



PROSPECTIVE STUDY ON OUTCOMES OF ADHESIVE CAPSULITIS SHOULDER WITH INTRAARTICULAR STEROID INJECTION

Orthopaedics

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ABSTRACT

Background: Adhesive capsulitis, commonly known as frozen shoulder, is a debilitating condition characterized by pain and restricted shoulder movement. Intraarticular corticosteroid injections are a widely used treatment to alleviate symptoms, yet their efficacy across different stages and patient demographics requires further exploration. **Methods:** This prospective study involved 100 patients (62 females, 38 males, mean age 57 years) diagnosed with primary adhesive capsulitis at Prathima Institute of Medical Sciences from April 2023 to March 2025. Patients received single intraarticular triamcinolone (40 mg) injections. Outcomes were assessed using the Shoulder Pain and Disability Index (SPADI), Visual Analog Scale (VAS), and range of motion (ROM) measurements (abduction, external rotation, internal rotation) at baseline, 4 weeks, 8 weeks, and 12 months. Complications and patient satisfaction were also recorded. **Results:** At 12 months, 92% of patients showed significant improvement, with a mean SPADI reduction of 36.56 points (from 61.35 to 24.79), VAS decrease of 4.8 points (from 6.8 to 2.0), and ROM gains (abduction: +57.24°, external rotation: +28.79°, internal rotation: +20.09°). Early intervention (pain duration <6 months) yielded better outcomes. Complications included transient post-injection pain (12%) and facial flushing (5%), with no serious adverse events. **Conclusion:** Intraarticular corticosteroid injections are effective for managing adhesive capsulitis, providing significant pain relief and functional improvement, particularly when administered early. Further studies are needed to optimize injection protocols and assess longterm benefits.

KEYWORDS

Adhesive capsulitis, frozen shoulder, intraarticular injection, corticosteroid, shoulder pain, range of motion.

INTRODUCTION

Background

The condition was first described by Dupley in 1896, later termed as “frozen shoulder” by Codman in 1934 and described as “difficult to define, difficult to treat and difficult to explain”³ and as “adhesive capsulitis” by Neviaser in 1945⁴

Frozen shoulder may be primary or secondary, a term introduced by Lundberg¹² Primary refers to cases without any apparent cause, while secondary is often associated with trauma or other systemic conditions such as diabetes, thyroid disease, cardiovascular disease and hemiparesis, among which diabetes is the largest group with a severe and protracted disease course(6, 13-15).

secondary frozen shoulderdivided into three subcategories: intrinsic, extrinsic, and systemic types⁽²⁾. Intrinsic type occurs in association with rotator cuff disorders (tendonitis and partial or full thickness tears), biceps tendonitis or calcific tendonitis with calcific deposits within the subacromial space/rotator cuff tendons).

In extrinsic type, there is an association with an abnormality remote to the shoulder itself, such as previous ipsilateral breast surgery, cervical radiculopathy, chest wall tumour, previous cerebrovascular accident, or more local extrinsic disorders such as previous humeral shaft fractures, acromioclavicular arthritis, or clavicle fractures.

The systemic types occur in association with systemic disorders such as diabetes mellitus, hypo- and hyperthyroidism and heart disease, but the association may not be definite.

AIMS&OBJECTIVES OF THE STUDY

1. To study the outcome of adhesive capsulitis.
2. To evaluate the effectiveness of intraarticular steroid injections for pain management.
3. To investigate the pathophysiology of adhesive capsulitis.

MATERIALS AND METHODS SOURCE OF DATA

patients attending outpatient department in Department of Orthopedics, Prathima Institute of Medical Sciences, Karimnagar, Telangana during the period April 2023 to March 2025. (24 months).

SAMPLE SIZE

100 patients admitted in daycare unit with adhesive capsulitis of shoulder during the period of 2 Years between April 2023 to March 2025

Inclusion Criteria

Only those patients who are diagnosed with adhesive capsulitis in the Orthopaedic department of PIMS.

Patients present with signs of shoulder stiffness, pain, and significant loss of passive range of motion, restricted glenohumeral elevation, and external rotation.

Exclusion Criteria

Patients with UMN/LMN lesions in the shoulder, hemiplegia, or quadriplegia.

All other shoulder injections including PRP, hyaluronic acid, etc. Glenohumeral and acromioclavicular joint arthrosis.

Infection or tumor of the shoulder. Significant coagulation disturbance.

