ASIAN JOURNAL OF PHARMACEUTICAL AND CLINICAL RESEARCH

INNOVARE ACADEMIC SCIENCES
Knowledge to Innovation

Vol 15, Issue 12, 2022

Online - 2455-3891
Print - 0974-2441

Research Article

FROZEN SHOULDER: DOES HYDRODILATATION WITH STEROID HAS ADDED ADVANTAGE OVER INTRA-ARTICULAR STEROID INJECTION

NITIN CHOUDHARY*, SANJEEV GUPTA

Department of Orthopaedics, Government Medical College, Jammu, Jammu and Kashmir, India.

Received: 22 July 2022, Revised and Accepted: 30 August 2022

ABSTRACT

Objective: In our study, we will compare the efficacy of intra-articular steroid injection with hydrodilatation (with steroid) with regards to Shoulder Pain and Disability Index (SPADI), visual analog scale (VAS), and range of motion (ROM) in patients of adhesive capsulitis.

Methods: The study is a prospective study carried out on 36 patients in Department of Orthopaedics, Government Medical College, Jammu, from August 2021 to July 2022. The patients were evaluated in terms of SPADI, VAS, and ROM (flexion, abduction, and external rotation) at 0-, 6-, 12-, and 24-week interval.

Results: Hydro-dilatation has better results in comparison to intra-articular steroid injection. The patients with hydrodilatation fared with better scores in terms of SPADI as well as VAS with significant p-value (≤0.05). In addition, the patients also had better ROM in the former group.

Conclusion: Hydrodilatation with corticosteroid provides better relief in terms of pain as well as ROM for frozen shoulder when compared to intra-articular CSI. The predictability of results with hydrodilatation is excellent and hence it is a better modality of treatment compared to intra-articular CSI.

Keywords: Adhesive capsulitis, Conservative treatment, Corticosteroid injection, Distension, Frozen shoulder, Hydrodilatation, Physiotherapy.

 DOI: http://dx.doi.org/10.22159/ajpcr.2022v15i12.45944. Journal homepage: https://innovareacademics.in/journals/index.php/ajpcr

INTRODUCTION

Adhesive capsulitis is a common cause of shoulder pain and disability. It is characterized by usually spontaneous onset of shoulder pain accompanied by progressive limitation of both active and passive glenohumeral movement. Both pain and stiffness tend to resolve spontaneously over months to years [1-4]. The essential pathology of the condition is a thickening and contraction of the capsule which becomes adherent to the humeral head [5], thus causing reduced joint mobility in these patients. While the arsenal of treatment methods for adhesive capsulitis is broad, there is a well-known lack of evidence on their effectiveness or the superiority of one approach over another. Due to the high probability of spontaneous recovery of adhesive capsulitis, conservative treatment should usually be advised as the first line of management of such cases [6]. The conservative treatment of adhesive capsulitis may include oral analgesics, oral or intra-articular corticosteroids, physiotherapy, acupuncture, manipulation, and hydrodilatation (distension) [7]. While adhesive capsulitis resolves usually spontaneously, the symptoms may persist for many months inflicting significant disability [8]. This fact may often force a patient to seek for an invasive procedure rather than for a slower conservative treatment. Hydrodilatation (distension and hydrodistension) aims at physical distension of the shoulder joint capsule by injecting a substantial amount of fluid into the joint. This quick procedure is technically easy to perform and it is less invasive than actual surgery and can be performed as an OPD procedure.

METHODS

This randomized and prospective study was conducted in a tertiary care center from August 2021 to July 2022. Thirty-six patients aged 18–60 years who were diagnosed as cases of frozen shoulder were included in the study after their consent.

Inclusion criteria

- The following criteria were included in the study: Adults aged 18–60 years.
- Restriction in Range of motion (ROM) >25 in two or more planes as compared to normal side.

Exclusion criteria

- The following criteria were excluded from the study: Age ≤18 and ≥60 years.
- Inflammatory joint disease.
- Localized skin condition which is a contra-indication for CSI.
- Shoulder abnormality detected on plain X-ray.

