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A COMPARATIVE STUDY OF EFFICACY OF INTRA ARTICULAR STEROID VS. PLATELET RICH PLASMA INJECTION IN ADHESIVE CAPSULITIS.

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ABSTRACT

Introduction: Adhesive capsulitis is one of the major causes of restriction of movement and pain in shoulder joint. Over the years the efficacy of steroid injections to relieve pain and improve range of motion was well established. Platelet Rich Plasma (PRP) has few more properties in management of same and hence the study aims to show PRP as an alternative to steroids.

Aim: To look for improvement in VAS, Range of Motion and SPADI due to PRP and steroids and to compare their efficacies.

Materials And Method: Two groups of Patients with adhesive capsulitis of shoulder were randomly selected. Group A (n=20) was injected with PRP and Group B (n=20) with methyl Prednisolone in aseptic technique after verbal consent. Assessment was done before the block then after 1st week, 4th week and 3months after the block.

Results: Statistically significant improvement was seen in both the groups with long term improvement better with PRP.

Conclusion: Although steroid showed better results in immediate reduction of pain compared to PRP but in long term follow up PRP was superior.

KEYWORDS : Adhesive Capsulitis, Intra- Articular Injection, PRP, Steroid.

INTRODUCTION

Adhesive shoulder capsulitis is also known as arthrofibrosis of shoulder or Frozen shoulder[1]. It describes a pathological process where the body forms excessive scar tissue and/or adhesions across the gleno humeral joint which leads to stiffness, pain and dysfunction[1] . The annual incidence of adhesive capsulitis is between 3%-5% in the general population and it is much more common in people with diabetes[2]. It has a prevalence rate of 2%–5%[3]. It usually develops between the ages of 40 to 70 years[4].There are many documented treatment options for adhesive capsulitis starting from include benign neglect to oral and intra articular corticosteroids, intra-articular injection of hyaluronic acid, physical therapy exercises, deep heat modalities, hydro dilation and manipulation under anaesthesia, arthroscopic release still the treatment of choice is yet, debatable [5,6].

PRP is a fraction of the whole blood containing concentrated growth factors and proteins and has a higher concentration of platelets[7]. Platelets secrete different proteins that has a paracrine effect on different cell types: myocytes, tendon cells, mesenchymal stem cells, chondrocytes, osteoblasts, fibroblasts and endothelial cells that stimulates cell proliferation, angiogenesis and cell migration, resulting in tissue regeneration[8]. Since any definite treatment modalities is yet to come in the field and recent introduction of PRP as a biological agent promoting healing without the side effects like avascular necrosis of steroid[9], it was needed to compare the effects, duration and shortcomings of PRP as a modality of treatment against steroid.

MATERIALS AND METHODS

This was a randomised comparative study conducted in the tertiary care hospital of IPGME&R and SSKM Hospital, Kolkata from January 2016 to December 2016. Ethical clearance was taken from Hospitals Ethics Committee. There was no external funding for the study and was conducted with the internal resources of the department. The patients with peri adhesive shoulder who did not improve for four weeks on conservative management and were in Stage I and II of the disease were included in the study. The exclusion criteria were patients with contraindications to PRP and Steroid, Patients refusing intervention, Stage III and IV of Adhesive capsulitis, bilateral shoulder joint involvement, previous shoulder surgery, and previous gleno humeral joint injection within 6months, secondary adhesive capsulitis, rotator cuff tear and patients with bleeding disorders.

40 Patients who fulfilled the inclusion criteria and were willing to participate in the study were randomised into two groups A and B. Subjects who were in Group A received 3ml of Steroid and lignocaine mixture composing of 1ml of methyl prednisolone (40mg/ml) and 2 ml of 2% lignocaine. And subjects in group B received 3ml of freshly prepared PRP. The injection was given via anterior approach following landmark technique maintaining complete asepsis. The patients were observed for any immediate complications and was advised to avoid any exercises for 2 days and take tablet paracetamol 500mg for any pain. After baseline evaluation and intervention all subjects were followed up after 1 week, 4weeks and 3months and were evaluated for improvement in Visual Analogue Scale (VAS) for Pain. Range of motion, Shoulder Pain and Disability Index (SPADI) was noted for functional outcomes. The PRP was freshly prepared in the Department of Physical Medicine and Rehabilitation and injected within 30 minutes of Preparation.

