

Comparative Assessment of the Significance of Platelet Rich Plasma (PRP) and Corticosteroid Injection in Management of Adhesive Capsulitis of Shoulder

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Abstract

Aim: Significance of platelet rich plasma (PRP) and Corticosteroid injection in management of Adhesive capsulitis of shoulder.

Methods: This prospective comparative study conducted in the Department of Orthopaedics, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India, for 1 year. 60 patients of frozen shoulder after proper clinical and radiological (X-ray, CT, MRI) assessment period of September 2020 to August 2021 in our institute and divided them randomly equally into two subgroups: subgroup A received PRP injection while subgroup B had received methylprednisolone injection. The inclusion criteria of this study was adult more than 18 year and stage 2 or more of periartthritis shoulder, shoulder range of motion decrease to 50% or more than opposite shoulder. All patients of our study advised neither to take any kind of analgesics i.e. NSAIDS nor any massage of shoulder, if patient had severe pain following injection opioids analgesic like the one tramadol can be given to patients. Patients were followed up at 1 week post injection, then after 1 month and then at 3 months.

Results There is statistically significant reduction in VAS pain scores after getting either with PRP injection as well as with MPS injection over 3-6 month period. 23.33% patients with excellent, 43.33% with good and 33.33% with poor outcome with PRP injection. For subgroup B this was found as 20% excellent, 36.67% good and 43.33% poor outcome.

Conclusion: we concluded that the PRP and MPS showed good efficacy on treating frozen shoulder.

Keywords: Platelet rich plasma, Corticosteroid injection, MPS

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Introduction

Adhesive capsulitis (AC) is one of the common causes of shoulder pain and disability in the upper extremity. It affects the functions of glenohumeral (GH) joint,

limiting both active and passive movements of the shoulder.[1] Limitation of passive range of movements (ROMs) of the

shoulder, particularly external rotation, has remained pivotal to the clinical diagnosis of AC. The incidence of AC is 2%–5% in the general population, whereas prevalence among diabetic patients is up to 20%.¹ The goals of treatment of AC are to relieve pain, restore

movement, and ultimately regain shoulder function.[1] Intra-articular corticosteroid (IA-CS) injection still remains one of the most common procedures for treating AC because of its cost-effectiveness and acceptance among patients.1,2 Studies have shown that CS into the shoulder joint provides symptomatic relief and limits the development of capsular fibrosis.[1,2]

The symptoms are generally self-limiting over one to three years and condition more common in females than males and the greatest incidence occurs in the 5th and 6th decades. The X-ray appearances may show either nothing abnormal or calcific deposits in the capsule or periarticular tissue. The Management is mainly focused on restoring joint movement and reducing shoulder pain, using anti-inflammatory medications, physical therapy, injection of saline with LA and/or surgical intervention including myofascial release. Although all these treatment may “unfreeze” the shoulder but usually, do not completely alleviate the chronic pain[2] Another practice of modern medicine is to inject methylprednisolone to prescribe anti-inflammatory medications. Platelet-rich plasma (PRP) is an orthobiologic that has recently gained popularity as an adjuvant treatment for musculoskeletal injuries.[3] The platelets contain alpha granules that are rich in several growth factors, such as platelet-derived growth factor, transforming growth factor- β , insulin-like growth factor, vascular endothelial growth factor and epidermal growth factor, which play key roles in tissue repair mechanisms.[4,5] The PRP injection therapy can have a beneficial effect in the management of frozen shoulder.

Materials and methods

A prospective comparative study was conducted in the study conducted in the Department of Orthopaedics, Darbhanga Medical College and Hospital, Laheriasarai, Darbhanga, Bihar, India, for 1 year. after taking the approval of the protocol review committee and institutional ethics committee.

Methodology

60 patients of frozen shoulder after proper clinical and radiological (X-ray, CT, MRI) assessment period of from October 2020 to September 2021 in our institute and divided them randomly equally into two subgroups: subgroup A received PRP injection while subgroup B had received methylprednisolone injection. The inclusion criteria of this study was adult more than 18 year and stage 2 or more of periarthritis shoulder, shoulder range of motion decrease to 50% or more than opposite shoulder. The patients who had bilateral periarthritis shoulder, stage 1 or lesser grade, less than 18-year age, any superficial or deep infection, any associated fracture, any comorbid condition, diabetic patients and those who were not willing for injection excluded from our study. The PRP injection was making with withdrawing 20-30 ml of patient venous blood and then with addition of sodium citrate double centrifugation was done at 1500 rpm for 6 minute and then at 3400 rpm for 15 min for getting high concentration platelet rich plasma. PRP preparation was activate with calcium gluconate, filled into syringe, and inject into affected shoulder of patients of subgroup A. The injection of methylprednisolone 2cc was inserted to affected shoulder in patients of subgroup B. All patients of our study advised neither to take any kind of analgesics i.e. NSAIDS nor any massage of shoulder, if patient had severe pain following injection opioids analgesic like the one tramadol can be given to patients. Patients were followed up at 1 week post injection, then after 1 month and then at 3 months.