After the diagnosis of idiopathic frozen shoulder was made on the basis of history, physical examination, and clinicoradiological examination, the patients were divided into two random groups, with both groups having 18 subjects each. ROM was evaluated at the shoulder joint, that is, active and passive shoulder flexion and abduction, as well as internal and external rotation with the patients standing or sitting. X-ray or MRI of the shoulder joint was carried out in some patients to exclude conditions other than frozen shoulder. Patients in first group (Group A) were given an intra-articular methylprednisolone injection (80 mg methylprednisolone mixed with 0.5% bupivacaine to make a 10-mL solution) and were given analgesics only during episodes of severe pain. We performed all intra-articular steroid injections under aseptic conditions in the setting of a minor operation theater with the patient in a sitting position through posterior approach. Patients in Group B were subjected to hydrodilatation. These patients were placed in a lateral lying position. Then, 2 ml of 1% lignocaine (local anesthetic) was used for skin anesthesia. A 22-gauge needle was used to gain access to the joint capsule and hydrodilatation was performed with a solution consisting of 40–60 ml of normal saline, 40 mg of corticosteroid, and 2 ml of 0.25% local anesthetic. The procedure lasted until all of the solution was injected into the joint. The end point was usually a stage when the resistance gave up. The patients were advised to take analgesics to counter pain following the procedure.

After receiving the injection, patients in both groups were advised to undergo exercises immediately as per protocol and were followed up subsequently at 2, 6, and 12 weeks. Shoulder function was evaluated

Table 1: SPADI scores at each follow-up for both groups

Time	Group A	Group B	p-value
0 weeks	57.28±8.28	57.49±8.76	0.93
6 weeks	45.33±6.68	44.32±6.06	0.52
12 weeks	33.11±6.78	27.07±4.98	0.007
24 weeks	19.40±5.27	13.97±3.59	0.002

Table 2: VAS scores at each follow-up for both groups

Time	Group A	Group B	p-value
0 weeks	5.69±1.29	5.92±1.26	0.52
6 weeks	4.78±1.03	4.56±1.09	0.34
12 weeks	2.69±0.88	2.19±0.57	0.03
24 weeks	1.77±0.71	1.05±0.47	0.0005

Table 3: External rotation values at each follow-up for both groups

Time	Group A	Group B	p-value
0 weeks	31.46±15.34	33.66±14.76	0.81
6 weeks	38.78±14.18	44.54±12.56	0.09
12 weeks	48.42±16.88	54.52±18.76	0.06
24 weeks	52.08±14.24	64.62±12.98	0.01

Table 4: Abduction values at each follow-up for both groups

Time	Group A	Group B	p-value
0 weeks	68.68±24.78	74.65±28.76	0.39
6 weeks	76.68±28.18	84.54±32.56	0.26
12 weeks	86.42±16.88	102.52±1876	0.03
24 weeks	102.08±18.24	128.62±16.98	0.001

Table 5: Flexion values at each follow-up for both groups

Time	Group A	Group B	p-value
0 weeks	122.68±24.78	119.65±28.76	0.19
6 weeks	135.68±24.18	134.54±32.56	0.72
12 weeks	146.42±16.88	154.52±18.76	0.04
24 weeks	158.08±11.24	170.62±6.98	0.006

and documented at the time of presentation and at each subsequent visit by Shoulder Pain and Disability Index (SPADI) and ROM at forward flexion, internal rotation, external rotation, and abduction. Similarly, improvement in pain score was assessed at subsequent visits using a visual analog scale (VAS). Flexion and abduction of the shoulder were done by measurement of the angle formed between the arm and thorax. External rotation was measured with the arm in adduction and the elbow at the side and flexed to 90°.

RESULTS

The mean age in our study was 41.12 years with Group A having a mean of 46.72 years and Group B having a mean of 45.08 years. Right side (64%) was more commonly involved than the left (36%). Females (56%) had a higher incidence of adhesive capsulitis than males (44%) in our study. No case was bilateral. All these parameters, though, were statistically non-significant, that is, p≤0.05.

