



Assessment of Clinical Outcome Based on Womac Score Between Intra-Articular Injection of Platelet Rich Plasma and Long Acting Corticosteroid in Stage II-III Kellgren-Lawrence Osteoarthritis of Knee

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KEYWORDS

Osteoarthritis, Platelet-Rich Plasma, Corticosteroids, Kellgren-Lawrence grade, WOMAC score, VAS Score

ABSTRACT:

Introduction: Osteoarthritis is chronic degenerative condition of joint characterized by progressive deterioration of cartilage and inflammation, causing pain and limiting functional of joints. Intra-articular corticosteroid injections are most commonly used to reduce the symptoms in Osteoarthritis, but their effects are often last for short-term and may come with risks factors. Platelet-rich plasma (PRP), an autologous treatment, has evolved into a potential alternative method to improve the limitation of joint function that may provide more sustainable relief.

Objective: This study is to determine clinical outcomes of intra-articular injections of platelet-rich plasma and steroids for the treatment of knee osteoarthritis over a period of 6 months follow-up. The focus of this study is to measuring the extent of pain relief and functional improvement.

Methods: A prospective randomized control study was conducted in 50 patients diagnosed with Grade II and III knee OA. Patients allocated randomly into two groups: Group A (corticosteroid injection) and Group B (PRP injection). All the patients had undergone a Clinical examination and then outcome were assessed using Visual Analogue Scale (VAS) for pain and Western Ontario and McMaster Universities Arthritis Index (WOMAC) for function at baseline, 1, 3, and 6 months.

Results: Both modality of treatment showed improvements in pain and function, with PRP showed a better reduction of VAS and WOMAC scores. At end of 6 months, VAS score in Group A decreased by 2.5 points, while Group B showed reduction of only 4.2-point. WOMAC total scores in Group B improved more significantly reduction in pain, stiffness, and function improvement compared to Group A.

Conclusion: In our study both corticosteroid and platelet rich plasma showed significant reduction in pain and improving function of KL grade II & III osteoarthritis knee. Intra-articular PRP injection showed significant short-term similar reduction of pain but knee function with no significant difference when compared to corticosteroids therapy at end of follow-up. However, PRP treatment resulted in a longer sustained effect. Intra-articular PRP injection is safe, it can reduce pain, and it can improve knee function of patients with mild/moderate knee OA for longer period.

Introduction

“Osteoarthritis (OA) is chronic degenerative illness that includes several factors beyond simple wear and tear”⁽¹⁾. It results from complex interactions triggered by inflammatory mediators. In addition to cartilage degradation, OA affects the synovial membrane, joint capsule, ligaments, menisci, and

subchondral bone. The primary sign of osteoarthritis is pain. Primary OA refers to those instances of OA when the etiology is unknown. The main cause of primary osteoarthritis is aging. It may manifest as erosive OA, widespread, or localized. Another illness or ailment is the cause of secondary osteoarthritis.



Osteoarthritis is predominant joint disease in India, with a 22% to 39% prevalence. It is also the second most frequent rheumatologic condition. Osteoarthritis in females have a higher likelihood of developing osteoarthritis compared to males, with the frequency of occurrence increasing significantly with age. Around 45% of women aged 65 and above have symptoms, but 70% of women in the same age group exhibit radiological evidence. Osteoarthritis of the knee is a primary factor contributing to decreased mobility, particularly among women. According to one assessment, OA ranks as the seventh most prevalent non-fatal burden. Self-report surveys may underestimate the prevalence of osteoarthritis (OA) due to potential unreported cases within the population. Based on the research, the knee is the primary location for osteoarthritis.

Intra-articular (IA) corticosteroid infiltration, such as triamcinolone acetonide, offers temporary pain relief for individuals with osteoarthritis (OA). This treatment is typically used alongside core therapy to alleviate moderate to severe pain. The primary mechanism by which corticosteroids reduce pain is through their potent anti-inflammatory properties, which help decrease swelling and inflammation in knee joint. However, effectiveness of corticosteroids slowing down progression of Osteoarthritis is limited. Furthermore, there are potential adverse reactions associated with frequent and high-dose corticosteroid injections, including cartilage damage and joint infection. In spite of this, Corticosteroids is commonly used due to their rapid onset of action for short-term pain relief in osteoarthritis patients.

