Management of Periarthritis Shoulder by Intra-Articular Steroid Injection and Shoulder Joint Manipulation

Chandramouli Gonuguntla 1, Raja Shekhar Kasukurthi 2, Sai Samaran Thota 3, Rajesh Menda 4

Received: 20 January 2024 / Accepted: 13 February 2024 / Published online: 20 July 2024

Abstract

Introduction: “Periarthritis” and “adhesive capsulitis” have been used synonymously with frozen shoulder. The condition known as “frozen shoulder,” which has an unknown cause, is characterized by a delayed, spontaneous restoration of all shoulder joint movements to some extent or entirely over several months to a year. Various treatment methods have been employed to manage peri arthritis shoulder, with varying outcomes.

The Aim: To evaluate the functional outcomes and pain relief of peri arthritis shoulder treated with intra-articular steroid injection and manipulation under anesthesia.

Material and Methods: A prospective study was conducted on adults with periarthritis of the shoulder who were admitted, evaluated, and followed up on 30 cases using intra-articular steroid injection and manipulation over three months.

Results: In our study, most of the patients were females and elderly, with diabetics being more prone to periarthritis of the shoulder. The Range of movements improved, and pain was relieved in all 30 patients. Excellent results were found in 26 cases (86.6%) based on DASH Score criteria.

Conclusion: Intra-articular steroid injection and manipulation of the shoulder in periarthritic patients with a 12-week follow-up resulted in the study finding a significant improvement in the Range of shoulder movement, pain, and function in patients with shoulder periarthritis.

Keywords: Periarthritis shoulder; intra-articular steroid injection; Range of movement.

Introduction

The condition “frozen shoulder,” which has an unknown cause, is characterized by a delayed, spontaneous restoration of all shoulder joint movements to some extent or entirely over several months to a year.[1]

Frozen shoulder has very confusing terminologies. The term “peri arthritis of the shoulder” was first used to describe painful shoulders whose symptoms could not be explained by arthritis of glenohumeral articulation. However, as knowledge of the various pathological processes affecting the shoulder has improved, the broad term “peri-arthritis” has been further broken down into its components. It includes Bilateral tendinitis, supraspinatus tendinitis, subacromial bursitis, calcific tendinitis, and partial rotator cuff tear.[2]
Additionally, individuals with shoulder arthritis, fractures, dislocations, cervical spondylosis, and referred pain should be eliminated from the diagnosis of frozen shoulder. Conditions including calcific tendinitis, supraspinatus tendinitis, bicipital tenosynovitis, and subacromial impingement are expressly excluded.

**Materials and Methods**

A 24-month prospective study was conducted on 30 patients with periarticular shoulder, managed using intra-articular steroid injection under anesthesia.

**Inclusion criteria:** Patients with Periarthritis Shoulder aged between 30-70 years who have not shown improvement after six months of analgesics and physiotherapy.

**Exclusion criteria:** The individual received a local corticosteroid injection within three months. Patients of Osteoarthritis, infective and inflammatory arthritis of the shoulder, and Uncontrolled Diabetes mellitus. Prior surgery or dislocation of the shoulder.

**Data Collection:** Periarthritis shoulder cases presented to the Orthopaedics Department

\[
DASH \text{ DISABILITY SCORE} = \left( \frac{\text{Sum of } n}{n} \right) \times 25.
\]

“n” is the number of completed responses. A DASH score cannot be computed if more than three items are missing. DASH score ranges from 0 (no disability) to 100 (most severe disability). [5]

**PRE-OPERATIVE ASSESSMENT:** The shoulder joint is stiff for 3-6 months, causing over 50% loss of external rotation and abduction and limiting movements to 30 degrees or less in two or more planes.

**PROCEDURE:** Lignocaine plain 2% was used along with Triamcinolone 40mg/ml in the present study.

Aseptic precautions were taken in all cases, and the injection site was determined using anatomical landmarks and marked with a skin pencil before administering the injection. The anterior and posterior approach is the most suitable method for intraarticular infiltration after administering general anesthesia supplemented with an interscalene block. The patient lay supine with the joint to be injected at the edge of the table. 21-gauge needle with 20ml syringe, 1ml Triamcinolone acetonide injection 40mg, 8ml 2% plain lignocaine injection and 40 ml of normal saline are used. Under the guidance of C arm fluoroscopy, anterior shoulder joint space is identified, the needle is inserted, and a bolus of injection is given. The posterior acromion angle was felt. About 1 cm under the posterior border of the acromion process, just medial to the posterior corner, a fingertip was insinuated into a depression marked. The coracoid process is identified. The injection was given anteriorly with minimal downward (about 15°) inclination towards the coracoid process till the needle touched intraarticular cartilage, and a bolus of injection was given. After appropriate dressing, shoulder manipulation using a short lever arm and a fixed scapula is done in a sequence of flexion, extension, abduction, adduction, external rotation, and internal rotation till the audible and palpable release of adhesions is made. Under C arm fluoroscopy, the shoulder is checked for fractures or dislocation.
Rehabilitation

Rehabilitation after manipulation is crucial for preventing recurrence, and supervised physical therapy is initiated immediately after the manipulation for 3 to 4 weeks. Patients were instructed to perform their exercises at home 3-4 times daily, each session lasting 15-20 minutes.

