

Comparision of Functional Outcome of Autologous Platelet Rich Plasma (PRP) Vs Hydrodilatation In Adhesive Capsulitis

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BACKGROUND- Adhesive capsulitis also known as frozen shoulder is a progressively limiting musculoskeletal disorder which leads to excruciating pain, joint stiffness, and restricted movement on the shoulder joint hampering the day to day activity. This prospective study compares the efficacy of autologous platelet rich plasma (PRP) intra-articular injection with hydrodilatation.

MATERIALS AND METHODS-Patients who satisfied the inclusion criteria were selected for the study. A total number of 30 participants were divided equally in two groups namely Group A (n15) who received autologous platelet rich plasma injection Group B (n15) who underwent hydrodilatation for adhesive capsulitis. All the participants were followed up preprocedurally and post procedurally at 1 week, 1 month and 3 months for range of motion and pain relief and were charted in terms of VAS score and Shoulder pain and disability score (SPADI).

RESULTS- A total number of 13 patients were statistically analysed from group A and 12 patients were analyzed for group B. Participants from group A who received autologous platelet rich plasma injection showed a significant improvement in pain and quality of life. Autologous platelet rich plasma injection improves the quality of life and reduces pain with a long term outcome.

CONCLUSION- In patients suffering from primary adhesive capsulitis of shoulder autologous platelet rich plasma injection is superior than hydrodilatation as autologous platelet rich plasma injection also helps to rejuvenate the degenerative tissue.

KEYWORDS- Autologous platelet rich plasma injection, Hydrodilatation, Adhesive Capsulitis

I. Introduction

Adhesive capsulitis, or "frozen shoulder," is an aching and disabling condition which results in gradual and progressive limitation of both active and passive range of motion (ROM) of the shoulder joint, frequently with a pattern of capsular restriction¹. It generally advances through three clinically recognized phases: The initial painful freezing stage, the intermediate frozen stage characterized by marked stiffness, and the thawing stage during which mobility gradually returns.²

Painful stiffness of the shoulder can adversely affect activities of daily living and consequently impair quality of life.

The incidence of adhesive capsulitis is 3–5% in general population and 20% in diabetic individuals³. The histological biopsy of the contracted capsule revealed the deposition of fibroblasts admixed with type 1 and 3 collagen where there will be a transformation of fibroblasts into myofibroblasts with altered levels of matrix metalloproteinases. The management of adhesive capsulitis of shoulder ranges from non-operative management to surgical release of fibrosis of shoulder joint. Treatment of adhesive capsulitis involves both conservative and interventional methods. physical rehabilitation, pain management using non-steroidal anti-inflammatory drugs, corticosteroid injections, fluid distension techniques like hydrodilatation, and in cases unresponsive to conservative therapy, surgical options such as manipulation under anesthesia or arthroscopic capsular release⁴. In this study we aim to compare the efficacy and functional outcome of autologous platelet rich plasma injection versus hydrodilatation in patients with adhesive capsulitis.

Materials and Methods

This prospective cohort study was conducted in the Department Of Orthopedics at Chirayu Medical College and Hospital, Bhopal from August 2024 to February 2026 and a total of 30 patients diagnosed with adhesive capsulitis were

included in the study with a follow-up period of 3 months. The patients were divided into two groups namely Group A (n15) who received autologous platelet rich plasma injection and Group B (n15) who were treated with hydrodilatation.

Inclusion Criteria

1. Patients aged 18 years or older with primary frozen shoulder.
2. Persistent symptoms despite 1 month of conservative management (physiotherapy and analgesics).
3. No previous procedure done on the affected shoulder.
4. Patients who gave consent for treatment with PRP or hydrodilatation.

Exclusion Criteria

1. Bony injuries or glenohumeral arthritis in the ipsilateral shoulder.
2. History of corticosteroid injections for the same condition.
3. Active skin infections or lesions near the injection site.
4. Patients refusal for PRP or hydrodilatation treatment as per our protocol.

Procedure

Patients clinically diagnosed with frozen shoulder based on the predefined inclusion and exclusion criteria were enrolled in the study. Written informed consent was obtained from each participant before participation. Baseline evaluations included:

- Pain assessment using the VAS; 0–10, where 0 indicated no pain and 10 represented the worst possible pain.
- Functional outcome using Shoulder pain and disability index.