Patients in both groups were assessed for SPADI score at presentation and subsequent follow-ups. The results were much better in Group B, more with each subsequent follow-up so much that the difference between two groups was significant at follow-up at 12 and 24 weeks.

VAS was assessed and results were drawn for both groups. Patients in Group B fared much better results in terms of VAS score than the counterparts of Group A. The difference in VAS score was statistically significant at 12 and 24 weeks of follow-up.

Although there was an improvement in ROM in both groups when compared to initial presentation, the results were much better in Group B with patients having more pain free ROM than their initial presentation as compared to their counter-parts.

There was dramatic improvement in ROM of patients in both groups but the improvement was much better in patients of Group B and the difference was statistically significant at 12-week follow-up for flexion and abduction and for all three, that is, flexion, external rotation, and abduction at final follow-up of 24 weeks.

DISCUSSION

Frozen shoulder remains a difficult problem to be managed. Despite having an armamentarium available at our end, still the treatment is controversial with different patients responding differently to treatment modes. Hydrodilatation has been used to improve the outcome in patients who do not significant improvement with oral medications and exercise protocols. Studies previously done have usually quantified results up to 3 months of follow-up; however, in this study, we have kept final follow-up at 6 months to study and compare the efficacy of hydrodilatation with intra-articular CSI.

Codman [9] and Lundberg [10] showed that the disease occurred in males at a relatively younger age than in females. Codman [9] and Lippman [11] found adhesive capsulitis to be more common in females in their study. In our study, also the incidence was higher in females (56%) than males (44%). Many studies [12,13] done over time have shown dominant hand to be more commonly involved. In our study, all cases were right dominant and right side (64%) involvement was more than the left side (36%). Studies conducted by Tveitå *et al*. [14] and Lädermann *et al*. [15] showed progressive improvement of SPADI and VAS scores with time with results in hydrodilatation being better than other modalities. Our study also showed significant results in patients of hydrodilatation with p≤0.05. However, in meta-analyses of Tveitå *et al*. [14] and Lädermann *et al*. [15], and most studies followed patients for only 3 months but in our study, the final follow-up was at 6 months, which also showed progressing improvement in SPADI as well as VAS score in patients managed by hydrodilatation with statistically significant results. In terms of effect on ROM, studies conducted by Lädermann *et al*. [15] and Rookmoneea *et al*. [16], the patients fared improvement in ROM in flexion, abduction, and external rotation planes with each follow-up which like most studies were taken till 3 months. In our study, also the ROM improved in both groups in all three planes (flexion, abduction, and external rotation) but much better results were obtained in hydrodilatation group with results being statistically significant at 12 and 24 weeks of follow-up. Hydrodilatation, in our study, has shown better efficacy than intra-articular CSI in terms of SPADI, VAS, and ROM and same results were also reproduced in studies conducted by Lädermann *et al*. [15] and Gam *et al*. [17].

Hydrodilatation, therefore, offers significant relief to patients of adhesive capsulitis, although we would have liked to extend follow-up till 1 year so as to establish long-term efficacy and need for repeat procedure; interval between first and subsequent repeat hydrodilatations, and progression thereafter, which remain as limitation of this study.

CONCLUSION

Hydrodilatation with corticosteroid provides better relief in terms of pain as well as ROM for frozen shoulder when compared to intra-articular CSI. The predictability of results with hydrodilatation is excellent and hence it is a better modality of treatment compared to intra-articular CSI.

AUTHOR'S CONTRIBUTION

All the authors have contributed to the study design. The authors declare that they have no competing interests.

CONFLICTS OF INTEREST

There are no conflicts of interest.

SOURCE OF FUNDING

None.

DECLARATION OF PATIENT CONSENT

Well informed consent was taken from all subjects included in our study.

