https://doi.org/10.29309/TPMJ/2026.33.04.10183 www.theprofesional.com

ORIGINAL ARTICLE

Comparison between treatments of osteoarthritic knee pain with intra-articular injection of platelet-rich plasma versus hyaluronic acid.

Mubashar Ahmed Bajwa[1], G.R. Bajwa[2], Muhammad Tariq Sohail[3]

ABSTRACT… Objective: To compare the mean pain alleviation and mean improvement in physical function of intra-articular injections of hyaluronic acid (HA) and platelet-rich plasma (PRP) for osteoarthritic knee pain. **Study Design:** Randomized Controlled Trial. **Setting:** Department of Orthopaedics & Spine Surgery, Rai Medical College & Teaching Hospital and Bajwa Trauma Centre & Teaching Hospital, Sargodha. **Period:** 1st May 2024 to 30th November 2024 (6 Months). **Methods:** Following informed permission and institutional ethical committee approval, 314 patients between the ages of 40 and 80 who met the inclusion criteria and presented with osteoarthritic knee pain were enrolled. At baseline, treatment weeks two and three, and post-treatment weeks six, twelve, and twenty-four, patients were clinically assessed using both subjective and objective evaluations using VAS and WOMAC. SPSS version 23 was used to analyze the data. **Results:** Group 1 (PRP) patients had a mean age of 61.72 ± 9.14 years, as compared to group 2 (HA), 62.87 ± 8.47 years. Of 314 patients, 187 (59.55%) were female and 127 (40.45%) were male. Mean pain reduction (VAS score) in the PRP group was 4.84 ± 1.23, while in the HA group it was 2.76 ± 1.17 (p = 0.0001). The mean decrease in WOMAC score in the PRP group was 50.57 ± 11.22, whereas in the HA group it was 27.80 ± 7.93 (p = 0.0001). **Conclusion:** When treating osteoarthritic knee pain, intra-articular injections of platelet-rich plasma offer better pain relief and functional improvement than hyaluronic acid.

Key words: Functional Outcomes, Hyaluronic Acid (HA), Intra-articular Injection, Knee Osteoarthritis, Platelet-rich Plasma (PRP), Pain Management.

Article Citation: Bajwa MA, Bajwa GR, Sohail MT. Comparison between treatments of osteoarthritic knee pain with intra-articular injection of platelet-rich plasma versus hyaluronic acid. Professional Med J 2026; 33(04):582-585. https://doi.org/10.29309/TPMJ/2026.33.04.10183

INTRODUCTION

Osteoarthritis (OA) is among the most common chronic degenerative diseases and a leading cause of musculoskeletal pain worldwide. It may affect any joint, but the knee joint is most frequently involved, particularly in the adult population. OA is more common in women and is one of the top 10 causes of disability worldwide, with prevalence varying from 6% to 40%. Due to obesity and longer life expectancies, the prevalence of knee OA is predicted to increase dramatically over the next few decades.[1,2]

Exercise, weight loss, oral analgesics, topical medications, intra-articular injections, and non-steroidal anti-inflammatory medicines (NSAIDs) are all conservative treatments for symptomatic OA. Hyaluronic acid (HA), platelet-rich plasma (PRP), and corticosteroids are the most frequently administered injections.[3]

HA is a naturally occurring glycosaminoglycan that is present in synovial fluid and cartilage and is in charge of preserving the viscoelasticity and lubrication of joints. Pain and stiffness are caused by a reduction in HA's molecular weight and concentration in OA. The goal of intra-articular HA injections, sometimes referred to as viscosupplementation, is to restore these characteristics.[4]

PRP, which is made from the patient's own blood by centrifugation, has a rich mixture of growth factors released during platelet degranulation and a high concentration of platelets, four to five times higher than in normal blood. These bioactive substances support the joint's chondrogenesis, extracellular matrix formation, and anti-inflammatory properties.[4,5]

The rationale was to compare intra-articular PRP and HA injections for osteoarthritic knee pain among patients reporting to patients in our set up.

1. FCPS, Assistant Professor Orthopedic & Spine Surgery, Rai Medical College & Teaching Hospital, Sargodha.
2. FRCS, FCPS, Professor Orthopedic & Spine Surgery, Rai Medical College & Teaching Hospital, Sargodha.
3. FRCS, M.ch (Orthopedic Surgery), Professor Spine Surgery, Doctors Hospital & Medical Centre, Lahore.

