

ORIGINAL RESEARCH

Comparative evaluation of outcome of osteoarthritis of knee managed by intra-articular platelet rich plasma versus prolotherapy

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ABSTRACT

Background: To compare the outcome of osteoarthritis of knee managed by intra-articular platelet rich plasma versus prolotherapy. **Materials & methods:** 40 Patients were selected from orthopaedics OPD after taking written informed consent. The patients were divided into 2 groups as follows: Intra-articular Platelet Rich Plasma group and Intra-articular prolotherapy injection. Based on the WOMAC score, clinical outcome analyses were performed to determine the effectiveness. Using 24 characteristics, the WOMAC (Western Ontario and McMaster Universities) score was utilised to evaluate individuals with hip or knee osteoarthritis. All the results were recorded and analyzed using SPSS software. Student t test and ANOVA test were used for evaluation of level of significance. **Results:** At 5 weeks follow-up, among the patients of Intra-articular Platelet Rich Plasma group, mean functional limitation score, pain level score, stiffness score and overall WOMAC score was 28.1, 9.2, 3.6 and 40.9 respectively. Among the patients of Intra-articular prolotherapy injection group, mean functional limitation score, pain level score, stiffness score and overall WOMAC score at 5 weeks was 24.3, 6.2, 3.3 and 33.8 respectively. Significant better results were obtained in terms of WOMAC score at 5 weeks follow-up among the patients of Intra-articular Platelet Rich Plasma group in comparison to Intra-articular prolotherapy injection group. **Conclusion:** In patients with knee OA, prolotherapy and PRP both considerably improved the outcome in terms of pain, stiffness, and functional restriction. However, PRP injection was more efficient than prolotherapy at reducing pain, stiffness, and functional limitations in patients with knee osteoarthritis.

Key words: Osteoarthritis, Platelet rich plasma, Prolotherapy

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INTRODUCTION

Osteoarthritis (OA), also known as degenerative joint disease, primary OA, wear-and-tear arthritis, or age-related arthritis, is a leading cause of disability worldwide. Clinicians use the word arthritis to mean inflammation of the joints. In public health sectors, arthritis is a blanket term used to refer to more than 100 rheumatic diseases and conditions that affect the joints, the tissues surrounding the joints, and other connective tissue. Knee OA affects the 3 compartments of the knee joint (medial, lateral, and patellofemoral joint) and usually develops slowly over 10 to 15 years, interfering with daily life activities.¹⁻³

Autologous platelet-rich plasma (PRP) is the processed liquid fraction of autologous peripheral blood with a platelet concentration above the baseline. PRP therapies have been used for various indications for more than 30 years, resulting in considerable interest in the potential of autologous PRP in regenerative medicine. The term orthobiologics has recently been introduced for the treatment of musculoskeletal (MSK) disorders, with promising results for the regenerative capacity of the heterogeneous biological active PRP cellular cocktail. Currently, PRP therapies are suitable treatment

options with clinical benefits, with encouraging patient outcomes reported.^{4,5}

Prolotherapy is a nonsurgical regenerative injection technique that administers small amounts of an irritant solution to the degenerated tendon insertions (entheses), joints, ligaments, and adjacent joint spaces over a series of several treatment sessions. The mechanism of action behind prolotherapy is not completely understood, but the current theory is that the injected proliferate causes a healing process that is similar to the body's natural healing process, whereby a local inflammatory cascade is initiated, which triggers the release of growth factors and collagen deposition.⁶ Hence; under the light of above-mentioned data, the present study was conducted for comparing the outcome of osteoarthritis of knee managed by intra-articular platelet rich plasma versus prolotherapy.