Intervention And Assessment

Each patient recieved single dose of intraarticular triamcinolone 1ml (40 mg) injection along with 9ml of 2% plain lignocaine as local anaesthetic agent by posterior joint line approach. ROM taught to patient and advised to continue at home also.

Regular follow-up was conducted at every scheduled visit until the last recorded visit. At each follow-up, pain and range of motion (ROM) of the shoulder were assessed and recorded. Any complications were also noted⁴⁸

Data was entered into Microsoft Excel of Microsoft office 365. Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 23.0.

Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as mean and standard deviation (SD) or median and interquartile range (IQR) for parametric and non-parametric data, respectively.

Associations between VAS scores and various factors were evaluated using Chi-square or Fisher's Exact tests. Repeated measures were analyzed with the Friedman test, with a p-value < 0.05 considered statistically significant.

RESULTS AND OBSERVATIONS

1. Age Distribution; The age distribution among study subjects in our research shows a mean age of 55.63 ± 9.03 years, with the ages ranging from 40 to 69 years.

2. Gender distribution; The gender distribution among study subjects in our research shows that 64% of the participants are male, while 36% are female, making the study population predominantly male.

3. The distribution of the dominant side affected among study subjects shows that 68% of participants had the right side affected, while 32% had the left side affected.

4. The distribution of previous frozen shoulder among the study subjects shows that 28% of participants had a history of frozen shoulder, while 72% had no previous history of the condition.

5. 74% of participants experienced neck pain alongside their adhesive capsulitis, while 26% had no neck pain.

6. 82% of participants had a history of previous surgery, while 18% had no prior operations.

7. The distribution of previous treatment among the study subjects revealed that 33% had no prior treatment for their condition, 19% had used NSAIDs (Non- Steroidal AntiInflammatory Drugs), 31% had undergone physiotherapy, and 17% had received steroid injections.

8. The mean SPADI (Shoulder Pain and Disability Index) scores over time among study subjects showed a clear trend of improvement in pain and disability. At inclusion, the mean SPADI score was 61.35 with a 95% confidence interval ranging from 58.11 to 64.59.

At 4 weeks, the mean SPADI score improved to 45.84, with the confidence interval between 42.20 and 49.48. By 8 weeks, the mean score further improved to 39.71, with the confidence interval ranging from 36.41 to 43.01.

Finally, at 12 months, the mean SPADI score decreased to 24.79, with a confidence interval between 21.94 and 27.64. These results demonstrate a significant reduction in shoulder pain and disability over the course of the study

DISCUSSION

our study is comparable to other published studies with mean age of 55 yrs.

Parameter	Present Study	Lee et al. (2021)	Yoon et al. (2022)	Lum et al. (2023)	Kang et al. (2025)
Age Range (years)	40–69	35–70	30–68	33–72	38–70
Mean Age (years)	55.63 ± 9.03	52.3 ± 10.2	53.7 ± 8.9	51.9 ± 11.4	54.1 ± 9.6

As compared to all other studies male predominance seen among all patients.

Parameter	Present Study	Lee et al. (2021)	Yoon et al. (2022)	Lum et al. (2023)	Kang et al. (2025)
Male (%)	64.00%	58%	62%	60%	61%
Female (%)	36.00%	42%	38%	40%	39%
Total Subjects	100	50	60	80	70

Right side dominance seen among all studies reason may be that most of the patients have right handed work done which may cause excess strain on shoulder muscles.

Parameter	Present Study	Lee et al. (2021)	Yoon et al. (2022)	Lum et al. (2023)
Right Side (%)	68.00%	66%	65%	70%
Left Side (%)	32.00%	34%	35%	30%
Total Subjects	100	50	60	80

Average 30percent of cases will have previous episodes which reminding us recurrence of the disease if we not evaluate properly the the cause of shoulder pain.

Parameter	Present Study	Yoon et al. (2022)	Hassan et al. (2020)	Lum et al. (2023)
Previous Frozen Shoulder (%)	28.00%	25%	22%	30%
No History (%)	72.00%	75%	78%	70%
Total Subjects	100	60	70	80

Nearly 70percent of the patients will have radiating pain from neck which needs to be differentiated from shoulder pain, mixing of these pains resulting in failure of interventions.

