



ORIGINAL ARTICLE

Efficacy of platelet rich plasma (PRP) injection in the treatment of knee pain in patients with osteoarthritis knee.

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ABSTRACT... Objective: To assess the efficacy of intra-articular PRP injections in patients with knee osteoarthritis. **Study Design:** Cross Sectional. **Setting:** Orthopedic Department of Mardan Medical Complex. **Period:** 13th August to 14th December 2023. **Methods:** Involving 50 diagnosed osteoarthritis patients at demographic data, grades of osteoarthritis, and Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) scores were recorded pre-treatment. Patients received PRP injections at three intervals, and post-treatment WOMAC scores were assessed. Statistical analysis included mean, standard deviations, and a paired t-test. **Results:** The study comprised 66% female patients, with a mean age of 50.08±5.82 and mean BMI of 27.16±3.53. Regarding grades of osteoarthritis, grade 1, grade 2 and grade 3 comprised of n=14(28%), 19(38%), 17(34%) respectively PRP treatment significantly reduced WOMAC scores from a pre-treatment mean of 56.62±5.70 to 27.54±4.79 (p < 0.001). **Conclusion:** The significant reduction in WOMAC scores post-treatment suggests that intra-articular PRP injections may serve as a valuable intervention in the short term management of knee osteoarthritis.

Key words: Grades, Osteoarthritis, Platelet Rich Plasma, WOMAC.

INTRODUCTION

Osteoarthritis (OA) is a severe degenerative joint disease characterized by low levels of synovitis, subchondral bone breakdown and proliferative reformation, and articular cartilage degeneration.¹

Over 10% of people worldwide are thought to be affected by knee osteoarthritis (KOA), which carries a 45% lifetime risk.^{2,3} It is expected that the prevalence of symptomatic knee OA would increase in tandem with the rising rates of obesity in the general population.⁴ People who have osteoarthritis in their knees frequently have pain, edema, stiffness, and restricted range of motion.⁵ In the elderly (above 70 years of age), it is a major cause of pain and disability.⁶

Because OA interferes with normal joint metabolism, there is increased catabolism and decreased anabolism.⁷ Knee OA pain is treated with a range of techniques, such as NSAIDs, glucosamine, chondroitin sulfate, supplements,

intra-articular injections (hyaluronic acid, glucocorticoids), physical agents (shoes, braces, insoles, exercise therapy, application of cold and heat modalities, etc.), and surgery.⁸ The administration of Platelet Rich Plasma (PRP), which contains growth factors like Hepatocyte Growth Factors (HGF), Vascular Endothelial Growth Factor (VEGF), Platelet-Derived Growth Factor (PDGF), and Transforming Growth Factor (TGF), has been shown to modify the joint milieu in OA because OA changes joint metabolism and decreases anabolism.⁹

The use of PRP has been recommended as a therapeutic alternative for all phases of osteoarthritis.¹⁰ Intra-articular PRP injections have demonstrated a considerable improvement in pain reduction and symptom enhancement in active patients with osteoarthritis (OA).¹¹ A minimum of two injections has been linked to better pain and functional status in patients with moderate knee OA. One intra-articular PRP

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injection may be enough to improve everyday activities and effectively relieve pain in advanced knee OA.^{12,13}

OBJECTIVE

To evaluate the efficacy of platelet rich plasma injection in knee osteoarthritis patient in term of pain, stiffness, and function by using WOMAC score.

METHODS

A Cross Sectional study was conducted after approval from ethical review board (IRB No. 430, 03/08/2023) including 50 patients with diagnosed osteoarthritis admitted through outpatient department of Orthopaedic, Mardan Medical Complex, Mardan from 13th August to 14th December. Sampling technique was non probability consecutive. Informed consents were taken from patients prior to the study. Pre-treatment demographic variables included age, gender, body mass index (BMI), grades of osteoarthritis (assessed by OA Kellgren-Lawrence classification¹⁴ and WOMAC score¹⁴ was used to assess functional status of the knee.

After that, the patients had the operation three times, separated by 0–3 and 6 weeks. Every time, patients were prepared using chlorhexidine, and a uniform, sanitary atmosphere was guaranteed. Using the Arthrex double syringe technique, PRP injection preparation and injection procedure were carried out as described by Moretti L et al.¹⁴

Patients were followed for period of 3 months and post treatment WOMAC scores were recorded.

Inclusion Criteria

Patients aged 40 or more with diagnosed radiologically with osteoarthritis irrespective of gender and ethnicity and grades of osteoarthritis.

Exclusion Criteria

Patients with signs of local or systemic infections, rheumatoid arthritis, uncontrolled diabetes mellitus, history of coagulative disorders, traumatic osteoarthritis and immunocompromised were excluded from the study.

The Western Ontario and McMaster Universities Arthritis Index (WOMAC) is widely used in the evaluation of Hip and Knee Osteoarthritis. It is a self-administered questionnaire consisting of 24 items divided into 3 subscales:¹⁴

- Pain (5 items): during walking, using stairs, in bed, sitting or lying, and standing upright
- Stiffness (2 items): after first waking and later in the day
- Physical Function (17 items): using stairs, rising from sitting, standing, bending, walking, getting in / out of a car, shopping, putting on / taking off socks, rising from bed, lying in bed, getting in / out of bath, sitting, getting on / off toilet, heavy domestic duties, light domestic duties.