PRP was prepared following a standardized protocol:

- Blood collection: 20 mL of venous blood was drawn from each patient
- Centrifugation: The sample was centrifuged at 5000 rpm for 5 min to separate components into red blood cells, buffy coat (leukocytes), and PRP
- PRP extraction: Approximately 3 mL of PRP was collected under sterile conditions

Injection procedure

- The patient was positioned supine with the shoulder in neutral alignment.
- Under aseptic precautions, the glenohumeral joint was accessed through an anterior approach using an 18-gauge Needle.
- 3 mL of PRP in Group A and 40ml of normal saline with 10 ml of lignocaine in Group B was injected intra-articularly.

Post procedural care

- Oral analgesic were prescribed for post procedural pain.
- Physiotherapy and Shoulder ROM is started.
- Ice pack application was advised for the first 3 days to reduce swelling.

RESULTS

Group A–Autologous PRP group

Out of 15 patients, 2 patients were lost to follow-up, hence the study was done on 13 patients. Out of 13 patients 9 (69.2%) patients were male and 4 (30.2%) patients were female with a slight predominance of male population. The age ranged from 40 years to 75 years with the mean age of 49.85 ± 8.2 years. The mean pre-procedural range of motion for shoulder 40 degree flexion, 20 degree extension, 45 degree abduction, 25 degree adduction, 20 degree internal rotation and 30 degree external rotation. The mean pre-procedural VAS score was $8.1 \pm .9$ and pre-procedural SPADI score was 48.5 ± 8.2 . At the end of 3 month the mean VAS score improved to 3.96 ± 1.9 and the mean SPADI score improved to 70.8 ± 10.5 .

The mean range of motion of the shoulder also significantly improved at the end of three month.

5 out of 13(38.46%) patients who underwent autologous PRP injection showed excellent results, 5(38.46%) patients showed good results and 3(23.07%) patients showed poor results at the end of 3 month follow-up. Complications of

Autologous PRP, 8 patients complained of pain and 5 of swelling in the first week follow-up which improved with ice fomentation. No other major complication was noted.

Group B–Hydrodilatation group

Out of 15 patients, 3 patients were lost to follow-up and the study was done on 12 patients. Out of 12 patients 5 were male (41.66%) and 7 were female (58.33%) with a slight predominance of female population. The age ranged from 45 to 70 years with the mean age of 52.46 ± 6.8 years. The mean pre-procedural range of motion was 45 degree of flexion, 30 degree of extension, 45 degree of abduction, 20 degree of adduction, 25 degree internal rotation and 30 degree of external rotation. The mean pre-procedural VAS score was $8.5 \pm .75$ and pre-procedural SPADI score was 54.2 ± 12.8 . At the end of end of 3 months there was a significant improvement in the VAS and SPADI score. The VAS score at the end of 3 month was 5.8 ± 1.5 and SPADI score was 65.4 ± 8.6 and there was a significant improvement in the range of motion.

Out of 12 patients who underwent Hydrodilatation 3(25%) showed excellent results, 6(50%) showed good results and 3(25%) showed poor results. The major complication which was noted was pain(n5) and swelling(n6) at the end of 1 week follow-up which resolved with ice fomentation and NSAIDS. No other major complication was noted.

DICUSSION

Adhesive capsulitis of shoulder is also called scapulohumeral peri arthritis, frozen shoulder, arthrofibrosis or peri arthritis of shoulder. Lundberg classified frozen shoulder into two groups namely primary frozen shoulder which is of idiopathic in nature and secondary frozen shoulder which is due to trauma, tendinitis or systemic disorders. It affects the age group of 4th to 5th decade of life.⁵ The clinical course of adhesive capsulitis is frequently described in three overlapping phases—painful (freezing), adhesive (frozen), and recovery (thawing)—extending over 12 to 24 months, although individual timelines can vary substantially⁶. The incidence of adhesive capsulitis(Frozen Shoulder) in general population is about 3–5% and is usually diagnosed clinically on the basis of medical history and physical examination and is often a diagnosis of exclusion. Some of the other causes of a painful and stiff shoulder should be ruled out before we reach the diagnosis of adhesive capsulitis. Clinically, patients presents with pain in shoulder which further leads to gradual loss of both active and passive range of motion (ROM) due to fibrosis of the glenohumeral joint capsule. Evaluating outcomes in adhesive capsulitis relies heavily on standardized instruments which help to access both intensity of pain and ROM. The most frequently used measures is the Visual Analog Scale (VAS), introduced by Huskisson in 1974⁷, which serves as a simple tool for measuring subjective pain. Meanwhile, the Shoulder Pain and Disability Index (SPADI) provides a more detailed evaluation of pain and functional limitations specific to the shoulder region. Its reliability and validity have been reinforced in multiple clinical contexts, and it has shown strong reliability and validity in various clinical contexts and continues to be widely used to track progression of shoulder conditions⁸.

