

Original Research Article

To assess the effects of platelet rich plasma application on pain in osteoarthritis knee

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ABSTRACT

Background: Platelet rich plasma (PRP) is a concentrate extract of platelets from autologous blood. It is known to increase growth factor of plasma and helps to heal the injured tissue. Platelet-rich plasma (PRP) is an autologous biologic treatment including patients own plasma, containing growth factors released from platelets. The rationale for the use of PRP is to stimulate the natural healing cascade and tissue regeneration by an increase release of platelet-derived factors directly at the site of treatment. This study is done to assess the effects of platelet rich plasma application on pain in osteoarthritis knee.

Methods: Total of 40 cases was included in this study (18 male and 22 females) with mean age of 57.3 (Range 35-75). All patients received intra-articular PRP injection. This study was conducted on the patients coming to orthopaedic department at MGM medical college and hospital, Navi Mumbai.

Results: In this study it was found that there is decrease in pain on vas pain score, with increasing time. We followed up the patients for period of 3 months. We found that average mean VAS score was decreased from 6.0 to 4.13 after follow up of 3 months after a single dose of intra-articular PRP injection.

Conclusions: PRP is an effective treatment for pain in OA knee. It is one of the new approaches in the field of orthopaedics to solve the issues of pain management.

Keywords: PRP, Osteoarthritis knee, Intra-articular injection

INTRODUCTION

Platelet rich plasma (PRP) is one of the newer methods used to biologically enhance healing. Platelet Rich Plasma is highly concentrate platelets in plasma made from patients own blood after centrifugation. It is known to increase growth factor concentration three to five times of normal plasma and helps to heal the injured tissue.^{1,2} Platelet-rich plasma (PRP) is an autologous biologic treatment including patients' own plasma, containing growth factors released from platelets.³ The rationale for the use of PRP is to stimulate the natural healing cascade and tissue regeneration by a supra-physiologic release of platelet-derived factors directly at the site of treatment.⁴

PRP is a minimally invasive therapy approved by the US Food and Drug Administration (FDA) that is used to enhance healing and tissue regeneration.⁵

Osteoarthritis knee is a progressive joint disease characterized by joint inflammation and a reparative bone response. Osteoarthritis is characterized by a repetitive inflammatory response of the articular cartilage due to focal loss or erosion of the articular cartilage and a hypertrophy of osteoblastic activity or a reparative bone response known as osteophytosis.⁶ The complains in OA knee, such as pain, stiffness of the joints and muscle weakness, are risk factors for mobility limitation leading to impaired quality of life for the affected population.⁷

PRP injection is one of the newer therapeutic options that have been used in a variety of clinical fields, including dermatology, plastic surgery, sport medicine, dentistry and orthopaedic surgery. It is a simple, low cost and minimally invasive way to obtain a concentration of many growth factors.⁸

The active secretion of growth factors by platelets begins within 10 min after activation with 10% calcium chloride in osteoarthritis knee with more than 95% of the pre-synthesized growth factors secreted within 1 hour.⁹

The basic mechanism of action of PRP is simple, after injecting PRP in O.A. knee with 10% of calcium chloride, induces a local inflammation. The pro-inflammatory mediators together with the growth factors released from the platelets trigger the localized inflammation and wound healing cascade, resulting in the cellular migration and proliferation, glycosaminoglycan and collagen deposition, collagen maturation and remodelling of the healing tissue at different stages of wound healing.¹⁰

PRP effectively induces an inflammatory response, few patients experienced minimal to moderate discomfort following the injection which may last for up to 1 week. Acetaminophen is recommended as the optimal analgesic, and NSAID's to be avoided as they may diminish the effectiveness of PRP injection in O.A knee.¹¹

The objective of the study is to evaluate the clinical vas score of pain in osteoarthritis knee after giving single dose of platelet rich plasma injection.

METHODS

This study was conducted on the patients coming to orthopaedic department at MGM medical college and hospital, Kamothe, Navi Mumbai. Total of 40 cases included in this study. All patients were given intra-articular PRP injection. A single dose of PRP injection was given with follow up of 3 months from October 2016 to December 2016.

Inclusion criteria

Patients suffering from symptomatic osteoarthritis knee, age between 35 years to 80 years, unilateral/bilateral knee, both male and females, failure of conservative management (e.g. NSAIDS and exercise).

Exclusion criteria

Active infection of knee and skin over the injection site, Age less than 35 years and more than 80 years, rheumatoid arthritic knee, Patient not consenting for the injection.

Pre-injection data

Name of The Patient, Age, Sex, Informed Consent, VAS Score, Side/site.

Post-injection data

Complications if any, Pain Assessment with help of VAS Score as shown in Figure 1, Hospitalisation, high grade fever, pain, vomiting, any allergic reaction.