The test questions are scored on a scale of 0-4, which correspond to: None (0), Mild (1), Moderate (2), Severe (3), and Extreme (4).

The scores for each subscale are summed up, with a possible score range of 0-20 for Pain, 0-8 for Stiffness, and 0-68 for Physical Function. Usually a sum of the scores for all three subscales gives a total WOMAC score, however there are other methods that have been used to combine scores.

Higher scores on the WOMAC indicate worse pain, stiffness, and functional limitations.¹⁴

Statistical analysis was done using SPSS version 23. Mean and standard deviations were calculated for numeric variables. Frequencies and percentages were calculated for categorical variables. Comparison of pre and post treatment WOMAC score was done using Paired t-test for mean with p value of ≤ 0.05 was considered statistically significant.

RESULTS

Total of 50 patients were included in the study. The mean age of patient was 50.08 ± 5.82 and mean BMI of patients was 27.16 ± 3.53 . $n=17$ (34%) patients were male and $n=33$ (66%) of patients were female. Regarding grades of osteoarthritis, grade 1, grade 2 and grade 3 comprised of $n=14$ (28%), 19 (38%), 17 (34%) respectively. Regarding age categories, $n=19$ (38%) patients

were in 40 to 50 years of range while n=31 (62%) were 51 or above age range. Patients were also categorized into BMI categories. n=11 (22%) patients had normal BMI while overweight and obese patients were n=24 (48%) and n=15 (30%) patients respectively. (Summarized in Table-I)

Characteristics	Categories	Frequencies	Mean±SD
Gender	Male	17(34%)	
	Female	33(66%)	
Grades of Osteoarthritis	Grade 1	14(28%)	
	Grade 2	19(38%)	
	Grade 3	17(34%)	
Age	40 to 50 years	19(38%)	50.08±5.82
	51 or above	31(62%)	
BMI	Normal	11(22%)	27.16±3.53
	Overweight	24(48%)	
	Obese	15(30%)	

Table-I. Demographic characteristics of patients

The mean pre treatment WOMAC score of patients was 56.62±5.70 while the post treatment WOMAC mean score was 27.54±4.79. The pre treatment and post treatment score was statistically significant with p value of <0.001.

WOMAC Score	Mean±SD	P-Value
Pre-Treatment	56.62±5.70	<0.001
Post Treatment	27.54±4.79	

Table-II. WOMAC score statistics

DISCUSSION

An important part of treating knee osteoarthritis (OA) involves non-surgical treatment methods including intra-articular injections. These therapies include the use of unloaded bracing, non-steroidal anti-inflammatory medications (NSAIDs), platelet-rich plasma (PRP), hyaluronic acid (HA), corticosteroids, and physical therapy.^{1,2}

PRP has been used therapeutically for 20 years, but only recently has it been applied to musculoskeletal problems, particularly osteoarthritis (OA). PRP has clearly demonstrated its superiority over hyaluronic acid, saline placebo, ozone, and corticosteroids in multiple clinical trials.^{14,15,16}

Osteoarthritis typically effect patients above 40

years of age. In our study mean age of patient was 50.08±5.82. Similar findings were reported by Rasheed N et al., and Akhlaque Uzma et al., in their studies, which showed mean age of 55.15+6.93 and 59.6+9.6 in their series respectively.^{15,16}

In our study the majority of patients were female i.e. 66%. According to multiple studies, female are more like to suffer from osteoarthritis compared to male.^{15,16,17}

High BMI also have a role in development of Osteoarthritis which is reported by many studies.^{18,19,20} In our study the mean BMI of patients was 27.16±3.53. In a metaanalysis by Sax OC et al., reported range of mean BMI of 25 to 30 in patients with osteoarthritis from multiple studies in past.¹⁷

Regarding grades of osteoarthritis, grade 1, grade 2 and grade 3 comprised of n=14(28%), 19(38%), 17(34%) respectively. Rasheed N et al, reported in his study that 10(20%) patients had grade-2, while 20(40%) each had grade 1 and grade-3 condition.¹⁵

The mean pre treatment WOMAC score of patients was 56.62±5.70 while the post treatment WOMAC mean score was 27.54±4.79. The pre treatment and post treatment score was statistically significant with p value of <0.001. A systematic review by Carlo J et al., who analysed 6 clinical trials reported that WOMAC scores significantly improved after treatment with PRP injection in patient with osteoarthritis i.e., Average pre-treatment WOMAC was 52.36 compared to post operative Average WOMAC score of 28.5.²¹ Also another study by Rasheed N et al showed that mean WOMAC score before the start of treatment was 83.05 (±4.3) and after 6 months it was reduced to 38.84 (±5.5), which was statistically significant (p = 0.000).¹⁵ These finding are similar to our study findings.

LIMITATIONS OF STUDY

Firstly the sample size was small. Secondly, it was a cross sectional study and randomized control trial would be a better option for generalizing the findings. Thirdly, Womac score is a subjective test

and might be subjected to bias. Fourthly, we lost some data of post 1st and 2nd injection outcomes and that was the reason we didn't included its outcomes.

CONCLUSION

The significant reduction in WOMAC scores post-treatment suggests that intra-articular PRP injections may serve as a valuable intervention in the management of knee osteoarthritis.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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

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