Management options for adhesive capsulitis of shoulder varies from a) physical therapy in the form of active range of shoulder movements, pendulum, and wheel exercises, short wave diathermy, ultrasonic therapy and interferential therapy of the shoulder joint, b) pharmacological management with analgesics and muscle relaxants, c) home based exercise programme in the form of hot fomentation and active range of shoulder movement exercises, d) intra-articular steroid injection in the form of 40 mg of triamcinolone into the affected shoulder joint, e) intra-articular sodium hyaluronate injection, which acts as a viscosupplement by increasing the viscosity of the synovial fluid, which helps lubricate, cushion and reduce pain in the joint, f) brisement in the form of distension arthrography (hydroplasty or hydrodissection), which mechanically ruptures the contracted capsule by injecting a mixture of normal saline admixed with local anaesthetic agent and thus relieves the shoulder pain, g) manipulation of shoulder in all the directions under general anaesthesia which ruptures the fibrosis across the shoulder joint, h) whole body cryotherapy with -110 degree C to -140 edrgdd C provides anti-inflammatory and analgesic effect to the body, i) surgical management in the form of open or arthroscopic release of fibrosis of shoulder joint and j) biological therapy with autologous platelet rich plasma injection.

The future treatment modalities of adhesive capsulitis of shoulder are intra-articular collagenase injections which breaks down the peptide bonds in collagen and biological agents of anti-TNF agents are under clinical research.

Agarwal et al conducted a study on 24 patients with hydroplasty revealed significant range of movements immediately post-procedure and at 4 weeks with 70% excellent results. Hence, he concluded hydroplasty acts as a low cost, effective and economical outpatient procedure for adhesive capsulitis of shoulder.⁹

Aslani et al conducted an experimental PRP therapy for frozen shoulder in a volunteer revealed 2 consecutive doses of PRP with an interval of 4 weeks improved functional range of movements and pain relief. He emphasised 2-fold improvement for range of movements with PRP therapy.⁹ Kumar et al conducted an observational study to compare local steroid injections and ultrasonic wave therapy in frozen shoulder patients revealed immediate improvement of range of movements is better with local steroid injections. They concluded long term effects are same in both the groups.¹⁰ Jadhav et al performed arthroscopic 360 degree capsular release for 40 patients showed maximum gain in range of movements in 2 months duration.¹¹ Kothari et al compared the efficacy of PRP injection, corticosteroid injection and ultrasonic therapy in treatment of periarthritis shoulder revealed PRP therapy resulted in statistically significant improvements over steroid injections and ultrasonic therapy. Hence they concluded PRP therapy is superior and biological therapy than steroid injections and ultrasonic therapy for periarthritis shoulder.¹¹

In this paper we compared the efficacy of hydrodilatation and autologous platelet rich plasma injection as the treatment for adhesive capsulitis. The patients who received autologous PRP showed statistically significant improved range of motion of shoulder at the end of three months as compared to patients who underwent hydrodilatation. The group who received PRP therapy showed better pain relief, functional range of motion and improved quality of life than the group who underwent hydrodilatation for adhesive capsulitis.

Limitations

Further research on the natural history and progression of adhesive capsulitis of shoulder needs to be evaluated which will guide the researchers to target the micro-molecules which prevents the degeneration of soft tissues around the joint and improve the functional quality of life. Hence conducting larger prospective randomized controlled trials could further increase the strength of our results.

Conclusion

The autologous platelet rich plasma injection demonstrates better efficacy than hydrodilatation in treating adhesive capsulitis. While hydro dilatation achieves results by forced rupture of the capsule, PRP facilitates healing through growth factor mediated tissue regeneration, it also helps in reducing inflammation and fibrosis resulting in increased mobility and improved long term outcomes.

Conflict of Interest

There was no conflict of interest.

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