“Platelet-rich plasma is newer techniques is an autologous compose of highly concentrated platelets, growth factors and other bioactive components produced by centrifuge the blood”⁽²⁾. PRP helps in tissue regeneration and facilitate the healing process. The proposition is PRP injecting directly into joint similar to triaminolone acetonide will reduce pain quickly. Additionally, it is expected PRP will provide long-term pain relief and improve the functional recovery compared to corticosteroids injection at end of follow-up period. PRP treatment has the potential to provide longer-lasting benefits since it has regenerative qualities, which address the underlying causes of Osteoarthritis

rather than just relieving symptoms. This makes PRP a promising option for OA treatment, especially for patients looking for alternatives to corticosteroids.

OBJECTIVES

The primary objective of this study is to determine the clinical outcomes between in intra-articular corticosteroids and platelet-rich plasma injection in patients with Grade II - III Kellgren-Lawrence knee osteoarthritis over a period of 6-month follow-up. Specifically, study aims to determine effectiveness of pain relief and functional improvement on both modality of treatment. For corticosteroids, is to determine their impact on symptom management and joint function in patients with moderate OA, given their properties of anti-inflammatory element and pain relief rapid onset. meanwhile, study seeks to evaluate clinical benefits of PRP injections, focusing on their potential to relieve symptoms but also promote joint regeneration and long-term functional enhancement in the same distribution of population. The findings will help clarify efficacy of these treatments and guide clinicians in optimizing therapeutic strategies for managing knee osteoarthritis.

METHODS

Participants were selected based on inclusion and exclusion criteria. Eligible patients had radiographic evidence of knee osteoarthritis, classified as Kellgren-Lawrence (KL) Grade II or III, with no prior surgical interventions on the affected knee. They reported pain levels ranging from 4 to 9 on the Visual Analogue Scale (VAS) for a period exceeding six months and showed no improvement after over six months of conservative management, including analgesics and physiotherapy. Patients were excluded if they had coagulation disorders, on anticoagulant therapy, has systemic connective tissue diseases, or allergic to corticosteroids. Additional those with synovial abnormalities, such as large joint effusions aspiration of more than 10 ml of synovial fluid, then history of knee operations, fractures, meniscal or ligament injuries, a Baker's cyst of affected knee or significant deformity of degenerative joint. Also excluded were patients with a previous history of intra-articular (IA) corticosteroid injections.



Patients were randomly allocated into two groups of 25 each, using simple convenient sampling method. Group A received intra-articular corticosteroid injections, while Group B received intra-articular PRP injections. Each patient was thoroughly informed about the procedure, benefits, and potential risks of this study in their own under stable language prior to intervention. Written & informed consent is obtained from the participants.

For Group A, the corticosteroid injection protocol began with patient positioned supine then knee extended. Identify injection site, superior pole of patella,

then sterilized with an antiseptic solution (eg.iodine or chlorhexidine). In 5ml syringe aseptically, 2ml (80mg) triamcinolone acetamide and 4ml of 2% lignocaine is aspirated. Then administered by inserting a needle horizontally from lateral or medial side, below superior pole of patella, then direction slightly downward into the joint, in gap between the patella and femoral condyles, once the needle is in the joint space, Inject the Inj.Corticosteroids (2ml triamcinolone acetamide)+ 4ml of 2% Lignocaine) slowly into the joint space. Post-injection into joint space cyclical flexion and extension of knee is done. Then sterile dressing is done, and crepe bandage applied. This method is illustrated in Figure 1.



