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Original Research Paper

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DOES PRP IMPROVE SHORT TERM FUNCTIONAL OUTCOME IN PATIENTS WITH DEGENERATIVE OSTEOARTHRITIS - A PROSPECTIVE STUDY

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ABSTRACT

Introduction: Osteoarthritis is one of the leading causes of disability having high prevalence in elderly population. There is a large debate regarding usage of biologicals in treatment of OA knee. The purpose of this study is to evaluate the efficacy and safety of intra articular PRP injection in treatment of OA knee. **Materials and methods:** 50 patients were enrolled in this prospective non-randomized study.10 patients were lost to follow up.40 patients and 55 knees were studied .All of them received 2 doses of 5ml intraarticular PRP injection 3 weeks apart. The WOMAC scores and VAS scores at baseline, 1month, 3months and 6 months follow up are compared. **Results:** Out of 40 patients 25 had unilateral 15 had bilateral symptomatic osteoarthritis knee. A total of 55 knees were studied. 9 patients were males and 31 were females with mean age of 55.65yrs and mean BMI of 29.2. According to KL grading 40 knees were grade 3 and 15 were grade 4.There is statistically significant ($p<0.001$) decrease in VAS scores and improvement in WOMAC functional scores after 2 doses of PRP injections. No significant adverse effects were observed. **Conclusion:** Intraarticular PRP injection is safe, well tolerated and effective in treatment of primary osteoarthritis. There is decrease in pain and improvement in functional outcome after 2 doses of PRP. More well designed RCT'S with large sample and long term follow up are required to establish long term effectiveness of PRP injections.

KEYWORDS : osteoarthritis, Platelet rich plasma (PRP), VAS score, WOMAC score.

1. INTRODUCTION

Osteoarthritis is one of the most common forms of arthritis in the elderly population. There is an increase in number of cases due to aging population and growing obesity epidemic. It affects the quality of life of the individuals. The goals of treatment include relief of pain and improved joint function [1,2].

There is no definitive medical treatment for OA of knee; current treatment options include lifestyle modifications, physiotherapy, analgesics, chondroprotective drugs, intraarticular steroids, Hyaluronic acid and total knee replacement as surgical option.

Autologous platelet rich plasma (PRP) which is classified as an orthobiologic agent having pro inflammatory cytokines and growth factors like PDGF, TGF-B etc.[3] They have a potential for soft tissue, bone and cartilage regeneration by reducing the ongoing inflammation and improving metabolic function of damaged structures[4,5]. Also there are only minimal or no adverse effects with these injections when done in aseptic conditions. This property of PRP made it as a potential and safe option in treatment of OA knee[6].

Various studies done on PRP have some controversial results. Several studies showed favourable outcomes for intraarticular PRP [7-13]but few studies[14-17] were inconclusive regarding the efficacy of PRP. Our study aims to evaluate the efficacy of intraarticular PRP injection given in 2 doses, 3 weeks apart in improving functional knee score and pain score.

2. MATERIALS AND METHODS

This was a prospective Non-randomized study done at tertiary teaching hospital. 50 patients who attended OPD of Kamineni institute of medical sciences hospital from September 2020 to April 2021 were enrolled in this study after satisfying the inclusion and exclusion criteria.

Inclusion criteria:

1. Patients with chronic knee pain for more than 1 yr duration.
2. Grade 3 and 4 kellgren lawrence grading radiologically
3. Only having temporary relief with analgesics
4. Normal CBC, ESR and CRP

Exclusion criteria:

1. History of autoimmune diseases
2. Platelet or bleeding disorders
3. Platelet count < 1,50,000 cu/mm
4. Patients receiving anticoagulation or antiplatelet drugs 10 days prior to injection
5. NSAIDS 2 days before injection
6. Previous intraarticular injections

After taking clearance from institutional ethics committee 50 patients who gave their written informed consent for the study were given 2 doses of Intraarticular PRP injections 3 weeks apart. Out of which 10 patients were lost to follow up, the remaining 40 patients (55 knees) were included in this study. All the baseline personal information, clinical examination, radiological grading, initial WOMAC scores[18] and VAS scores[19] were documented.

2.1 PRP Preparation:

(Raeissadat et al)[10] 35-40 ml of venous blood is collected from antecubital vein of the patient using 18 gauge needle. 5ml of Acid citrate dextrose solution-A was added to sample as anticoagulant. The sample was centrifuged for 15 min at 1600 rpm resulting in 3 layers .The lower layer containing RBC intermediate buffy layer containing WBC and upper plasma layer. The upper and buffy layer was collected into another tube using a pipette and this sample is again centrifuged for 7 min at 2800 rpm in order to concentrate the platelets. Two layers are formed out of which upper layer is platelet poor plasma and lower platelet rich plasma. The final product was 5-6 ml of PRP containing leucocytes. No exogenous factors were used for platelet activation but let the platelets to be in direct contact with collagen present in joint to get activated.