Correspondence Address:
Dr. Mubashar Ahmed Bajwa
Rai Medical College & Teaching Hospital, Sargodha.
dr.bajwa59@gmail.com

Article received on:
02/10/2025
Accepted for publication:
04/12/2025

Since limited comparative studies have been showed in Pakistan, this study aimed to identify the most effective treatment option for sustained pain relief and improved functional outcomes, ultimately reducing morbidity and improving patient satisfaction.

METHODS

Following clearance from the hospital's Ethical Review Committee, this randomized controlled experiment was performed at the Department of Orthopaedics & Spine Surgery, Rai Medical College & Teaching Hospital and Bajwa Trauma Centre & Teaching Hospital, Sargodha, from 1st May 2024 to 30th November 2024 (6 Months) after approval from the hospital's Ethical Review Committee (No. RMCS/Principal/11/7) Dated: 10/03/2024. After giving their informed written agreement, 314 patients between the ages of 40 and 80 who met the inclusion criteria and had unilateral osteoarthritic knee pain verified by radiographic imaging were enrolled. Patients were included if they had unilateral symptomatic knee osteoarthritis confirmed radiographically, had persistent pain despite conservative management such as NSAIDs or physiotherapy, and were willing to comply with scheduled follow-up visits at baseline, weeks 2–3, 6, 12, and 24. Both male and female patients meeting these criteria were eligible. There were both male and female patients. Patients with immunodeficiency, diabetes mellitus, hematological problems, rheumatoid arthritis, cardiovascular disease, or active infections were not included. Recent intra-articular steroid injections (within the last 30 days), hyaluronic acid treatment within the previous six months, anemia, pregnancy, knee instability, bilateral symptomatic lesions, and muscular or skeletal dystrophy were other exclusion factors.

The WHO sample size calculator was used with 314 patients (157 per group). Participants were chosen using a non-probability sequential sampling method. Patients were randomly split into two equal groups using the lottery method. Group 1 and Group 2 received intra-articular injections of hyaluronic acid (HA) and platelet-rich plasma (PRP), respectively. Patients and the research team analyzing the results were blinded to group assignments, and non-clinical staff performed the randomization.

The lateral mid-patellar route was used to administer all injections under stringent aseptic conditions. 2% lidocaine and epinephrine were used to provide local anesthesia (without intra-articular anesthesia). The PRP group received five milliliters of platelet-rich plasma, which is low in red blood cells and high in white blood cells, made from the patient's own blood by centrifugation and activated with serum. The HA group received two milliliters of high molecular weight, non-cross-linked hyaluronic acid derived from bacterial cells. Under ultrasound guidance, three injections were administered every three weeks.

After each injection, patients were advised to minimize the use of the treated limb for 24 hours and apply ice or a sponge for any local discomfort. They were encouraged to perform light activities such as cycling or aquatic therapy, followed by gradual resumption of regular exercises and recreational activities as tolerated.

Baseline, week 2-3, week 6, 12, and 24 evaluations of the patients were done through both subjective and objective evaluations. The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) was used to gauge the functional improvement, while the visual analogue scale (VAS) was used to gauge the results in terms of pain. After analysis, the data was entered into SPSS version 23. While qualitative variables, such as gender and the affected side of the knee, were found in the form of frequencies and percentages, quantitative variables, such as age, pain, and functional improvement, were determined using mean and standard deviation (SD). The stratification variables were anatomical site, age, and sex. Independent samples t-tests were used to compare the two groups' mean VAS and WOMAC scores with p-value of 0.05.

RESULTS

Group 1 (PRP) patients had a mean age of 61.72 ± 9.14 years, as compared to group 2 (HA), as 62.87 ± 8.47 years. A majority (176; 56.05%) were aged 61–80 years. There were 187 females (59.55%) and 127 males (40.45%), with a female-to-male ratio of 1.5:1.

