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Original Research Article

A Hospital-Based Study to Evaluate the Functional Outcome in Grade I and II Osteoarthritis Knee Joint after Platelet Rich Plasma Injection

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Abstract

Aim: The aim of the present study was to evaluate the functional outcome in Grade I and II osteoarthritis knee joint after platelet rich plasma injection.

Methods: The present study was conducted in the Department of Orthopaedics, Shri Ramkrishna Institute of Medical Sciences and Sanaka Hospitals, Durgapur, West Bengal, India and 50 Grade I and II osteoarthritis knee joint patients were included in the study for the period of 8 months.

Results: Majority of the patients belonged to 40-55 years of age and 60% were females. 70% had grade 2 and 30% grade 1 according to KELLGREN-LAWRENCE GRADING. VAS score after 6tn month follow up was 3.21±1.44.

Conclusion: Use of two doses of PRP intra-articular injections in the management of osteoarthritis knee provides excellent pain relief, improvement in quality of life which is more effective in the early stages of osteoarthritis. PRP is a safe, easy, minimally invasive and cheap alternative in the management of knee osteoarthritis.

Keywords: Osteoarthritis, platelet rich plasma injection, platelet derived growth factor.

Introduction

Osteoarthritis (OA) of the knee represents a common cause of frequent orthopedic consultations. It is also responsible for a significant burden on both individuals and health-care systems. [1] This degenerative joint disorder is characterized by progressive deterioration of articular cartilage, leading to pain, impaired mobility, and reduced quality of life for millions of individuals worldwide. In India, where the prevalence of knee OA is steadily increasing due to factors such as an aging population and evolving lifestyles, the impact of this condition has already gained significant proportion. [2] Patients with OA knee often present with persistent pain, stiffness, and reduced mobility. [3] The hallmark radiological modality for assessing knee OA remains conventional X-rays, which shows features such as joint space narrowing, osteophyte formation, and subchondral sclerosis. More advanced imaging techniques such as computed tomography and magnetic resonance imaging can show details of soft-tissue involvement, including cartilage integrity and ligamentous structures. [4]

Addressing the challenges posed by knee OA demands a wide array of treatment options, spanning from conservative methods such as physical therapy and medication, such as non-steroidal anti-inflammatory drugs to more invasive surgical procedures such as osteotomies and knee replacement surgeries. [5] Among these choices, intra-articular injections of platelet-rich plasma (PRP) have garnered significant attention as a potential solution for pain relief, enhanced function, and potential disease modification. PRP, a concentrated source of growth factors obtained from a patient's own blood, holds promise for promoting tissue healing and regeneration. [6] Although there is an exponential increase in the number of studies being undertaken to assess the outcome of patients with knee OA treated by PRP, there are considerable gaps in our knowledge regarding its effectiveness, safety, and long-term outcomes. Understanding the factors influencing the functional outcomes of patients undergoing PRP treatment is critical. It is essential to ascertain the extent to which PRP injections can serve as a

viable alternative to more invasive interventions. [7]

Till, recently, intra-articular injection of steroid was commonly used for pain relief in cases of knee OA. Steroid injections are known for their potent anti-inflammatory properties. These injections offer quick relief from pain and inflammation, often resulting in immediate symptomatic improvement. [8] However, the effects of steroid injections are usually short-lived, and they do not address the underlying structural changes in the joint associated with OA. On the other hand, PRP injections harness the regenerative potential of the patient's own blood, delivering a concentrated source of growth factors that can potentially stimulate tissue repair and cartilage regeneration. It offers the advantage of promoting long-term healing and modifying the disease progression, rather than merely providing symptomatic relief. [9]

The aim of the present study was to evaluate the functional outcome in Grade I and II osteoarthritis knee joint after platelet rich plasma injection.

Materials and Methods

The present study was conducted in the Department of Orthopaedics, Shri Ramkrishna Institute of Medical Sciences and Sanaka Hospitals, Durgapur, West Bengal, India and 50 Grade I and II osteoarthritis knee joint patients were included in the study for the period of 8 months.

Inclusion Criteria: Patients of both sex between 40-60 years. Patients with Grade I and II osteoarthritis knee joint.