Preparation of site of injection



Site of injection of Inj. Corticosteroid



Collection of 2ml of Corticosteroids (80ml Triamcinolone acetamide) + 4ml of 2% Lignocaine

Figure 1: The methods of corticosteroids administration

For Group B, the PRP injection protocol began Blood collection draw a 10ml of venous blood from patient's uninvolved arm and transferred into container containing a platelet-activating factor and then place the collected blood in a centrifuge and spin it at 1,500 rpm for period of 30 minutes to achieve separation into distinct layers. After the centrifugation, the PRP forms a layer at the bottom of the tube. Carefully aspirate this layer, which contains the concentrated platelets in the

5 ml syringe The concentrated PRP was then collected in a 5ml syringe for injection. This procedure is illustrated in Figure 2.The injection of PRP mirrored the same technique used Group A, with patient positioned supine, injection site cleaned aseptically, and needle inserted at same anatomical point below superior pole of patella. PRP was injected slowly into joint space, followed by cyclical knee movement and application of a sterile dressing with a crepe bandage.

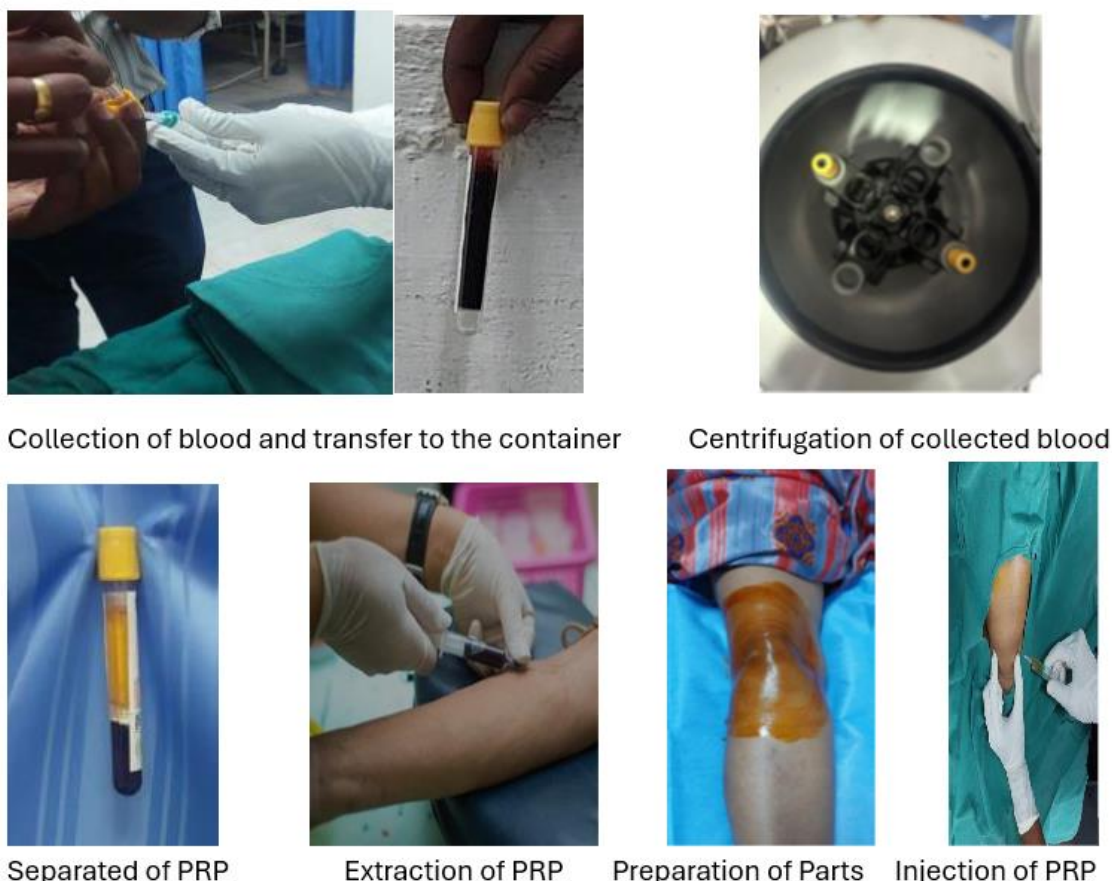


Figure 2: The methods of PRP administration

Data collection at baseline, 1 month, 3 months and 6 months post-treatment involved assessing patients' pain relief and functional improvement using the VAS and WOMAC scores. These scores served as primary outcome measures to evaluate efficacy of corticosteroid

versus PRP injections. Statistical analysis was conducted to determine effectiveness of both treatments in pain reduction and functional improvement over period of 6-month follow-up.