TABLE-I

Comparison of PRP and HA Groups by Affected Knee, Pain Reduction, and Functional Improvement (n = 314)

Parameter	Group 1 (PRP)	Group 2 (HA)	P-Value
Affected Knee			
Right	95 (60.51%)	96 (61.15%)	0.908
Left	62 (39.49%)	61 (38.85%)	
Overall Mean Scores			
Pain (VAS reduction)	4.84 ± 1.23	2.76 ± 1.17	0.0001
WOMAC score decrease	50.57 ± 11.22	27.80 ± 7.93	0.0001
Stratified by Age (Years)			
Pain (VAS reduction)			
40–60	4.59 ± 1.19	2.67 ± 1.29	0.0001
61–80	5.05 ± 1.23	2.84 ± 1.08	0.0001
WOMAC score decrease			
40–60	47.29 ± 9.63	29.51 ± 8.97	0.0001
61–80	53.34 ± 11.77	26.55 ± 6.87	0.0001

The majority of the 314 patients (60.83%) had right knee osteoarthritis, and the distribution between the PRP and HA groups was almost equal, suggesting no discernible lateral bias. Mean reduction in pain as determined by the Visual Analogue Scale (VAS), was significantly higher in the PRP group (4.84 ± 1.23) compared to the HA group (2.76 ± 1.17; p = 0.0001). Similarly, the mean decrease in WOMAC scores, indicating improved physical function, was significantly greater in the PRP group (50.57 ± 11.22) versus the HA group (27.80 ± 7.93; p = 0.0001).

Age-wise stratification showed consistent results, with PRP providing superior pain relief and functional improvement across both age ranges (40–60 and 61–80 years). The differences was significant (p = 0.0001 for all comparisons).

DISCUSSION

With increasing life expectancy, the prevalence of knee osteoarthritis has also risen, prompting the search for less invasive and cost-effective alternatives to joint replacement. PRP has emerged as a promising option due to its regenerative potential and affordability compared to arthroplasty.[6-9]

PRP is prepared from autologous blood through centrifugation and contains growth factors such as PDGF, TGF-β, IGF-1, and FGF, which stimulate chondrogenesis and cartilage repair.[10-15] These biologically active components promote cellular proliferation, angiogenesis, and extracellular matrix synthesis, leading to improved joint function.

When compared to CS injections, IA-PRP injections yield better results for the symptomatic treatment of knee OA, including reduced joint stiffness, better pain management, and increased engagement in sports and exercise at the 12-month follow-up. Three IA-PRP injections spaced one week out seem to be more beneficial than one IA-PRP injection.[16] Similarly, For mild to moderate knee OA, intra-articular injections of PRP + HA, PRP, or HA offer a safe and effective treatment with similar efficacy in terms of pain reduction and functional outcomes.[17] Intra-articular injections of autologous platelet-rich plasma have been shown to relieve pain complaints in patients with advanced KOA. It is deserving of therapeutic advancement since it can successfully lessen the severity and function of patients' swollen knee joints and lower the levels of inflammatory and pain mediators.[18]

Our study's findings align with these results, showing that PRP led to greater reductions in both scores, indicating superior pain relief and functional improvement.

CONCLUSION

Intra-articular platelet-rich plasma injections work better than hyaluronic acid for treating early osteoarthritic knee pain in terms of both pain relief and physical function. PRP is a useful, secure, and reasonably priced choice for patients wishing to maintain their joints and improve their range of motion.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

