



Clinical outcomes of platelet rich plasma therapy in Osteoarthritis knee

Orthopaedic

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ABSTRACT

New studies focused on modern therapeutic methods which stimulate cartilage healing and repair the damage, including the use of platelet-rich plasma (PRP) as a cocktail of growth factors. This study has the purpose to present the use of PRP in management of early stage of knee Osteoarthritis and its outcomes up to 12 month follow up. 48 patients with 87 knees (22 male, 26 female) with Kellgren Lawrence grade 1, 2 and 3, aged between 50 to 65 years between Feb.2015 to December 2015 treated with 4ml of intra-articular PRP injections at 4 week interval in each affected knee and evaluated using WOMAC and VAS scores before treatment begins and at end of the 1st, 3rd, 6th and 12th month follow up. Improvement in WOMAC score for KL grade 1(15.82%), grade 2(17.93%), grade 3(11.92%) at end of 12 months follow up. Improvement in VAS score for KL grade 1(18.84%), grade 2(12.55%), grade 3(23.22%) at the end of 12 months follow up. Improvement is statistically significant with p value (<0.05) at 12 months follow up. The results of our study illustrated that the treatment with intra articular PRP injections is safe and effective in reducing pain and stiffness as well as improve knee function and quality of life in early stages of knee Osteoarthritis.

KEYWORDS:

Platelet-rich plasma, Kellgren Lawrence, Osteoarthritis, WOMAC, VAS

Introduction:

A relatively new strategy for the treatment of OA is application of cellular bio-mediators for cartilage healing and repair by delivering a high concentration of growth factors.

Aims and objectives:

To evaluate the clinical outcomes of intra-articular platelet rich plasma (PRP) injections in patients with early stage Osteoarthritis knee.

Materials and Methods:

Patients coming to the department of orthopedics at Jawahar Lal Nehru Medical College and Associated Group of Hospitals, Ajmer (Raj.) between Feb.2015 to December 2015 fulfilling exclusion and inclusion criteria.

Sample Size: 100 knees with Osteoarthritis (OA).

Inclusion criteria: Patients (50 to 65years) with symptom duration of more than 3 months, confirmatory X-ray diagnosis (Kellgren-Lawrence grade 1-3) with failure to satisfactorily reduce pain after conservative management.

Exclusion criteria: Immune compromise state, collagen vascular diseases, any malignant disorders, infection in and around knee, history of severe trauma to the knee, clotting disorders, taking anticoagulant and antiplatelet medications, history of intraarticular knee injections of corticosteroids, abnormal blood cellular counts, history of vasovagal shock, Kellgren-Lawrence grade 4 osteoarthritis knee.

Our research approved by ethical committee of JLN Medical College, Ajmer. All the mentioned information was given to the patients and signed the written consent form. All patients were treated with 2 intra-articular injections of autologous PRP (at 4 week interval) in each affected knee. Using 34 ml of autologous venous blood 4ml of PRP prepared using double spin centrifugation technique (using PRP centrifuge machine, Model-CM-8 plus, REMI Company, WHO guidelines with ISO9001/2008 certification). Patients were evaluated using Western Ontario and McMaster Universities Arthritis Index (WOMAC) and visual analog scale (VAS) before and at the end of the treatment 1st, 3rd, 6th and 12th month on follow up. Patient advised for dynamic and static quadriceps exercises for 1 hr daily.

Statistical analysis: Data were analyzed using GraphPad Software (Inc.7825 Fay Avenue, Suite 230 La Jolla, CA 92037 USA). Data from Kellgren-Lawrence grade and WOMAC score/VAS score were evaluated by the paired t test. P value < 0.05 was accepted as statistically significant for all tests.

Results:

Mean age of patients under study was **57.39 year** 35 patients have bilaterally affected knees whereas only 17 patients have only 1 affected knee.

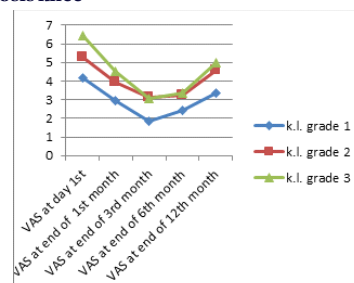
No. of knees of K.L. grade 1(14), 2(47), 3(26)

Table-1: Mean of total WOMAC score as per K.L. grades of OA knee

K.L. Grade	Mean of Total WOMAC score at day 1 st (Pre-treatment)	Mean of Total WOMAC score at end of 1 st month	Mean of Total WOMAC score at end of 3 rd month	Mean of Total WOMAC score at end of 6 th month	Mean of Total WOMAC score at end of 12 th month
1	29.78	23.36	17.07	19.57	24.29
2	38.45	24.94	19.85	25.13	31.15
3	49.65	39.46	28.73	36.85	43.77

It is evident from [Table-1] that irrespective of grade minimum total WOMAC score seen at the end of 3rd month of intra articular PRP injection therapy

Chart1: Chart showing VAS scoring as per K.L. grade of Osteoarthritis knee



It is evident from chart 1 that Irrespective of any grade of OA minimum VAS score is seen at the end of 3rd month follow up of PRP therapy

Mean platelet concentration in whole blood was about $263.48 \times 10^3/\mu\text{l}$ and mean platelet concentration in PRP was about $1320.84 \times 10^3/\mu\text{l}$. So, there was about 5-fold increase in mean platelet concentration.

No infection, fever, or other major adverse events occurred among study subjects.

Three patients had mild effusion and pain after the injections, which persisted for not more than 2 days.

Discussion:

All patients showed significant improvement in WOMAC and VAS score at 1, 3, 6 and 12 months ($P\text{value} < 0.05$) at 12 month follow up. It concluded that PRP injections can represent a valuable treatment option in patients with early OA knee (K.L. grade 1, 2, 3) in long term follow up (up to 1 yr).

In our study we have found that low grade OA knee (K.L. grade 1, 2, 3) which is comparable to study done by Franca Vaccaro, Rita Guitaldi et al.¹ which concluded that better results were achieved in younger patients with a lower degree of cartilage degeneration.

No major complications were noted in our study which is comparable with other study reports^{2, 3, and 4} and signifies the safety profile of autologous PRP intra-articular injections.

Pre-treatment blood analysis of our patients showed an average platelet count of $263.48 \times 10^3/\mu\text{l}$. After centrifugation of 34 mL of peripheral blood, we obtain 4 mL of PRP with average $1320.84 \times 10^3/\mu\text{l}$ of platelet concentration which is about 5-fold increase in mean platelet concentration. The system we used includes a second centrifugation step to further concentrate platelets by removing poor platelets plasma. We did not activate PRP prior to injecting as activation could actually decrease their availability as compared to activation of platelets by collagen because thrombin activation result in an immediate release and collagen having a more sustained release pattern of growth factors as demonstrated by Harrison et al.⁵ in their study.

The main limitation of our study was that we did not include a control group and no diagnostic evaluation like MRI done to assess effect on cartilage.

Conclusion:

The clinical results of our pilot study are encouraging and suggest that this method is potentially safe, efficient, minimally invasive, and cost-effective in treatment initial stages of knee OA aiming to reduce pain and improve knee function and quality of life.

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