REFERENCES

1. Binder AI, Bulgen DY, Hazleman BL, Roberts S. Frozen shoulder: A long-term prospective study. Ann Rheum Dis 1984;43:361-4. doi: 10.1136/ard.43.3.361, PMID 6742896
2. Grey RG. The natural history of "idiopathic" frozen shoulder. J Bone Joint Surg Am 1978;60:564. doi: 10.2106/00004623-197860040-00029, PMID 670287
3. Reeves B. The natural history of the frozen shoulder syndrome. Scand J Rheumatol 1975;4:193-6. doi: 10.3109/03009747509165255, PMID 1198072
4. Shaffer B, Tibone JE, Kerlan RK. Frozen shoulder. A long-term follow-up. J Bone Joint Surg Am 1992;74:738-46. doi: 10.2106/00004623-199274050-00013, PMID 1624489
5. Neviaser JS. Adhesive capsulitis of the shoulder. J Bone Joint Surg 1945;27:211-22.
6. Eljabu W, Klinger HM, von Knoch M. Prognostic factors and therapeutic options for treatment of frozen shoulder: A systematic review. Arch Orthop Trauma Surg 2016;136:1-7. doi: 10.1007/s00402-015-2341-4, PMID 26476720
7. Rangan A, Hanchard N, McDaid C. What is the most effective treatment for frozen shoulder. BMJ 2016;354:41-62.
8. Vastamäki H, Kettunen J, Vastamäki M. The natural history of idiopathic frozen shoulder: A 2 to 27 year follow-up study. Clin Orthop Relat Res 2012;470:1133-43. doi: 10.1007/s11999-011-2176-4, PMID 22090356
9. Codman EA. The Shoulder. Boston: Thomas Told Co.; 1934.
10. Lundberg BJ. The frozen shoulder. Clinical and radiographical observations. The effect of manipulation under general anesthesia. Structure and glycosaminoglycan content of the joint capsule. Local bone metabolism. Acta Orthop Scand Suppl 1969;119:1-59. PMID 4952729
11. Lippmann RK. Frozen shoulder; periarthritis; bicipital tenosynovitis. Arch Surg 1943;47:283-96. doi: 10.1001/archsurg.1943.01220150064005
12. Zreik NH, Malik RA, Charalambous CP. Adhesive capsulitis of the shoulder and diabetes: A meta-analysis of prevalence. Muscles Ligaments Tendons J 2016;6:26-34. doi: 10.11138/mltj/2016.6.1.026, PMID 27331029
13. Favejee MM, Huisstede BM, Koes BW. Frozen shoulder: The effectiveness of conservative and surgical interventions-systematic review. Br J Sports Med 2011;45:49-56. doi: 10.1136/bjsm.2010.071431, PMID 20647296
14. Tveitå EK, Tariq R, Sesseng S, Juel NG, Bautz-Holter E. Hydrodilatation, corticosteroids and adhesive capsulitis: A randomized controlled trial. BMC Musculoskelet Disord 2008;9:53. doi: 10.1186/1471-2474-9-53, PMID 18423042
15. Lädermann A, Piotton S, Abrassart S, Mazzolari A, Ibrahim M, Stirling P. Hydrodilatation with corticosteroids is the most effective conservative management for frozen shoulder. Knee Surg Sports Traumatol Arthrosc 2021;29:2553-63. doi: 10.1007/s00167-020-06390-x, PMID 33420809
16. Rookmoneea M, Dennis L, Brealey S, Rangan A, White B, McDaid C, *et al*. The effectiveness of interventions in the management of patients with primary frozen shoulder. J Bone Joint Surg Br 2010;92:1267-72. doi: 10.1302/0301-620X.92B9.24282, PMID 20798446
17. Gam AN, Schydlowsky P, Rossel I, Remvig L, Jensen EM. Treatment of "frozen shoulder" with distension and glucorticoid compared with glucorticoid alone. A randomised controlled trial. Scand J Rheumatol 1998;27:425-30. doi: 10.1080/030097498442244, PMID 9855212