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Effects of hydrodilatation versus corticosteroids in primary idiopathic frozen shoulder

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Abstract

Introduction: Frozen shoulder is condition in which there is pain and disability of shoulder joint mostly due to contraction of rotator interval capsular ligaments. Hydrodilatation is procedure to dilate the contracted capsule using normal saline and local anaesthetic agent while corticosteroid therapy depicts injection of Triamcelone acetate into joint capsule to reduce inflammation and adhesions thereby reducing pain and disability.

Objective: Objective of study is to compare effects of Hydrodilatation versus corticosteroids alone in intra articular shoulder joint on mobility of joint and pain in primary idiopathic frozen shoulder.

Materials and Methods: 50 patients were taken in our study out of which Maximum patients are in the age group of 40-50 years i.e., 20 patients (40%) followed by 50-60 year age group i.e., 19 patients (38%), There are 31 (62%) male and 19 (38%) females in our study, Right side is more Commonly involved 33 (66%) and left side involved in 17 (34%) patients, In Corticosteroids group, at Presentation mean abduction was 21% which was improved to 61%, external rotation in neutral position was 18% which improved to 89%, external rotation in abduction was 20% which improved to 83%, In Hydrodilatation group, at Presentation mean abduction was 20% which was improved to 60%, external rotation in neutral position was 18% which improved to 86%, external rotation in abduction was 22% which improved to 82%, Average SPADI and ASES score not showing any significant difference in outcome at 1 year follow up between Hydrodilatation and corticosteroids group of patients.

Conclusion: In this study, we investigated treatment effects in patients with adhesive capsulitis treated with either intra articular corticosteroid or with hydrodilatation procedure. Shoulder of the dominant hand (right side) is more commonly involved. No significant difference in the outcome as assessed with SPADI and ASES was found between both groups at 1 month, 6 month and 1 year follow up. In both groups there was significant improvement in range of motion & pain.

Keywords: Hydrodilatation, primary idiopathic frozen shoulder, capsular ligaments

Introduction

Frozen shoulder is a common cause of shoulder pain and disability. This condition has spontaneous onset of pain in shoulder joint with limitation of joint movement. This combination of pain and active & passive movement limitation causes discomfort and disability to patient with interference in a day-to-day activity.

Primary pathology according to Neviaser (1945) is thickening and contraction of capsule which become adherent to humeral head that leads to restricted shoulder joint movements¹⁸. No intra articular pathology found on arthroscopy.

Following Neviaser's findings various techniques were developed to loosen the contracted capsule to increase mobility and to relieve pain. Techniques like mobilization under anaesthesia carries risk related to anaesthesia in old patients and also iatrogenic fracture. Intra articular steroids have been in use for years with benefits. Andrean and Lundberg¹ described hydrodilatation procedure first. This procedure involves in principle injection into glenohumeral joint under pressure. Various studies used varying amount from 10 ml to 43 ml. The aim of present study is to compare results of Hydrodilatation technique with results of intra articular corticosteroids injection on range of motion at 1 month and 1 year.

Advantages of Hydrodilatation

1. Less expensive
2. Used in diabetic patients.

Disadvantage of Hydrodilatation

1. Anaphylactic reaction due to radioactive dye
2. Improper placement of spinal needle
3. Delayed response to pain reduction
4. Initial increase in pain following Normal saline Injection.

Advantages of corticosteroids

1. Can be done on OPD basis.
2. Quick pain relief as compared to hydrodilatation.

Disadvantages of Corticosteroids

1. Cannot be used in diabetic patients.

Stages of Frozen Shoulder

1. Painful stage: 10-36 weeks
2. Stiffness: 4-12 months
3. Recovery: 5-24 months

Materials and Methods

This study was done in department of orthopaedics in civil hospital Ahmedabad between August 2018 to November 2020.

All patients with shoulder pain and stiffness in one or both the shoulders for the period of minimum 3 months with restriction of external rotation and abduction were included in the study after informed consent and institutional ethical committee approval.

This study included 50 patients out of which they are randomised to distribute equally in both the study groups.

For hydrodilatation procedure normal saline, Iohexol dye, 22 G spinal needle, 10 ml syringe was used.

For corticosteroid procedure 2 ml Triamcelone acetate (80 mg), 2 ml 2% lignocaine and 22 G spinal needle used.