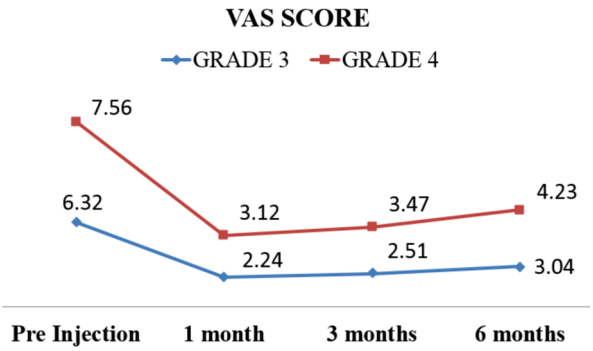
2.2 Interventional procedure:

Patient in supine position and knee flexed. Under aseptic conditions 5ml of PRP was injected into the knee joint through anterolateral portal in the soft spot using 21 gauge needle. After the injection patient was advised to do flexion and extension for few times so that PRP would spread in the knee joint. All the patients were observed for half an hour for any adverse reactions and later sent home. Patients were advised not to use any NSAIDs during this period. The second injection was done after a gap of 3 weeks. Patients were followed up at 1st month 3rd month and 6th month after the second injection, WOMAC and VAS scores were documented at each follow up.

3. RESULTS

This study included 55 knees of 40 patients. Among them 15 patients have bilateral and 25 have unilateral symptomatic knees. In this study 9 (22.5%) were males and 31(77.5%) were females with mean age of 55.65 years ranging from 42y-65y and mean BMI of 29.2±3.8. According to Kellgren Lawrence grading 40 knees were grade 3 and 15 were grade 4 Osteoarthritis with chief complaint being pain in knee joint.

There is significant decrease ($p<0.001$) in VAS scale at final follow up Comparing the pre and post injection in grade 3(6.32 to 3.04) and grade 4 (7.56 to 4.23). The difference in decrease of VAS scores is more in first month in both grade 3 and 4 Osteoarthritis. There is slight increase in VAS scores after 1st month but an overall decrease at 6month follow-up. Graph-1



Graph 1 Showing The Vas Scores

There is significant improvement ($p<0.001$) in WOMAC functional scores at final follow up Comparing the pre and post injection in grade 3 (56.75 to 31.52) and grade 4 (64.56 to 43.62). **table-1**

Table-1. Womac Functional Score

	GRADE 3	GRADE 4
PRE INJECTION	56.75±6.32	64.56±5.82
1 MONTH	43.76±7.61	55.76±6.8
3 MONTHS	34.46±4.3	49.24±5.6
6 MONTHS	31.52±2.92	43.62±3.2

4. DISCUSSION

There are many invasive and non-invasive treatment options for osteoarthritis. The treatment of OA is difficult due to poor regeneration capacity of cartilage[20]. The aim of treatment is to provide symptomatic relief, slow down the degenerative process and to improve quality of life. Recent research focuses on resolving the cytokine imbalance in osteoarthritis by using biologics[21-23].

PRP is an autologous mixture containing high platelet concentration and growth factors like TGF-β, IL-1,PDGF,VEGF,IGF,FGF etc. These growth factors induce regeneration of damaged tissues by improving metabolic function and critical regulation of inflammatory processes. PRP had shown a positive effect on chondrogenisis and mesenchymal regeneration[24,25].

The present study aims at evaluation of short term effect of PRP in grade 3 and 4 osteoarthritis using WOMAC and VAS scores. There is significant decrease ($P<0.001$) in final WOMAC scores following PRP injection at 6 months compared to pre injection scores in both grade 3 and 4. We found better improvement in WOMAC scores in grade 3 compared to grade 4. Comparable results were reported by Raeissadat et al, Filardo et al, Patel et al, Srikanth et al[10,26,27,28] These findings suggest that PRP injection work better in early grades of OA.

In our study there is significant decrease ($p<0.001$) in VAS scores at final follow up. The decrease in VAS scores were more at initial follow-up at 1 month but later there is gradual increase in VAS scores from 3rd month to 6th month. Even then the final VAS score at 6 months is significantly less than pre injection scores. Similar findings are reported by Kon E et al, Say F et al, Spakova et al [30, 31,32].

Bottegoni et al[33] in his study also observed significant improvement in IKDC,KOOS and VAS score at 2 months follow up but statically significant worsening between 2 to 6 months follow up period. The improvement in knee scores is explained by modification of joint environment by effecting concentration of cytokines and inflammatory cascade which for short to medium duration only. In this duration patient can be put on physiotherapy and improve the quality of life [29].

PRP is well tolerated by all patients .In our study there are no serious effects except mild pain at the injection site .**Glynn et al**[34] in his study observed that PRP has only minimal associated adverse effects. It is due to autologous nature of PRP. **Di Martino et al** [35] in his double blinded RCT demonstrated that there is no difference in adverse effects in relation to different leucocyte concentration.

In spite of promising results in OA, PRP has not gained acceptance and confidence as a valid treatment option. This is because of lack of standardization in segregation techniques like single spin and double spins, rpm, platelet concentration, leucocyte rich and leucocyte poor, usage of leucocyte filters etc. There is also no universalization in timing of injection, dosage, frequency and rehabilitation protocol. Limitations of the present study is lack of randomization, no placebo or control group, short term follow up and no radiological evidence to substantiate regeneration of cartilage.

5. CONCLUSION

Intra articular PRP injection is safe, well tolerated and effective in treatment of primary osteoarthritis .There is significant decrease in pain and improvement in functional outcomes for a short term follow up. PRP is more effective when given in early grade of disease. Further there is need for well-designed RCT'S with large sample and long term follow up to establish long term effect of PRP injections.

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