Warm, moist heat was used before, and ice was used after the sessions. Patients underwent outpatient physical therapy three times per week for the first three weeks, followed by two times per week for the next three weeks. The focus was on a range of motion, avoiding machines, resistive exercises, and weights until the pain-free motion was restored. After 6 to 8 weeks, light resistive strengthening can begin.

Results

Age incidence: The study’s participants had a mean age of 53.8, a maximum age of 68, and a minimum age of 36.

Age Distribution: In our study, 3.3% of patients are 30-40 years old, 40% are 41-50 years old, 30% are 51-60 years old, and 26.6% are 61-70 years old.

Sex incidence: Out of 30 patients, 16 females and 14 males were followed.

Sex Distribution: In our study, male and female distribution was 47% and 53%, respectively.

Side involved: The series involved 16 patients (53%) with dominant proper arm involvement, 14 patients (47%) with non-dominant left arm involvement, and no bilateral involvement was observed.

Associated conditions: The series involved ten patients with diabetes mellitus, 1 with hypothyroidism, and 2 with peri arthritic post-trauma.

Change in DASH Score in study period: In our study, the mean DASH score in pre-procedure was 42.6 and post-procedure 27.5 in 1st week, 19.8 in 2nd week, 12.5 in 3rd week, 6.8 in 1st month, 2.6 in 2nd month, 0.4 in 3rd month respectively.
**Discussion**

In our study, 30 patients with periarthritis of the shoulder were included. Patients were assessed for pain and disability and their condition through routine investigations and pre-anesthetic evaluation. The functional assessment was conducted on all patients using the DASH scores.

*Age-wise distribution* Periarthritis of the shoulder peaks in the 4th-6th decades of life, with the 5th decade being the most common.[6]

Our study included patients aged 30-70 years, of whom 56.6% were between 51-70, and 40% were aged 41-50. Only 3.3% of patients in the age group 30–40 years. This correlated with a prospective hospital-based cross-sectional study in a tertiary care hospital. The age of patients ranged between 23–69 years (51.36).[7] The peak incidence of shoulder periarthritis was observed in the 40s and 50s, with 40% and 30%, respectively. The study by Singh S et al. found that shoulder periarthritis peak incidence was 40% in the 40s and 30% in the 50s.[7]

*Gender-wise distribution* Periarthritis of the shoulder is more prevalent in women than men. [8] The present study found that 53% of patients were female and 47% were male, indicating a female predominance of the condition. Kothari SY et al.’s study revealed that shoulder periarthritis is more prevalent in females (52.2%) than males.[9]

<table>
<thead>
<tr>
<th>Mean DASH Scores:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Procedure</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>&lt;80°</td>
</tr>
<tr>
<td>80°-100°</td>
</tr>
<tr>
<td>101°-120°</td>
</tr>
<tr>
<td>121°-140°</td>
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<tr>
<td>141°-160°</td>
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<tr>
<td>161° &amp; above</td>
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</tbody>
</table>

**Table 1** Abduction ROM in the study period

<table>
<thead>
<tr>
<th>Pre-Procedure</th>
<th>1st week</th>
<th>2nd week</th>
<th>3rd week</th>
<th>1st month</th>
<th>2nd month</th>
<th>3rd month</th>
</tr>
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<tbody>
<tr>
<td>&lt;20°</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>20°-40°</td>
<td>29</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>41°-60°</td>
<td>1</td>
<td>28</td>
<td>29</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>61°-80°</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>23</td>
<td>29</td>
<td>22</td>
</tr>
<tr>
<td>81° &amp; above</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>8</td>
</tr>
</tbody>
</table>

**Table 2** External Rotation ROM in the study period

**Table 3** compares the female-male ratio of patients with our study

<table>
<thead>
<tr>
<th>Female-male ratio</th>
<th>Female/male (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present study</td>
<td>53/47</td>
</tr>
<tr>
<td>Singh S [7]</td>
<td>1:0.8</td>
</tr>
<tr>
<td>Verma VK [10]</td>
<td>72/28</td>
</tr>
<tr>
<td>Cadogan A [12]</td>
<td>69/31</td>
</tr>
<tr>
<td>Sakeni RA [6]</td>
<td>58/42</td>
</tr>
</tbody>
</table>

**Comorbid association with the study population** Our study revealed a significant disparity between the percentage of participants who had diabetes (33.3%) and those who did not (66.6%). Bridgman JF’s analysis revealed that periarthritis of the shoulder was found in 10.8% of diabetics and 2.3% of non-diabetics, a statistical difference between the two patient groups. (p<0.005).[13] Based on consistent results from various studies, the study indicates that diabetes is a prevalent risk factor linked to a frozen shoulder.