Inclusion Criteria

1. Primary Adhesive Capsulitis
2. Limitation of passive movement in the glenohumeral joint, external rotation in neutral position less than 30 degrees, forward flexion less than 90 degrees and abduction less than 60 degrees.
3. Pain is predominantly symptom lasting for more than 3 months, less than 1 year.

Exclusion Criteria

1. Gross restricted range of motion.
2. Age under 30 or over 80.
3. Various contraindications to injections: allergy to injection material, allergy to radio opaque dye (Iohexol Dye).
4. Patients having rheumatoid arthritis.
5. Local site infection.
6. Patient in whom surgical intervention is planned.

Methodology

Patient is primary assessed with history of shoulder pain which includes any traumatic history, history related to infection or history of multiple joint involvement.

After thorough assessment of history of patient, examination of shoulder joint is done.

Examination of shoulder includes following:

1. Examination of local site by inspection and palpation to see for wasting, redness.
2. Tenderness
3. Active and passive range of motion mainly abduction and external rotation.
4. Special Tests
 - a) External Rotation Lag Sign (Test for rotator cuff)
 - b) Drop Arm Test (Test for rotator cuff)
 - c) Belly Press Test (Test for rotator cuff)
 - d) Empty Can Test (Test for rotator cuff)
 - e) O'Brien's Test (Test for acromioclavicular joint)

After history and examination, patients are investigated with

- Xray of Respective Shoulder joint (AP View).
- USG of the shoulder was done to rule out Rotator Cuff Tear in these Patients.
- Routine blood investigation like Complete blood count, Random blood sugar done to rule out Infection and Other pathologies.

Patient is assessed after history, examination, and investigation for the type of procedure to be done i.e., hydrodilatation or corticosteroid injection. We have randomised the patients for either hydrodilatation or corticosteroid injection procedure. Patient is taken to operation theatre for procedure. Both procedures are done in supine position under local anaesthesia. Post procedure patient is kept under observation for 2 hours. After that patient can go home as the procedure is done as day care procedure. Patient is advised for physiotherapy by physiotherapist for range of motion exercises of shoulder joint.

First follow up done at the end of first month. Patient is examined for shoulder joint movements and assessed for pain and SPADI score & ASES score. Patient is advised physiotherapy at home and to be followed up after 6 months and 1 year.

At 6 months follow up SPADI and ASES scores are calculated. Final follow up is done at the end of 1 year.

Procedures**1. Corticosteroid injection Procedure**

Under Fluoroscopy guidance 22 G spinal needle was inserted in Shoulder Joint entering the joint from rotator interval at the lateral aspect from coracoid process into the joint capsule and 2 ml triamcinolone acetonide (80 mg) and 2 ml of local anaesthetic (Lignocaine 2%) was given slowly, Spirit swab kept for 2 minutes



Fig 1: Insertion of spinal needle lateral to coracoid process in rotator interval

Hydrodilatation Procedure

Arthrograms were performed according to the Kaye-Schneider technique^[2]. The patients were placed supine on a table with an overhead X-ray tube and a supporting pillow under the opposite shoulder. Under image-intensified fluoroscopy a marker was placed over the glenohumeral joint space at about the junction of its middle and lower third. This point was then marked on the skin with a pen. The skin area was cleaned with an antiseptic. The joint was punctured by a needle 22 G Spinal Needle and its position was checked frequently by fluoroscopy during the procedure.

When performing these injections, the syringe was filled with 4 ml of contrast medium, 4 ml local anaesthetic lignocaine 2% and 20-ml saline. This injection of 28 ml in total was given to all patients undergoing the dilatation treatment. The fluid was injected very slowly into the joint. When resistance was met, injection was halted for a while, and then continued. During the injection, the joint was gradually distended, making especially the axillary and subscapular recesses more visible. The capsule would usually rupture in the wall of the subscapular recess, or sometimes in the wall of the bicipital or axillary recesses. This was recorded as a loss of resistance and contrast leakage was identified by fluoroscopy with Popping Sound after which resistance gives away.