Statistical Analysis:

For statistical analysis Statistica version 6 [Tulsa, Oklahoma: StatSoft Inc., 2001] and GraphPad Prism version 5 [San Diego, California: GraphPad Software Inc., 2007] software were used. The data was entered initially in Microsoft Excel and then analysed with the help of Turkey's Multiple comparison test. The results with $P<0.05$, i.e. 5% level of significance were considered significant.

RESULTS:

40 patient with Peri adhesive shoulder were selected for the study and were randomised into two groups with 20 each. Demographic characterisation of the study population is shown in table-1.1 No significant difference was seen in age, sex distribution or duration of symptoms. Except self-limiting pain in 2 of the patients who received PRP injection, no other significant or major complication was noted during the entire study. No adverse effects were noted in subsequent follow ups and in between. The turkeys multiple comparison test in Group A with steroid , on comparing VAS at Baseline and 1st week, 4th week and 3 months all the data were statistically significant with $p<0.001$. The VAS in 1st follow at 1 week was significantly lower (3.65) than baseline visit (6.95) but increased mildly during 2nd follow up at 1 month (3.95). The third follow up showed more increase in VAS (4.55) but still lower than Baseline visit as shown in table 1.2 and figure 1. On comparing SPADI at Baseline and subsequent follow ups with the Turkeys multiple comparison test all data were statistically significantly with $p<0.001$. Baseline visit showed SPADI of 69.4 which decreased to 42.25 in 1st follow up at 1 week but increased mildly to 41.35 in 2nd follow up at 1 month, which further increased to 48.4 in final follow up at 3 month but still below the base line SPADI as depicted in table 1.2 and figure 2. Range of Motion (R.O.M) analysis of Shoulder abduction and external rotation were statistically significant in group A with gradual improvement in each subsequent visits. ROM of shoulder abduction increased from value of 58.1 in baseline to 79.35 in 1st week to 95.25 in 1st month to 114.4 at 3month. ROM of shoulder external rotation increased from value of 21 in baseline to 35.95 in 1st week to 51.3 in 1st month to 94.2 at 3 month as shown in table 1.2 and figure 3 and 4.

Group B , with patient receiving PRP injection, on comparing VAS at baseline , 1st week , 1 month and 3 months all data were statistically

significant with P<0.001. VAS at baseline was 6.65 which decreased to 5.45 at 1st visit after 1 week, which further decreased to 3.45 in 2nd visit at 1 month and 3rd visit at 3 month showed more decreased VAS of 1.7 as shown in table 1.2 and figure 1. Analysis of SPADI was statistically significant with p<0.001. There was continuous decrease in SPADI in each visit, baseline value was 67.9, 1st visit it was 56.05, 2nd visit was 36.55 and on 3rd it was 19.9 which is depicted in table 3 and figure 2. Range of Motion (R.O.M) analysis of Shoulder abduction and external rotation were statistically significant in group B with P value <0.001. ROM in both shoulder abduction and external rotation increased over time. ROM in abduction showed at baseline was 65.15, at 1st week increased to 83.7, 1st month was 102.85 and at 3rd month was 138.25. ROM of shoulder external rotation at baseline was 22.85 which increased to 39.1 at 1st week and was 58.2 in 1st month and 81.05 in 3rd month as mentioned in table 1.2 and figure 3 and 4.

Table 1.1 : Demo Graphics

	Group A	Group B
SEX		
Males	12	11
female	8	9
AGE		
40-49	3	4
50-59	9	8
60-69	7	6
70-79	2	2
HANDEDNESS		
Right handed	16	17
Left Handed	4	3

Table 1.2: Howing The Statistical Significance Of The Study

	Group A (Steroid)		Group B (PRP)	
Turkey's Comparison Test	**Mean Diff**	**P-value**	**Mean Diff**	**P-value**
VAS_Baseline vs VAS_1week	3.3000	<0.001	1.2000	<0.001
SPADI_Baseline vs SPADI_1week	27.150	<0.001	11.850	<0.001
ROMAbd_Baseline vs ROMAbd_1week	-20.550	<0.001	-18.550	<0.001
ROMExtr_Baseline vs ROMExtr_1week	-14.950	<0.001	-16.250	<0.001
VAS_Baseline vs VAS_1month	3.0000	<0.001	3.2000	<0.001
SPADI_Baseline vs SPADI_1 month	28.050	<0.001	31.350	<0.001
ROMAbd_Baseline vs ROMAbd_1 month	-36.450	<0.001	-37.700	<0.001
ROMExtr_Baseline vs ROMExtr_1 month	-30.300	<0.001	-35.350	<0.001
VAS_Baseline vs VAS_3month	2.4000	<0.001	4.9500	<0.001
SPADI_Baseline vs SPADI_3 month	21.400	<0.001	48.000	<0.001
ROMAbd_Baseline vs ROMAbd_3month	-55.600	<0.001	-73.100	<0.001
ROMExtr_Baseline vs ROMExtr_3month	-53.200	<0.001	-58.200	<0.001