Results

In this study, there were 58.33% female patients and 41.67% were males. Most of the patients are in age group of 40-60 years in both the groups. Most of the patients (58.33%) were injected with PRP in period of 3-6 months and with inj. MPS also in 3-6 months (55%). There is statistically significant reduction in VAS pain scores after getting either with PRP injection as well as with MPS injection over 3–6-month period as depicted in Table 1. The comparative clinical outcome during the follow-up period with PRP and MPS

injection were given in Table 2 and table 3 respectively and final 3-month follow up suggest 23.33% patients with excellent, 43.33% with good and 33.33% with poor outcome with PRP injection. For subgroup B this was found as 20% excellent, 36.67% good and 43.33% poor outcome (table 4). The complication rate as PRP is made of patients own blood, there is no such complications except local site post injection pain seen in 15 patients (50%) for some time.

Table 1: Comparisons of pain according to VAS during pre and post treatment

Time interval	PRP (Mean ± SD)	MPS (Mean ± SD)
Pre	8.86±0.89	8.58±0.70
Post – 1 week	5.70±2.65	5.82±2.16
Post – 1 month	4.10±3.39	3.82±2.57
Post – 3 months	3.22±3.75	3.22±3.21
P value	<0.00001(S)	< 0.00001 (S)
Chi-square	48.316	40.868

Table 2: Comparisons of Constant score during pre and post treatment (PRP)

Pre	Post - 1 week			Post - 1 month				Post - 3 month		
	Good	Fair	Poor	Excellent	Good	Fair	Poor	Excellent	Good	Poor
Fair	1	2	0	0	3	1	0	0	3	0
Poor	4	10	8	1	10	6	10	7	10	10
Total	7	13	10	1	13	7	10	7	13	10
p value	0.41			0.51				0.11		

Table 3: Comparisons of Constant score during pre and post treatment (MPS)

Pre	Post - 1 week			Post - 1 month				Post - 3 month		
	Good	Fair	Poor	Excellent	Good	Fair	Poor	Excellent	Good	Poor
Fair	5	0	0	1	3	0	0	1	3	0
Poor	4	9	12	0	8	4	14	5	8	13
Total	9	9	12	1	11	4	14	6	11	13
p value	0.005			0.021				0.21		

Table 4: Comparative final outcome at 3 month post injection follow up

Results	PRP	MPS
Excellent	7 (23.33%)	6 (20%)
Good	13 (43.33%)	11 (36.67%)
Poor	10(33.33%)	13 (43.33%)

Discussion

The primary goal of this study was to evaluate the efficacy of intra-articular PRP and corticosteroid injection in patients with idiopathic adhesive capsulitis. The pathology involved in adhesive capsulitis is synovial hyperplasia and capsular fibroplasia with fibrosis and dense capsular scar formation.

Rodeo et al. reported role of cytokines and other inflammatory mediators in patients with adhesive capsulitis and Intra-articular corticosteroid decreases synovitis limits development of fibrosis.[6,7] Van der Windt et al. compared intra-articular corticosteroid to 6 weeks of physical therapy for patients with painful stiff shoulders and reported significant improvements in pain, disability, and motion in the injection group.[8]

Gam et al[9] treated patients with adhesive capsulitis with either steroid injection or saline injection and distension with 19 cm[3] of Lidocaine and found that the distension with steroid group (12 patients) used fewer analgesics and had improved motion compared to the steroid-only group (eight patients). There are many disadvantages of corticosteroid injection have been reported including periarticular calcification, cutaneous atrophy, cutaneous depigmentation, tendon rupture, avascular necrosis, and joint infection[10] but in our study, no significant adverse effect have been reported. Thus, corticosteroid injection in the early stages of adhesive capsulitis leads to significant improvement in range of motion and pain. Our study demonstrated that PRP is not inferior to corticosteroid injection in any of the measured parameters and both of the groups experienced similar benefits from the injection therapies with no statistical differences detected in ROM or VAS scores at 1 week, 1 month and 3 months and no adverse effects were detected in either of any two groups. Our results are consistent with current literature, showing that PRP can be beneficial treatment of adhesive

capsulitis.[11,12] The previous studies are controversial in interpreting the efficacy of PRP injections due to the different research and treatment protocols, in many cases involving arthroscopy or different products of PRP, for example PRP fibrin matrix[13,14] and retrospective design and lack of randomization might have been the major limitations of this study.[15,16] The current literatures strongly advises against surgery in conditions like frozen shoulder and favors conservative treatment options.[17] In this perspective, PRP may offer a valid alternative to corticosteroid injection, considering that there are no documented significant adverse effects in PRP treatments unlike in corticosteroid injection treatments.[11] The advantages of PRP over CS are the absence of severe complications locally and systematically and more safe and simple treatment while disadvantages of PRP would be more injections required achieving similar outcomes as a single corticosteroid injection. The PRP treatment may be repeated whether symptoms return, but multiple corticosteroid injection should be avoided and concurrent physical therapy is still advised because of its proven benefits, as seen with given the outcomes of our study, we recommend considering PRP as an alternative treatment to CS in order to reduce local and systemic effects involved with CS injections.

Conclusion

We concluded that the PRP and MPS showed good efficacy on treating frozen shoulder. The current study provides strong evidence in support of a statistically significant effect of platelet concentrate in the treatment of frozen shoulder in vivo where steroid contraindicated or refused by patient.

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