Result

Table 1: Demographic and Clinical outcomes of participants

Parameter	Category	Group A	Group B	Group A (%)	Group B (%)
Age Distribution	41-50	7	7	28%	28%
	51-60	11	12	44%	48%
	61-70	7	6	28%	24%
Sex Distribution	Male	9	8	36%	32%



Parameter	Category	Group A	Group B	Group A (%)	Group B (%)
	Female	16	17	64%	68%
Kellgren-Lawrence Grade	Grade 2 (41-50 years)	7	7	28%	28%
	Grade 2 (51-60 years)	6	6	24%	24%
	Grade 2 (61-70 years)	0	0	0%	0%
	Grade 3 (41-50 years)	0	0	0%	0%
	Grade 3 (51-60 years)	5	6	20%	24%
	Grade 3 (61-70 years)	7	6	28%	24%

Table 2: Clinical Outcomes at Baseline and Follow-Up

Parameter	Time Point	Group A (Mean ± SD)	Group B (Mean ± SD)
VAS Score	Pre-treatment	7.5 ± 1.0	7.2 ± 1.1
	Follow-up	5.0 ± 1.4	3.0 ± 1.1
WOMAC Score	Pain (Baseline)	10.21 ± 1.14	9.36 ± 0.40
	Pain (6 months)	6.58 ± 0.58	3.77 ± 1.13
	Function (Baseline)	45.16 ± 2.07	42.83 ± 2.52
	Function (6 months)	27.44 ± 2.52	18.03 ± 1.02
	Stiffness (Baseline)	4.21 ± 0.67	3.98 ± 0.46
	Stiffness (6 months)	2.46 ± 0.46	1.12 ± 0.47
	Total (Baseline)	59.58 ± 2.46	56.51 ± 2.59
	Total (6 months)	36.48 ± 2.63	22.52 ± 1.59

DISCUSSION

In our study, treatment of osteoarthritis with PRP demonstrated a notable improvement in both relieving pain and function outcome compared to corticosteroid. Patient in Group B, received PRP injections, showed a significant reduction in VAS scores, with a mean decrease of 4.2 points at the 6-month follow-up, compared to a 2.5-point reduction in Group A (corticosteroid group). These findings co-relate with Khan et al. (2018) (6) and Güvendi (2018) (7), hence PRP

showed significant improvement compare with corticosteroids in pain management. Both studies showed a greater reduction in VAS scores seen in PRP group, supporting our observation that PRP injections provide more substantial pain relief in osteoarthritis patients. Mechanism likely involves PRP's regenerative properties by enhancing cartilage repair, whereas corticosteroids focus on reduction of inflammation.

Similarly, our study found that PRP injections showed functional outcomes as measured by



WOMAC scores. Group B showed greater improvement across all WOMAC domains—pain, function, and stiffness—resulting in a more pronounced reduction total score than Group A. This is consistent with previous studies, done by Khan et al. (2018)(6) and Güvendi (2018) (7), which highlighted PRP therapy superior functional improvements. While corticosteroids provided only symptom relief, but PRP showed better sustained benefits, particularly in restoring joint function. These findings reinforce potential of PRP as a more effective, longer-lasting treatment for osteoarthritis compared to corticosteroids therapy, advocating its use in clinical practice for managing patients with Grade II and III osteoarthritis knee.

Conclusion

In our study both corticosteroid and platelet rich plasma showed significant reduction in pain and improving function of KL grade II & III osteoarthritis knee.

Intra-articular PRP injection showed significant short-term similar reduction of pain but knee function with no significant difference when compared to corticosteroids therapy at end of follow-up. However, PRP treatment resulted in a longer sustained effect.

Intra-articular PRP injection is safe, it can reduce pain, and it can improve knee function of patients with mild/moderate knee OA for longer period

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