) and the mean difference at one month was 22.89 ± 6.61 . One more study published in favor of AD with mean reduction in pain score was 4 ± 0.075 . The average OSS was also significantly improved at one month after AD with mean OSS at one month was 36.5 ± 1.475 , p-value < 0.01 and mean improvement in OSS was 14.2 ± 0.47 . So, the results are in agreement with our findings. More over in the series by the Bell et al¹² distention was continued until capsular rupture occurred. Dependent upon the contracted state of the joint capsule this usually occurred when between 10 ml and 55 ml of normal saline has been injected. On occasion, rupture was not usually achieved until 100 ml has been injected. Rupture usually occurred through the subscapularis bursa and occasionally down the bicep sheath. In some cases, the pain of procedure was so severe that it had to be terminated before capsular rupture was achieved. Rizk et al¹³ reported that pain relief was not achieved when rupture occurred at the distal bicipital sheath.

CONCLUSION

We conclude that using AD there was lesser pain and higher OSS at 1 month so, in future we can alter our practice and adopt this treatment option to gain early recovery of the patients with frozen shoulder.

Acknowledgement: The authors would like to acknowledge Prof. Dr. Amir Aziz for his support. The authors have no financial or personal relationship with the companies whose products were used in this work.

REFERENCES

1. Lewis J. Frozen shoulder contracture syndrome—Aetiology, diagnosis and management. *Manual Therap* 2015;20(1):2-9.
2. Jain TK, Sharma NK. The effectiveness of physiotherapeutic interventions in treatment of frozen shoulder/adhesive capsulitis: A systematic. *J Back Musculoskel Rehab* 2014;27:247-73.
3. Uppal HS, Evans JP, Smith C. Frozen shoulder: A systematic review of therapeutic options. *World J Orthop* 2015;6(2):263-8.
4. Oded H, Yaron SSS, Boster IB. Role of radiographs in shoulder pathology: a clinical review. *Reports Med Imag* 2014;7:75-80.
5. Kwaees TA, Charalambous CP. Surgical and non-surgical treatment of frozen shoulder. *Survey on surgeons treatment preferences. Mus, Ligaments & Tend J* 2014;4(4):420-4.
6. Arai Y-C, Shimo K, Inoue M, Sakurai H, Ohmichi Y, Matsubara T, et al. Integration of a Kampo Medicine, Nijutsuto, and Western Medical Treatment in the Treatment of Long-term Frozen Shoulder Refractory to Western Medical Treatment A Case Series. *J evidence-based complement & Alternative Med* 2015;20(2):157-61.
7. Clement RG, Ray AG, Davidson C, Robinson CM, PERks FJ. Frozen shoulder?: long-term outcome following arthrographic distension. *Acta orthop Belg* 2013;79(4):368-74.
8. Milgrom C, Novack V, Weil Y, Jaber S, Radeva-Petrova DR, Finestone A. Risk factors for idiopathic frozen shoulder. *The Israel Medical Association Journal* 2008;10(5):361.
9. Tighe CB, Oakley Jr WS. The prevalence of a diabetic condition and adhesive capsulitis of the shoulder. *Southern medical journal* 2008;101(6):591-5
10. Ahmad ZI, Ingham C, Roberts C. 87—Hydrodilatation in the frozen shoulder. *JBJS Brit* 2011;93(SUPP IV):570
11. Celik D. Comparison of the outcomes of two different exercise programs on frozen shoulder. *Acta orthop traumatol turc* 2010;44(4):285-92
12. Bell S, Coghlan J, Richardson M. Hydrodilatation in the management of shoulder capsulitis. *Australasian radiology* 2003;47(3):247-51
13. Rizk TE, Gavant ML, Pinals RS. Treatment of adhesive capsulitis (frozen shoulder) with arthrographic capsular distension and rupture. *Archives of physical medicine and rehabilitation* 1994;75(7):803-7.