Fig 2: IITV image of radio opaque dye in shoulder joint capsule

SPADI and ASES Score

1. SPADI score

SPADI is a self-administered instrument that measures pain and disability associated with shoulder disease^[3]. It consists of five pain and eight disability items each measured on a visual analogue scale. Pain and disability subscales are

calculated as the mean of the corresponding items on a 0–130 scale, the highest score indicating the most severe pain and disability. The total score is calculated as the average of the pain and disability subscales. Pain scale includes 50 points and Disability scale includes 80 points.

The score used in our study was a visual analogue SPADI has been used in previous randomized trials investigating treatment effects in frozen shoulder populations. The more the score more the disability. Significant difference is said if there is 10-point difference between two procedures.

2. American Shoulder Elbow Society Score (ASES)

ASES was used to measure the functional disability felt by the patient at the time of presentation and mean improvements in follow up on 1 months, 6 months, 12 months and results of both the methods are compared.

The difference of 10 points in SPADI and ASES Score of two treatments groups to be considered significant.

For calculation abduction of 160-degree, external rotation in neutral position 90 degree and external rotation in abduction 120 degree taken as normal reference.

Observation and results

Table 1: Age Distribution

Age	Number of patients	Percentage
40-50 years	20	40%
50-60 years	19	38%
60-70 years	9	18%
70-80 years	2	4%

Maximum patients are in the age group of 40-50 years i.e., 20 patients (40%) followed by 50–60-year age group i.e., 19 patients (38%).

Table 2: sex Distribution

Sex	Number of Patients	Percentage
Male	31	62%
Female	19	38%

There are 31 (62%) male and 19 (38%) females in our study.

Table 3: Side Involvement of Primary Idiopathic Frozen Shoulder

Side	Number of Patients	Percentage
Right	33	66%
Left	17	34%

Right side is more commonly involved 33 (66%) and left side involved in 17 (34%) patients.

Table 4: Comparison of pre procedure and final follow up (1 year) movements in shoulder joint treated with corticosteroids.

Range of Motion (in degrees)	Mean Range of motion at Presentation in Percentage (Mean)	Mean Range of motion at 1 year follow up in Percentage (Mean)
Abduction	21% (35)	61% (97)
External Rotation in neutral position	18% (17)	89% (80)
External rotation in abduction	20% (28)	83% (100)

In Corticosteroids group, at Presentation mean abduction was 21% which was improved to 61%, external rotation in neutral

position was 18% which improved to 89%, external rotation in abduction was 20% which improved to 83%.

Table 5: Comparison of pre procedure and final follow up (1 year) movements in shoulder joint treated with Hydrodilatation.

Range of Motion (in degrees)	Mean Range of motion at Presentation in Percentage (Mean range of motion)	Mean Range of motion at 1 year follow up in Percentage (Mean range of motion)
Abduction	20% (32)	60% (96)
External Rotation in neutral position	18% (17)	86% (78)
External rotation in abduction	22% (27)	82% (98)

In Hydrodilatation group, at Presentation mean abduction was 20% which was improved to 60%, external rotation in neutral position was 18% which improved to 86%, external rotation in abduction was 22% which improved to 82%.

Table 6: Average Change in SPADI Score at Presentation, 1 year follow up.

Procedure	At Presentation	1 Year Follow up
Hydrodilatation	113	36
Corticosteroids	112	34

SPADI Score at 1 year follow up in Hydrodilatation is 36 and in Corticosteroids is 34 which is less than the criterion of 10-point difference between two methods which shows no method is superior to one another at 1 year follow up.

Table 7: Average Change in ASES Score at Presentation, 1 year follow up.

Procedure	At Presentation	1 Year Follow up
Hydrodilatation	6	86
Corticosteroids	7	87

ASES Score at the 1 year follow up is 86 in hydrodilatation and 87 in corticosteroids which is almost similar which signifies there is no difference in either of the treatment at 1 year follow up.

Discussion

Frozen shoulder is a disabling condition in middle aged and old aged person characterised by pain and limitation of shoulder joint motion. In this study patients with shoulder pain for less than three months were not included because it would be difficult to distinguish between typical bursitis and developing capsulitis in this early phase. The present study is undertaken to compare the outcome of results of treatment of patients with corticosteroid and hydrodilatation.

We have chosen to compare treatment effects by using the method of a randomized controlled trial. By randomising the patients for procedure, we ensured various participant variability randomised.