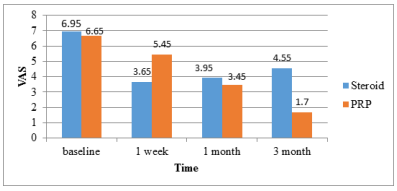

Figure 1. Comparing Changes In Vas

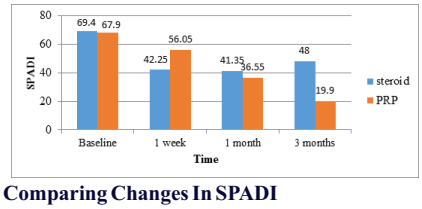

Figure 2. Comparing Changes In SPADI

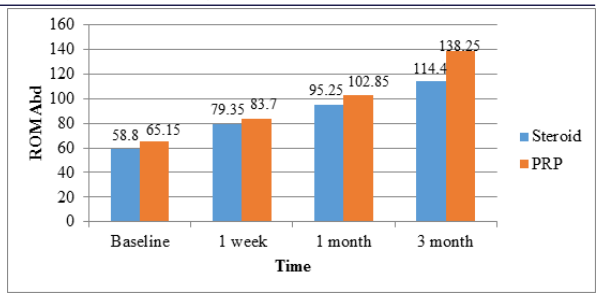

Figure 3: Comparing Changes In Rom Abduction

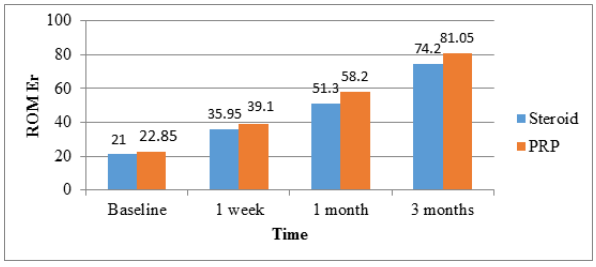

Figure 4. Comparing Changes In Rom External Rotation

DISCUSSION:

The age of patients in our study was in range of 40-78 years of age with mean of 58.2 ±8.8. A similar trend is also reported in other literatures[4].There was a slight male preponderance in the study and most of the patients were right handed, with higher prevalence in the dominant side. But many literature shows increased disease in non-dominant side[4]. Till date, mostly intra articular steroid is used to treat the condition along with physical therapy. On the other hand use of PRP is increasing in soft tissue diseases worldwide. in the 1st week post treatment there was 18% reduction in pain in PRP group whereas Steroid group its was 47% reduction in pain but in long term follow up at 3 months PRP showed 71% reduction in pain whereas steroid group it was only 34.5%, due to persistent action of PRP. Similar long term effects of PRP was also noted by Saif DS,et.al[10]. There was 17% improvement in SPADI, i.e. is functional outcome in PRP group whereas steroid group shows 39% improvement after 1st week of treatment. But again at 3rd month there was 70.6% improvement in SPADI following PRP injection but after Steroid it was 30.8% only. Wang et.al showed similar effects of steroid in his study which did not have any long term benefits but was good in immediate relief of pain and improvement of function[11]. Our study also shows there is improvement in shoulder movement mainly in abduction and external rotation, post intervention with both steroid and PRP over the time with PRP being slightly better than steroid in long term. Similar benefits were also shown in other studies[6,12,13]

LIMITATION:

There were a few limitations to the study. Effect based on stages of adhesive capsulitis of shoulder needs to be studied. Further long term study is required to understand the long term efficacy of both. Land mark technique can be replaced by Ultrasonography guided injections for a probable better intervention in future studies. Cases were limited and further comparison of socio economic factors need to be done.

CONCLUSION:

The study shows that PRP is more effective in reducing pain as well as improvement in functional outcome in long term than Steroid and it has almost similar effect in improving R.O.M after 3 months of intervention. However in 1st week steroid is more effective in reducing the pain.

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