ISSN 2515-8260 Volume 9, Issue 2, Winter 2022

ORIGINAL RESEARCH

ASSESSMENT OF ROLE OF PRP IN MANAGEMENT OF OSTEOARTHRITIS OF THE KNEE

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ABSTRACT

Background: Osteoarthritis (OA) is a chronic, non-inflammatory rheumatologic disease which affects the synovial joints. The present study was conducted to assess the role of PRP in management of osteoarthritis of the knee.

Materials & Methods: 65 patients of osteoarthritis of the knee of both genders were enrolled.

Cartilage thicknesses were measured radiologically by ultrasound before and at third and sixth months after treatment. The severity of pain was evaluated by using VAS.

Results: Out of 65 patients, males were 30 and females were 35. Right side was involved in 34 cases and left in 31 cases. The mean VAS before treatment was 5.4, after 3 months it was 2.3 and after 6 months it was 0.8. The difference was significant ($P< 0.05$). The mean cartilage thickness before treatment was 0.5 mm, after 3 months was 0.7 mm and after 6 months it was 0.8 mm. The difference was significant ($P< 0.05$).

Conclusion: PRP is found to be effective in management of cases of osteoarthritis of the knee.

Key words: Osteoarthritis, PRP, VAS, NSAIDS.

Introduction

Osteoarthritis (OA) is a chronic, non-inflammatory rheumatologic disease which affects the synovial joints. It is characterized by joint cartilage degeneration, subchondral bone changes, and synovitis. Goals of managing OA include controlling pain, maintaining and improving the range of movement and stability of affected joints, and limiting functional impairment. These goals should be achieved with minimal toxicity.[1] Joint arthroplasty is indicated by end-stage joint failure with intractable pain, but most patients will be managed without surgery. Management must be individualised and patient-centred, and usually involves multiple strategies. Most morbidity is associated with OA in the large weight-bearing joints (the knee and hip). Nonsteroid anti-inflammatory drugs, glucosamine, chondroitin sulfate and hyaluronic acid are generally used for reducing inflammation and relieving pain in patients with OA.[2]

When PRP is injected into the injured site, platelets are activated by endogenous thrombin and/or intra-articular collagen. Once activated, there is secretion of growth factors by degranulation of the -granules. Among secreted substances we can find: platelet-derived growth factor (PDGF), interleukin-1 receptor antagonist (IL-1RA), soluble receptor of tumor

necrosis factor (TNF-RI), transforming growth factor (TGF-), platelet factor 4 (PF4). Many of these mediators act as anti-catabolic and anti-inflammatory agents. The antagonist of IL-1 receptor inhibits activation of NFB gene, cytokine involved in the apoptosis and inflammation process.[3] Moreover, the soluble receptors of the tumor necrosis factor bind to TNF-, preventing its interaction with cellular receptors and its pro-inflammatory signaling. TGF-1 also acts as a factor inhibiting cartilage degradation, regulating and enhancing gene expression of tissue inhibitors of metalloproteinases.[4] The present study was conducted to assess the role of PRP in management of osteoarthritis of the knee.

Materials & Methods

The present study comprised of 65 patients of osteoarthritis of the knee of both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. Intra-articular PRP was applied in the beginning, and at first and second weeks of treatment. Radiologic grading of the knee was assessed using Kellgren-Lawrence scale. Cartilage thicknesses were measured radiologically by ultrasound before and at third and sixth months after treatment. The severity of pain was evaluated by using VAS. Data thus obtained was subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

Total- 65		
Gender	**Males**	**Females**
Number	30	35

Table I shows that out of 65 patients, males were 30 and females were 35.

Table II Assessment of parameters

Parameters	**Variables**	**Mean**	**P value**
Side	Right	34	0.97
	Left	31	
VAS	Before	5.4	0.01
	3 months	2.3	
	6 months	0.8	

Table II, graph I shows that right side was involved in 34 cases and left in 31 cases. The mean VAS before treatment was 5.4, after 3 months was 2.3 and after 6 months was 0.8. The difference was significant (P< 0.05).