MATERIALS & METHODS

The present study was conducted for comparing the outcome of osteoarthritis of knee managed by intra-articular platelet rich plasma versus prolotherapy. 40 Patients were selected from orthopaedics OPD after taking written informed consent. The patients were divided into 2 groups as follows: Intra-articular Platelet Rich Plasma group and Intra-articular prolotherapy injection. Patients were then checked for symptom remission and an improvement in knee joint range of motion after two weeks and five weeks. The study groups were instructed to check in after two and five weeks. Based on the WOMAC score, clinical outcome analyses were performed to determine the effectiveness. Using 24 characteristics, the WOMAC (Western Ontario and McMaster Universities) score was utilised to evaluate individuals with hip or knee osteoarthritis. It was used to monitor the course of the

disease or to determine the effectiveness of Therapy Scale of difficulty: 0 = None, 1 = Slight, 2 = Moderate, 3 = Very, 4 = Extremely. All the results were recorded and analyzed using SPSS software. Student t test and ANOVA test were used for evaluation of level of significance.

RESULTS

Mean age of the patients of the Intra-articular Platelet Rich Plasma group and Intra-articular prolotherapy injection group was 58.1 years and 59.3 years respectively. 60 percent and 70 percent of the patients of Intra-articular Platelet Rich Plasma group and Intra-articular prolotherapy injection group respectively were females. Non-significant results were obtained while comparing the WOMAC score at baseline and two weeks among the two study groups. At 5 weeks follow-up, among the patients of Intra-articular Platelet Rich Plasma group, mean functional limitation score, pain level score, stiffness score and overall WOMAC score was 28.1, 9.2, 3.6 and 40.9 respectively. Among the patients of Intra-articular prolotherapy injection group, mean functional limitation score, pain level score, stiffness score and overall WOMAC score at 5 weeks was 24.3, 6.2, 3.3 and 33.8 respectively. Significant better results were obtained in terms of WOMAC score at 5 weeks follow-up among the patients of Intra-articular Platelet Rich Plasma group in comparison to Intra-articular prolotherapy injection group. All the patients of Intra-articular Platelet Rich Plasma group showed significant improvement in the WOMAC score at difference successive follow-up time intervals. All the patients of Intra-articular prolotherapy injection group showed significant improvement in the WOMAC score at difference successive follow-up time intervals.

Table 1: Comparison of WOMAC Score at 5 weeks follow-up

Variable	Intra-articular Platelet Rich Plasma group	Intra-articular prolotherapy injection group	p-value
Functional limitation	28.1	24.3	0.000*
Pain level	9.2	6.2	0.000*
Stiffness	3.6	3.3	0.074
WOMAC Score	40.9	33.8	0.000*

*: Significant

Table 2: Comparison of WOMAC score among patients of Intra-articular Platelet Rich Plasma group at different time intervals

Variable	Pre-treatment	2 weeks follow-up	5 weeks follow-up	p-value
Functional limitation	45.3	37.8	28.1	0.000*
Pain level	14.8	12.3	9.2	0.000*
Stiffness	4.8	4.2	3.6	0.081
WOMAC Score	64.9	54.3	40.9	0.000*

*: Significant

Table 3: Comparison of WOMAC score among patients of Intra-articular Platelet Rich Plasma group at different time intervals

Variable	Pre-treatment	2 weeks follow-up	5 weeks follow-up	p-value
Functional limitation	44.1	34.1	24.3	0.000*
Pain level	13.2	11.3	6.2	0.000*
Stiffness	4.1	3.9	3.3	0.076
WOMAC Score	61.4	49.3	33.8	0.000*

*: Significant

DISCUSSION

Osteoarthritis is the most common disease of joints in adults around the world. Epidemiological studies have revealed that there are both endogenous and exogenous risk factors for osteoarthritis. Knee osteoarthritis is classified as either primary (idiopathic) or secondary. Among the various structures making up the knee joint, the hyaline joint cartilage is the main target of the harmful influences that cause osteoarthritis and the structure in which the disease begins. 95% of hyaline cartilage consists of extracellular matrix.^{7, 8}