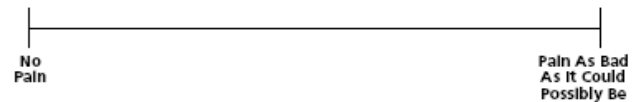


Figure 1: VAS pain score.¹²

Injection technique

Into the knee joint, through superior lateral approach, one line is drawn from the apex of the patella (the apex of the triangle) to the lateral pole of the patella and another line is drawn from the apex to the medial upper pole of the patella, resulting in an inverted triangle. The base of the triangle forms the upper border of the patella. The lateral line of the triangle is then marked at the midpoint, where the needle can be inserted and directed intra articularly into the knee joint.¹³

- Intra-articular injection.
- No local anesthetic or steroid are not used along with PRP.¹⁴

0.5ml Calcium chloride (10%) is mixed with 5ml of PRP for activation.



Figure 2: Pre injection scrubbing.

Post-injection care

Rest for a few days to a week, avoid stressful activities, and avoid hot fomentation.



Figure 3: Intra-articular injection in knee.



Figure 4: Dressing done for 24-48 hrs.

Follow up

Patients were followed for a period of 3 months (after 1 week, after 6 weeks, after 3 months). VAS score was used to assess severity of pain was recorded at each visit. Any physiotherapy, NSAIDS, other modality used for pain was also noted.

Statistical analysis

The results were tabulated and analysed. The statistical analysis was conducted using Microsoft excel 2010.

RESULTS

Total of 40 patients were included in this study. The mean age of the patients was 57.3 (range 35-75). There were 18 males and 22 females. There were 6 patients with right and 4 with left side O.A knee. There were 15 patients with bilateral knee involvement. This is assessed by visit to the clinic pre-injection, after 1 week, after 6 week, and after 3 months. The mean vas score at the time of pre-injection was 6.0. The mean vas score at the time of follow up after 1 week was 5.4. The mean VAS score at the time of follow up after 6 week was 5.1. The mean vas score at the time of follow up after 3 month was 4.13.

Table 1: Patient distribution with mean age and VAS score.

	No.	Mean age	Pre inj. VAS	Post inj. VAS (after 3 month)
Male	18	58.11	5.86	4.19
Female	22	59.13	6.15	4.09
Total	40	57.3	6.01	4.13

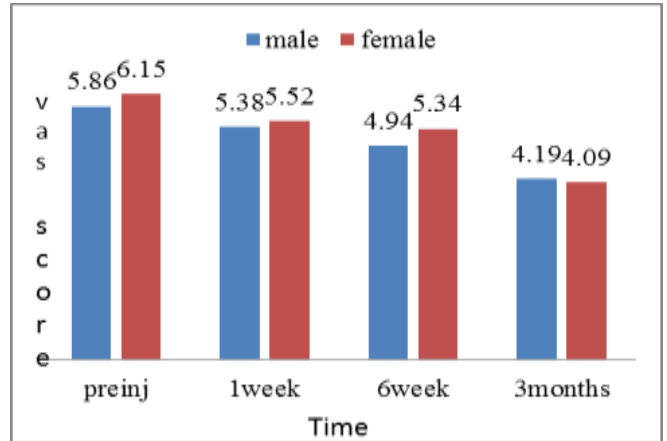


Figure 5: Mean VAS score during the follow up period.

DISCUSSION

Platelet rich plasma is being used surgical as well as outpatient procedures in the management of numerous musculoskeletal problems. Intra-articular injection of PRP has been increasingly used on patients of knee osteoarthritis. Sampson et al reported the results of study about the PRP injection on 13 patients with primary or secondary knee arthritis, showing improvement in pain and symptoms without adverse effect on the scales of knee injury and osteoarthritis outcome scores (KOOS).¹⁵ Wang Saegusa et al reported improvement of VAS, SF-36, and Western Ontario and McMaster Universities (WOMAC) scores at the 6-month follow-up in 261 patients with OA symptoms more than 3 months who had 3 intra-articular injection of autologous PRGF at 2-week intervals.¹⁶ Filardo et al reported that 3 injections of intra-articular PRP in 90 patients with chronic knee degenerative conditions revealed improvement in International Knee Documentation Committee (IKDC) and EQ-VAS scores at the 2-year follow-up and that it had discernible positive effects especially on younger patients with early osteoarthritis.¹⁷ However which growth factors are more beneficial needs better understanding. Since there is a lack of research evidence on treatment and efficacy of PRP injection, preparation methods, site of injection, and dose for clinical efficacy needs to be determined.

The platelet numbers injected in this study were between 6 lacs–10 lacs, 4–6 folds higher than the baseline value, a number similar to that used in many studies and it was

also within the recommended range. This study had certain limitations. The absence of a control group and the relatively small patient number with short follow up time were the main limitations of this study.

CONCLUSION

Platelet rich plasma is one of the newer therapeutic approaches that continue to evolve in the field of general musculoskeletal medicine, sports medicine, and orthopaedic medicine. It is a minimally invasive procedure appears to be effective, and as PRP biologically change the articular cartilage, it seems to be effective treatment modality in pain in osteoarthritis knee. Further researches are required with more sample sizes and longer follow-ups.

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