SOURCE OF FUNDING

This research received no specific grant from any

funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

1. Scheuing WJ, Reginato AM, Deeb M, Kasman SA. **The burden of osteoarthritis: Is it a rising problem?.** Best Practice & Research Clinical Rheumatology. 2023 Jun 1; 37(2):101836.
2. He Y, Jiang W, Wang W. **Global burden of osteoarthritis in adults aged 30 to 44 years, 1990 to 2019: results from the Global Burden of Disease Study 2019.** BMC Musculoskeletal Disorders. 2024 Apr 19; 25(1):303.
3. Primorac D, Molnar V, Matišić V, Hudetz D, Jeleč Ž, Rod E, et al. **Comprehensive review of knee osteoarthritis pharmacological treatment and the latest professional societies' guidelines.** Pharmaceuticals. 2021 Mar 2; 14(3):205.
4. Peck J, Slovek A, Miro P, Vij N, Traube B, Lee C, et al. **A comprehensive review of viscosupplementation in osteoarthritis of the knee.** Orthopedic Reviews. 2021 Jul 10; 13(2):25549.
5. Pavlovic V, Ciric M, Jovanovic V, Trandafilovic M, Stojanovic P. **Platelet-rich fibrin: Basics of biological actions and protocol modifications.** Open Medicine. 2021 Mar 22; 16(1):446-54.
6. Song X. **Advancements in minimally invasive techniques for joint replacement in orthopedic surgery.** Journal of Innovations in Medical Research. 2023 Nov 10; 2(11):16-23.
7. Girish L, Subhadra KT. **Understanding knee osteoarthritis: A comprehensive review.** Indian Journal of Integrative Medicine. 2025 May 30; 5(2):78-88.
8. Siddiq MA, Clegg D, Jansen TL, Rasker JJ. **Emerging and new treatment options for knee osteoarthritis.** Current Rheumatology Reviews. 2022 Feb 1; 18(1):20-32.
9. Gan D, Jiang Y, Hu Y, Wang X, Wang Q, Wang K, et al. **Mussel-inspired extracellular matrix-mimicking hydrogel scaffold with high cell affinity and immunomodulation ability for growth factor-free cartilage regeneration.** Journal of Orthopaedic Translation. 2022 Mar 1; 33:120-31.
10. Gao J, Ma Y, Tang J, Zhang J, Zuo J. **Efficacy and safety of platelet-rich plasma and hyaluronic acid combination therapy for knee osteoarthritis: A systematic review and meta-analysis.** Archives of Orthopaedic and Trauma Surgery. 2024 Sep; 144(9):3947-67.
11. De Lucia O, Jerosch J, Yoon S, Sayre T, Ngai W, Filippou G. **One-year efficacy and safety of single or one to three weekly injections of hylan GF 20 for knee osteoarthritis: A systematic literature review and meta-analysis.** Clinical Rheumatology. 2021 Jun; 40(6):2133-42.
12. Aliyev D, Akkemik U, Asik I. **Efficacy of an intra-articular ozone injection for chronic Macías I, Alcorta-Sevillano N, Infante A, Rodríguez CI. Cutting edge endogenous promoting and exogenous driven strategies for bone regeneration.** International Journal of Molecular Sciences. 2021 Jul 20; 22(14):7724.
13. Conrozier T, Raman R, Chevalier X, Henrotin Y, Monfort J, Diraçoglù D, et al. **Viscosupplementation for the treatment of osteoarthritis. The contribution of EUROVISCO group.** Therapeutic advances in musculoskeletal disease. 2021 May; 13:1759720X211018605.
14. Calvet J, Khorsandi D, Tío L, Monfort J. **Evaluation of a single-shot of a high-density viscoelastic solution of hyaluronic acid in patients with symptomatic primary knee osteoarthritis: the no-dolor study.** BMC Musculoskeletal Disorders. 2022 May 11; 23(1):442.
15. McLarnon M, Heron N. **Intra-articular platelet-rich plasma injections versus intra-articular corticosteroid injections for symptomatic management of knee osteoarthritis: Systematic review and meta-analysis.** BMC musculoskeletal disorders. 2021 Jun 16; 22(1):550.
16. McLarnon M, Heron N. **Intra-articular platelet-rich plasma injections versus intra-articular corticosteroid injections for symptomatic management of knee osteoarthritis: Systematic review and meta-analysis.** BMC Musculoskeletal Disorders. 2021 Jun 16; 22(1):550.
17. Fossati C, Randelli FM, Sciancalepore F, Maglione D, Pasqualotto S, Ambrogi F, et al. **Efficacy of intra-articular injection of combined platelet-rich-plasma (PRP) and hyaluronic acid (HA) in knee degenerative joint disease: A prospective, randomized, double-blind clinical trial.** Archives of Orthopaedic and Trauma Surgery. 2024 Nov; 144(11):5039-51.
18. Zhang J, Zhang D, Guo X, Wang T, Geng X, Jiang L, et al. **Effects of advanced knee osteoarthritis treatment with autologous platelet-rich plasma intra-articular injection on pain, pain mediators and inflammatory factors.** Int J Clin Exp Med. 2020 Jan 1; 13(9):6850-8.

AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Mubashar Ahmed Bajwa:** Manuscript Writing.
2	**G.R. Bajwa:** Data analysis.
3	**Muhammad Tariq Sohail:** Abstract.