Prolotherapy has been used in clinical practice for more than 80 years to treat various chronic musculoskeletal conditions. Interest in prolotherapy has intensified over the past two decades among both physicians and patients, accompanied by an increasing number of published treatment outcome studies that confirm anecdotal findings that prolotherapy is effective in treating many conditions with few adverse effects, including osteoarthritis (OA), musculoskeletal pain, joint pain and laxity, chronic low back pain, refractory lateral epicondylitis, painful overuse tendinopathy, refractory, disabling low back pain, and refractory tendinopathies, and OA.^{9, 10} PRP is a simple, efficient, and minimally invasive method of obtaining a natural concentration of autologous GFs. Generation of PRP involves centrifugation of autologous blood to separate and extract the plasma and buffy coat portion of the blood, which contain high concentrations of platelets. PRP has established use in the fields of dentistry, dermatology, plastic and maxillofacial surgery, acute trauma, cosmetic surgery, and veterinary medicine.^{11, 12}

Mean age of the patients of the Intra-articular Platelet Rich Plasma group and Intra-articular prolotherapy injection group was 58.1 years and 59.3 years respectively. 60 percent and 70 percent of the patients of Intra-articular Platelet Rich Plasma group and Intra-articular prolotherapy injection group respectively were females. Non-significant results were obtained while comparing the WOMAC score at baseline and two weeks among the two study groups. At 5 weeks follow-up, among the patients of Intra-articular Platelet Rich Plasma group, mean functional limitation score, pain level score, stiffness score and overall WOMAC score was 28.1, 9.2, 3.6 and 40.9 respectively. Among the patients of Intra-articular prolotherapy injection group, mean functional limitation score, pain level score, stiffness score and overall WOMAC score at 5 weeks was 24.3, 6.2, 3.3

and 33.8 respectively. Filardo G et al evaluated effectiveness, in terms of patient-reported outcome measures, of platelet-rich plasma (PRP) injections for knee osteoarthritis compared to placebo and other intraarticular treatments. Superiority of PRP did not reach the minimal clinically important difference for all outcomes, and quality of evidence was low. The effect of platelet concentrates goes beyond its mere placebo effect, and PRP injections provide better results than other injectable options. This benefit increases over time, being not significant at earlier follow-ups but becoming clinically significant after 6 to 12 months.¹³ Peng YN et al evaluated the clinical effects of leukocyte-rich platelet-rich plasma (LRPRP) and hyaluronic acid (HA) injections in treating patients suffering from knee osteoarthritis. They concluded that LR-PRP demonstrated better overall outcomes as compared to HA in knee OA patients at the follow-up periods of 3, 6, and 12 months. LR-PRP injection may be recommended as a feasible option in treating patients with knee OA.¹⁴ Significant better results were obtained in terms of WOMAC score at 5 weeks follow-up among the patients of Intra-articular Platelet Rich Plasma group in comparison to Intra-articular prolotherapy injection group. All the patients of Intra-articular Platelet Rich Plasma group showed significant improvement in the WOMAC score at difference successive follow-up time intervals. All the patients of Intra-articular prolotherapy injection group showed significant improvement in the WOMAC score at difference successive follow-up time intervals. Beletsky A et al determined the variability in study design and outcome reporting across randomized controlled trials (RCTs) examining intra-articular PRP injections for knee osteoarthritis. Twenty-seven studies were included. Five studies conducted repeat imaging postoperatively. Visual Analog Scale (VAS) Pain (63%) and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (59.3%) were the 2 most utilized PROMs, followed by Knee Injury and Osteoarthritis Outcome Score (KOOS) (29.6%). They concluded that PROs should be reported in a domain-specific manner allowing for assessment of pain, function, and health-related quality of life.¹⁵

CONCLUSION

In patients with knee OA, prolotherapy and PRP both considerably improved the outcome in terms of pain, stiffness, and functional restriction. However, PRP

injection was more efficient than prolotherapy at reducing pain, stiffness, and functional limitations in patients with knee osteoarthritis.

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