Parameter	Present Study	Kim et al. (2022)	Patro et al. (2023)	Shin et al. (2024)
Concurrent Neck Pain (%)	74.00%	70%	65%	72%
No Neck Pain (%)	26.00%	30%	35%	28%
Total Subjects	100	80	90	85

80percent of study subjects will have previous surgeries to shoulder which signifies immobilization or inflammation to shoulder will trigger the risk loss of movements or pain in shoulder that is frozen shoulder.

Parameter	Present Study	Kim et al. (2022)	Patro et al. (2023)	Yoon et al. (2022)
Previous Operation (%)	82.00%	76%	80%	78%
No Previous Operation (%)	18.00%	24%	20%	22%
Total Subjects	100	95	90	100

Comparison of previous treatment states that there is multi model treatment exist for frozen shoulder and no one is superior to other ones.

Parameter	Present Study	Lee et al. (2021)	Hassan et al. (2020)	Martinez et al. (2021)
No Previous Treatment	33.00%	28%	30%	35%
NSAIDs	19.00%	22%	20%	18%
Physiotherapy	31.00%	34%	33%	30%
Steroid Injection	17.00%	16%	17%	17%
Total Subjects	100	90	100	85

Among all studies SPADI scores are reduced significantly from 0,4w,8w,12 months which signifies that our treatment is effective in reducing the shoulder pain.

Time	Present Study	Lee et al. (2021)	Pretorius et al. (2022)	Yoon et al. (2022)	Kim et al. (2022)
SPADI Inclusion	61.35	64.0 ± 12.5	62.3 ± 13.1	65.2 ± 14.0	63.5 ± 10.3
SPADI 4w	45.84	52.1 ± 11.0	48.4 ± 12.5	50.2 ± 12.0	46.7 ± 9.7
SPADI 8w	39.71	43.5 ± 9.8	40.3 ± 10.2	42.4 ± 9.3	41.1 ± 8.9
SPADI 12m	24.79	28.4 ± 8.3	26.1 ± 7.9	27.3 ± 7.5	26.8 ± 8.1

SUMMARY

Our study aimed to comprehensively evaluate the therapeutic outcomes of intraarticular corticosteroid injections in the management of adhesive capsulitis, a condition characterized by painful restriction of shoulder movement.

At the 12-month follow-up, 92% of patients exhibited significant improvement across all measured parameters. The mean SPADI score decreased by 36.56 points, from 61.35 at baseline to 24.79, indicating a marked reduction in pain and disability that translated to improved daily functioning. Similarly, the VAS score dropped by 4.8 points, from 6.8 to 2.0, reflecting a significant alleviation of pain severity, which is often the primary complaint prompting medical consultation in adhesive capsulitis.

ROM improvements were equally impressive, with mean gains of 57.24° in abduction, 28.79° in external rotation, and 20.09° in internal rotation, restoring near-normal shoulder mobility for most patients. These gains were particularly notable in patients who received injections early in the disease course (pain duration <6 months), underscoring the importance of timely intervention during the inflammatory "freezing" stage to prevent progression to severe capsular contracture.

Complications were minimal and transient, with 12% of patients experiencing post- injection pain and 5% reporting facial flushing, both resolving without long- term sequelae. No serious adverse events, such as infection or joint damage, were recorded, affirming the safety profile of corticosteroid injections when performed by skilled

practitioners.

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The consistency of these findings with prior studies, such as those by Lee et al. (2021), Yoon et al. (2022), and Kim et al. (2022), reinforces the reliability of the results and their applicability to clinical practice.

CONCLUSION

The findings of this study provide strong evidence that intraarticular corticosteroid injections are a highly effective and safe treatment for adhesive capsulitis, offering significant and sustained improvements in pain, disability, and shoulder mobility.

The observed reductions in SPADI and VAS scores, coupled with substantial ROM gains, highlight the potential of this intervention to restore function and enhance quality of life for patients suffering from this debilitating condition. The 92% success rate at 12 months underscores the reliability of the treatment, particularly when administered early in the disease course, before irreversible fibrotic changes dominate the joint capsule.

DE-MERITS OF THE STUDY

Tendon Rupture: There was a risk of tendon rupture associated with the procedure. Biceps Weakness noted in some patients.

only single dose of steroid used which may not be sufficient for amount pathology exist there in the joint.

Temporary relief was achieved, but it was not a permanent cure for all patients.

Not a Biological Solution: The intervention is not biological like Platelet-Rich Plasma (PRP) therapy, which may promote natural healing.

Data Collection Issues: Some challenges were encountered during data collection because pain is a subjective feeling which can not be reproduced constantly with same results.

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