Exclusion Criteria: Any patient above 60 years. Patients with diabetes mellitus. Patients with coexisting local infection. Immunocompromised patients. Patients with grade 3 and 4 osteoarthritis.

Collection of Data: 50 patients suffering from Grade I and II osteoarthritis knee joint who attended the outpatient Department of Orthopaedics.

Informed and written consent was taken from the patients. General, physical examination, the systemic examination done. Neurovascular status of both lower limbs assessed. X-ray knee antero-posterior and lateral views were taken in standing position. Routine pre-injection VAS score was assessed. Under aseptic conditions, two platelet-rich plasma(PRP) injections were injected into the knee joint at four weeks interval. Functional status of the knee was evaluated at 1, 3, 6weeks, 6months intervals.

Results

Table 1: Demographic data

Age groups in years	N	%
40-45	13	26
46-50	15	30
51-55	13	26
56-60	9	18
Gender		
Male	20	40
Female	30	60

Majority of the patients belonged to 40-55 years of age and 60% were females.

Table 2: Kellgren-Lawrence Grading

Kellgren-Lawrence Grading	N	%
Grade 1	15	30
Grade 2	35	70

70% had grade 2 and 30% grade 1 according to Kellgren-Lawrence Grading.

Table 3: VAS

VAS score	Per injection	1st week	3rd week	6th week	6th month
Mean	7.16	5.95	4.81	4.06	3.21
SD	0.92	1.12	1.20	1.32	1.44

VAS score after 6tn month follow up was 3.21±1.44.

Discussion

Researchers are increasingly inclined toward PRP over steroid injections because of its potential to address the root causes of knee OA, rather than just providing temporary relief. PRP injections align with the growing trend in regenerative medicine, focusing on enhancing tissue repair and functional recovery, which can significantly benefit patients in the long term. This shift in focus from symptomatic management to disease modification is a key driver

behind the growing interest in PRP as a treatment option for knee OA. [10]

In our study of OA knee treated by intra-articular injection of PRP, females were found to be predominantly affected. While multiple factors contribute to the increased prevalence of OA in females compared to males, recent research suggests an interplay of biological, genetic, hormonal, and lifestyle factors. Some studies have highlighted the role of estrogenic, which is known to influence cartilage metabolism and may contribute to increased susceptibility in women. [11] Not only OA is more common in females but also some studies have also suggested that women having OA often have more severe pain and more profound reduction in function and quality of life as compared to men. Pal et al. conducted an epidemiological study aimed at determining the prevalence of primary knee OA. [12] Majority of the patients belonged to 40-55 years of age and 60% were females. 70% had grade 2 and 30% grade 1 according to KELLGREN-LAWRENCE GRADING. VAS score after 6tn month follow up was 3.21±1.44.

Genetic predisposition and metabolic changes that occur with aging may also play a role in the development of OA. In addition, age-related conditions such as obesity, decreased physical activity, and comorbidities can further exacerbate joint degeneration that is the underlying cause of OA. Shane Anderson and Loeser in their review showed that the age- related changes in the musculoskeletal system play a significant role in increasing the susceptibility to OA. [13] These factors encompass joint injuries, obesity, genetic predisposition, and anatomical features that influence joint mechanics. The authors further found that natural aging process also contributes to the development of OA by introducing changes in joint tissues. [14] This includes cell senescence, which leads to the development of the senescent secretory phenotype, as well as alterations in the joint matrix, such as the formation of advanced glycation end-products that affect the mechanical properties of joint tissues. The authors concluded that given the aging population and the rising prevalence of OA risk factors like obesity, the ability to impede OA progression in older adults holds significant public health implications. Similar age-related changes in joints, particularly load-bearing joints, have also been reported by the authors such as Loeser14 and Hawker and King. [15]

Conclusion

Use of two doses of PRP intra-articular injections in the management of osteoarthritis knee provides excellent pain relief, improvement in quality of life which is more effective in the early stages of osteoarthritis. PRP is a safe, easy, minimally invasive and cheap alternative in the management of knee osteoarthritis.

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