Graph I: Assessment of parameters

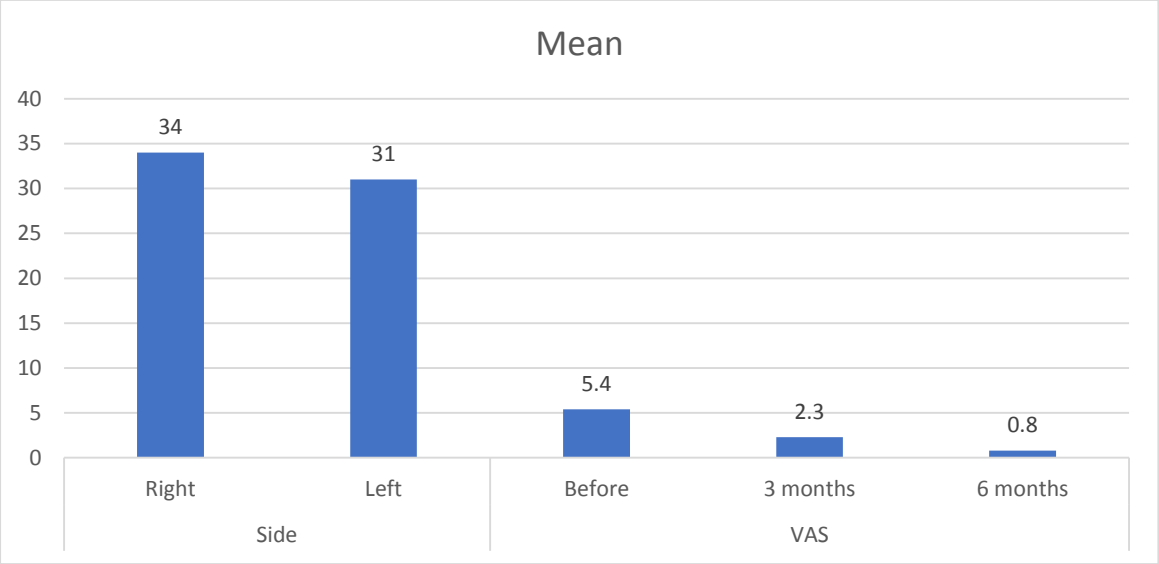

Table III Assessment of cartilage thickness

Time interval	Mean (mm)	P value
Before treatment	0.5	0.05
3 months	0.7	
6 months	0.8	

Table III shows that mean cartilage thickness before treatment was 0.5 mm, after 3 months was 0.7 mm and after 6 months was 0.8 mm. The difference was significant (P< 0.05).

Discussion

A relatively new strategy for the treatment of OA is the use of cell elements and biomediators of tissue response. In this context, the platelet-rich plasma (PRP) has been configured as a perspective for improving clinical and structural outcomes by delivering a high concentration of growth factors that mediate cartilage healing and remodeling. Its potential has been shown in vitro and in vivo studies.[5] Growth factor increases the synthesis of chondrocyte matrix and stimulates chondrogenic cell proliferation. It reduces the activation of nuclear factor kappa B which has an important role in the pathogenesis of OA, by inhibition of inflammatory process which is induced by interleukin-1 beta. Platelet alpha granules contain significant amounts of GF. For this reason, autologous platelet rich plasma (PRP) application has emerged as a treatment option for OA. PRP also includes plasma proteins that act as mesenchymal cell adhesion molecules like fibrin, fibronectin and vitronectin. It is known that these molecules appear during recovery process following a trauma in the human body. Growth factor is easily provided in the intended concentration by centrifuging the whole blood taken from the patient and forming PRP. Obtaining it from the patient's own blood after a simple centrifuging is an advantage.[6] The present study was conducted to assess the role of PRP in management of osteoarthritis of the knee.

We found that out of 65 patients, males were 30 and females were 35. Sánchez et al[7] compared 60 patients treated with PRP intra-articular injections to 30 patients treated with hyaluronic acid injections for knee OA. They showed that application of GF rich PRP was more effective than hyaluronic acid injections on pain management.

We found that right side was involved in 34 cases and left in 31 cases. The mean VAS before treatment was 5.4, after 3 months was 2.3 and after 6 months was 0.8. Wang Saegusa et al[8] demonstrated significantly improved WOMAC, VAS, Lequesne Index, and Short Form-36 values at the six months follow-up in 261 patients with unilateral or bilateral knee OA.
We found that mean cartilage thickness before treatment was 0.5 mm, after 3 months was 0.7 mm and after 6 months was 0.8 mm. Kon et al[9] reported 91 patients receiving PRP injections in one week intervals. They noted that 80% of patients were satisfied with the treatment. Moreover, in a systematic review and meta-analysis.
Sampson et al[10] measured the medial condyle, intercondylar notch and lateral femoral condyle cartilage thickness of 13 patients by ultrasound. Of these patients, 12 were males older than 18 years old and with a mean body mass index score of 25.0. However, the authors did not record the grade of degeneration. They demonstrated improvement, although not statistically significant, in the cartilage thickness on sonography at lateral condyle and intercondylar notch during the first six months of follow-up. They attributed the insignificant statistical results to the limited number of patients.
Çalis HT et al[11] evaluate the efficacy of autologous platelet rich plasma applications on pain, functional status, and cartilage regeneration in advanced knee osteoarthritis. A total of 82 patients (13 males, 69 females; mean age 63.5±9.3 years; range 40 to 88 years) with chronic knee pain for the last one year, who had grade 3-4 knee osteoarthritis according to Kellgren-Lawrence Scale and visual analog scale value of higher than 5, who did not receive physical therapy for the last six months, and did not respond to treatment despite use of nonsteroidal anti-inflammatory drugs and analgesics at least for the last three months were enrolled in the study. Totally 103 knee joints of 82 patients were applied intra-articular platelet rich plasma in the beginning, and first and second weeks of treatment. Platelet rich plasma was applied to both knees in 20 patients. Compared to values before treatment, patients' visual analog scale values were significantly decreased at third and sixth months after treatment ($p<0.05$). IN all patients, good response was seen.
The limitation the study is small sample size.

Conclusion

Authors found that PRP found to be effective in management of cases of osteoarthritis of the knee.

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