In various studies investigators have used varying amount of fluid from 10 ml to 43 ml. for hydrodilatation procedure. Buchbinder used ^[4] 43 ml., we have used 28 ml of normal saline for our studies. Our choice is based on belief that this volume will distend capsule without rupture and extra articular deposition.

In our study maximum patients are in the age group of 40-50 years i.e. 20 patients (40%) followed by 50-60-year age group i.e., 19 patients (38%), which means total 39 (78%) patients in 40-60-year age group which is also most common age of patients with frozen shoulder.

There are 31(62%) male and 19(38%) females in our study, in other studies there is more female patients as compared to male patients.

Right side is more commonly involved 33 (66%) and left side involved in 17 (34%) patients, which signifies more involvement of dominant hand.

While we have used single injection for both procedures,

various researchers used different numbers of injections from 1 to 6 injections. Majority of them used single injection while Gam & Colleagues used 6 injections. In corticosteroid treated group we have used single dose of Triamcelone acetate (80 mg). In hydrodilatation procedure we have used single dose of total of 28 ml which includes 20 ml normal saline, 4 ml iohexol dye, and 4 ml lignocaine 2%.

Effect of corticosteroid is to reduce the inflammation and thus reduce pain. In Corticosteroids group, at presentation mean abduction was 21% which improved to 61%, external rotation in neutral position was 18% which improved to 89%, while external rotation in abduction was 20% which improved to 83% at 1 year follow up. This shows significant improvement in the range of motion (ROM).

Procedure of hydrodilatation is thought to exert it's positive effect by improving glenohumeral mobility via stretching of capsule. In Hydrodilatation group, at Presentation mean abduction was 20% which improved to 60%, external rotation in neutral position was 18% which improved to 86%, external rotation in abduction was 22% which improved to 82% at 1 year follow up.

In our study we used SPADI and ASES score. In hydrodilatation group SPADI score improved from 113 (at presentation) to 36 (at 1 year follow up) while in corticosteroid group SPADI score improved from 112 (at presentation) to 34 (at 1 year follow up). ASES score at 1 year follow up is 86 in hydrodilatation group and 87 in corticosteroid group. This result signifies similar improvement in results of both groups.

Gam et al ^[5]. Reported significant improvement in various range of motion measures in the group treated with distension compared with the group treated with steroid alone. In the present study, the measures of range of motion were almost equal in the two groups at follow-up, a result much in line with the findings of Corbeil et al ^[6] study.

Conclusion

In this study, we investigated treatment effects in patients with adhesive capsulitis treated with either intra articular corticosteroid or with hydrodilatation procedure. Shoulder of the dominant hand (right side) is more commonly involved. No significant difference in the outcome as assessed with SPADI and ASES was found between both groups at 1 month, 6 month and 1 year follow up. In both groups there was significant improvement in range of motion & pain.

References

- Andren L, Lundberg BJ. Treatment of rigid shoulder by joint distension during arthrography. *Acta Orthop Scand* 1965;36:45-53.
- Schneider R, Ghelman B, Kaye JJ. A simplified injection technique for shoulder arthrography. *Radiology* 1975;114:738-739.
- Roach KE, Budiman-Mak E, Songsiridej N, Lertratanakul: Development of a shoulder pain and disability index. *Arthritis Care Res.* 1991;4:143-149. 10.1002/art.1790040403.
- Buchbinder R, Green S, Forbes A, Hall S, Lawler G.

Arthrographic joint distension with saline and steroid improves function and reduces pain in patients with painful stiff shoulder: results of a randomised, double blind, placebo controlled trial. *Ann Rheum Dis.* 2004;63:302-309. 10.1136/ard.2002.004655

5. Gam AN, Schydlowsky P, Rossel I, Remvik L, Jensen EM. Treatment of "frozen shoulder" with distention and glucocorticoid compared with glucocorticoid alone. *Scand J Rheumatol* 1998;27:425-430. 10.1080/030097498442244.
6. Corbeil V, Dussault RG, Leduc BE, Fleury J. Capsulite rétractile de l'épaule: étude comparative de l'arthrographie avec corticothérapie intra-articulaire avec ou sans distension capsulaire. *Can Assoc Radiol J* 1992;43:127-130.