**Prognosis In Associated Comorbid Conditions** Our study involved ten diabetic periarthritic patients who received Triamcinolone. The study revealed a mean pre-infiltration disability score of 51.8 and a post-infiltration disability score of 27.9.
Hudak PL et al.’s patients with diabetes showed a DASH score; the group patients showed significant improvement in disability score (DASH).[5] So in the case of periarthritis with diabetes, steroid infiltration shows significant improvement.

Complications associated with manipulation and intraarticular steroid injection The present study followed 30 patients for three months and found that manipulation and intraarticular steroid injection did not cause significant side effects. Loew et al.’s study involved 30 patients who underwent arthroscopy after manipulation, revealing significant complications such as joint cartilage damage, labrum tear, rotator cuff tear, humeral fractures, and traction nerve injury.[14]

Stout et al. warn against using intra-articular steroid injections in high-risk patients, including postmenopausal women, diabetes patients, and those undergoing surgery.[15]

Outcome

The analysis of the trial found that manipulation and intraarticular steroid injection were more effective in reducing pain and extending Range of motion. The DASH scores, however, showed a comparable clinical improvement. The patient group receiving intra-articular steroid and manipulation showed reduced pain, as measured by the DASH score. From pre-procedure to week 12, there was a substantial difference in the pain score in the treatment group favoring intra-articular steroids followed by manipulation, which gives pain relief and improves the Range of movements. In the pre-procedure, Range was 30.2-55.1. At 1st week, the Range was 23.2-31.9. In the 2nd week, Range was 16.4-23.2. In the 3rd week, Range was 8.6-16.4. In the 1st month and 2nd month, Range was 6-7.7 and 0.9-4.3. In the 3rd month, the Range was 0-0.9.

Early recovery from a frozen shoulder is crucial for patients’ quality of life, and when conventional treatments fail, manipulation is often considered a last resort.[8] Following manipulation, excellent results were observed in follow-ups.[16]

The current study also showed a sudden increase in ROM after manipulation. One week after intervention, 66% of patients (n=20) reported an overall improvement; at two weeks after intervention, 73.3%; and at four weeks after intervention, 90%. Additionally, between 1 and 3 months after manipulation, our data showed a relatively constant efficacy.

In this research, the shoulder was actively rotated in flexion-extension, abduction adduction, external rotation, and internal rotation after manipulation.

Passive capsular adhesion rupture during manipulation causes acute inflammation and discomfort. Steroid injections can reduce pain and prevent recurrence after manipulation. Tsveli et al. demonstrated the persistent efficacy and rapid improvement in ROM after manipulation.[17] Activating glucocorticoid receptors and preventing the action of inflammatory mediators explains how steroids’ anti-inflammatory effects reduce synovitis and fibrosis.[18] A previous review indicates that manipulation can be performed under general anesthesia, brachial block, or cervical root block. Nerve block not only provides pain relief during manipulation but also prolongs analgesia during passive and physical activity immediately after intervention.[19]

Physiotherapy is a common component of daily shoulder periarthritis care. It may prevent the early recurrence of the capsular adhesion and be crucial in maintaining and enhancing the Range of motion obtained after the manipulation.
EXTERNAL ROTATION

Case No 2:

ABDUCTION

Figure 9: Pre-Manipulation
Figure 10: Post Manipulation
Follow-Up

Figure 11: Pre-Manipulation
Figure 12: Post Manipulation
Figure 13: Follow Up

EXTERNAL ROTATION

Figure.14: Pre-Manipulation
Figure.15: Post Manipulation
Follow Up

COI Statement: This paper has yet to be submitted in parallel, presented fully or partially at a meeting, podium, or congress, published, or submitted for consideration beforehand.

This research received no specific grant from any funding agency in the public, commercial, or non-profit sectors. No relevant or minor financial relationships exist between authors, their relatives, or the next of kin with external companies.

Disclosure: The authors declared no conflict of interest. No funding was received for this study.

Patient consent: The patient’s consent was obtained for the publication of the case.
References:


