Original Research Paper

Volume - 12 | Issue - 06 | June - 2022 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Orthopaedics

IMPACT OF PLATELET RICH PLASMA (PRP) ON QUALITY OF LIFE IN KNEE OSTEOARTHRITIS PATIENTS

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ABSTRACT **Aim:** To assess the effect of Platelet rich plasma (PRP) on quality of life of knee osteoarthritis (OA) patients. Method: A total of 30 KL Grade 2/3 treatment-naïve patients aged 40-65 years with unilateral knee osteoarthritis for not more than 6 months were enrolled in the study. Each patient was given 4-5 ml autologous PRP at the affected knee for a maximum of two times one-month apart. Visual analogue scale (VAS) for pain, WOMAC and WHO-BREF Quality of life scores were noted at baseline and at final follow-up (12 weeks). Data was analysed using SPSS 18.0 version. Wilcoxon signed rank test was used to compare the data. **Results:** Mean age of patients was 52.23±7.20 years, majority were males (60%), urban residents (80%), homemakers or in service (60%). Mean BMI of patients was 27.4±3.97 kg/m^2 (Range 20.2-35.0 kg/m^2). At baseline mean VAS and WOMAC scores were 6.17±0.95 and 56.37±6.50 respectively. Mean WHO-BREF QoL scores for physical, psychological, social and environmental domains were 48.63±12.89, 32.33±13.37, 31.20±15.41 and 39.70±15.33 respectively. At final follow-up VAS and WOMAC scores showed a decline of 40% and 16.6% respectively. Physical, psychological, social and environmental domains of QoL showed an increase of 36.5%, 90.2%, 66.9% and 23.2% respectively. The changes in pain, WOMAC and QoL were significant statistically ($p<0.001$). Conclusion: PRP was helpful in reducing pain, improving functional outcomes and quality of life of Knee OA patients.

KEYWORDS : Platelet rich plasma, Visual analogue scale, Knee osteoarthritis, WOMAC, Quality of life.

INTRODUCTION

Knee osteoarthritis is a age-related chronic musculoskeletal disease characterized by progressive loss of articular cartilage, pain, restricted mobility, physical disability and loss in quality of life of affected patients[1,2,3]. Owing to crippling pain and mobility restriction, it is difficult for knee osteoarthritis patients to perform basic functions like walking, stair climbing, and squatting that are quite essential for day-to-day life as a result of which their active participation in routine life and recreation activities diminishes[4]. As a result of this disability the social ties of the patients are broken, giving an emotional or psychological sense of incompleteness. Moreover, the patient has a huge burden of financial liabilities as a result of reduced physical disability, healthcare related expenditure and loss in employment opportunities. Thus, the impact of the disease is not only limits to physical disability but also includes social, emotional and financial aspects[5,6]. With the increasing understanding of impact of knee osteoarthritis on quality of life of affected patients, it is emerging as a useful measure to depict the quantitative burden of disease status and treatment outcoems[7].

OA is a degenerative joint disease involving the articular cartilage and many of its surrounding tissues. In addition to damage and loss of articular cartilage, there is remodelling of subchondral bone, osteophyte formation, ligamentous laxity, weakening of periarticular muscles, and, in some cases, synovial inflammation[8].

Both pharmacological and non-pharmacological modalities are employed for treatment of Knee OA[9]. Pharmacological treatment modalities such as steroids are often associated with side effects. While surgical modalities involve processes of lavage and debridement in order to reduce synovitis and to improve joint motion, however, in the recent years its usefulness has been question in view of the results of large clinical trials showing no benefit for moderate to severe OA[10,11].

In recent years, the focus of knee OA management has shifted from use of pharmacological or surgical modalities to prevent cartilage degeneration and artircular structural remodelling and could revert back the process by initiating regenerative processes. In recent years, a preparation called Platelet rich plasma (PRP) is an emerging treatment modality classified as “Orthobiologics”. Platelet Rich Plasma (PRP) is a natural concentrate of autologous blood growth factors in different fields of medicine in-order to test its potential to enhance tissue regeneration. Platelet rich-plasma has also been used for the treatment of osteoarthritis knee and has shown promising clinical and radiological outcomes[13,14], both in comparison to other pharmacological as well as non-pharmacological treatment modalities like physiotherapy[15-17].

In view of the projected benefits of PRP in management of knee OA, the present study was carried out to evaluate the effect of PRP use on knee osteoarthritis with focus on quality of life as the primary outcome.

MATERIAL AND METHOD

This study was carried out at at orthopaedic clinic in a multispeciality hospital on 30 unilateral knee OA patients aged 40 to 65 years, diagnosed with radiological grade 2/3, having been diagnosed for knee OA for not more than six months with/without any history of conservative treatment (inclusion criteria). Patients with arthropathies, haematological disorders, having been on any intraarticular medication (steroids or Hyraluronic acid), having any active infection were excluded from the study (exclusion criteria). Informed consent was obtained from all the patients.

After enrolment demographic, anthropometric, clinical and radiological profile of patients was noted. Severity of pain was assessed using a 10-point visual analogue score (VAS) scale. Functional impairment was assessed using Western Ontario and McMaster Universities Arthritis Index (WOMAC). Quality of life of patients was assessed using 26-item World Health Organization (WHO)-Quality of Life-BREF instrument covering physical, psychological, social and environmental domains .

Procedure

A 20 ml of whole blood from all the consenting patients and autologous PRP was prepared as per procedure described by Dhurat and Sukesh[18]. After the preparation of PRP, 5 ml of PRP was injected in knee through supralateral approach with an 22-gauge needle. Knee immobilized for 8-10 minutes and discharged after half an hour of observation. Tablet paracetamol (650 mg) was given stat in patients who experienced pain at injection site after 10 minutes. All patients were asked to stop medications 48 hrs before follow up assessment.

All the patients was asked to appear report for development of any complication telephonically to the investigator and were followed up one week, one month and three months after intervention. Pain intensity was measured on VAS scale at each follow-up. Repeat PRP injection intervention was done on those patients who did not show a change in pain grade following intervention at one month. Final outcome was noted at 3 months in terms of change in VAS scores for pain, WOMAC scores and Quality of life.

Statistical Analysis

The data collected from the patients was fed into MS-Excel software. Statistical analysis was done using Statistical Package for Social Sciences (SPSS) 18.0 version. Wilcoxon signed rank test was used to evaluate the significance of change in different outcomes. A 'p' value less than 0.05 was considered significant.

RESULTS

Age of patients ranged from 40 to 65 years. Mean age of patients was 52.23±7.20 years. Majority of patients were females (60%). The sex ratio of study population was 0.67. Most of the patients were urban residents (80%) only 6(20%) were from rural areas. Maximum (40%) were homemakers followed by those in service (20%), teachers (16.7%), shop-owners (13.3%), businessmen (6.7%) and retired (3.3%) personnel. Right side (56.7%) was more commonly involved than the left side (43.3%). BMI of patients ranged from 20.2 to 35.0 kg/m^2 and mean BMI was 27.4±3.97 kg/m^2. Exactly half the patients were of KL grade 2 and 3 respectively. Only 11 (36.7%) patients required two PRP injections (Table 1).

At baseline, mean VAS scores for pain, WOMAC scores for functional impairment, WHO-BREFQoL scores for physical, psychological, social and environmental domains were 6.17±0.95, 56.37±6.50, 48.63±12.89, 32.33±15.37, 31.20±15.41 and 39.70±15.53 respectively (Table 2).

No side effect/complication was noted in 27 (90%) cases. There was one patient (3.3%) who reported of transient pain while 2 (6.7%) developed transient pain with synovitis (Table 3).

At final assessment, mean VAS scores for pain, WOMAC scores for functional impairment, WHO-BREFQoL scores for physical, psychological, social and environmental domains were 3.70±1.15, 47.03±8.59, 66.33±12.12, 61.50±14.00, 52.07±17.75 and 48.93±15.80 respectively. As compared to baseline VAS scores for pain and WOMAC scores for functional impairment showed a reduction of 40% and 16.6% respectively, the change in both these outcomes was significant statistically ($p<0.001$). On the other hand for quality of life outcomes, the percentage increase was 36.5%, 90.2%, 66.9% and 23.2% respectively. For all the QoL domains, post-intervention change was significant statistically ($p<0.001$) (Table 4).

DISCUSSION

The present study showed that PRP treatment was successful in bringing about a significant reduction in pain and functional impairment of patients. It also showed that quality of life of patients also showed a significant increase following interventions. It was interesting to see that the treatment was not only successful in bringing about a change in physical domain of quality of life (36.5% increase) but had a higher impact on psychological domain (90.2% increase) and social domain (66.9% increase), thus showing that the physical disability caused by knee OA had a larger impact on psychological status and social ties of the affected patient.

As far as reduction in pain and functional outcomes is concerned, the findings in present study are in agreement with most of the previous studies that have shown that PRP injections at affected site could help in reducing the burden of pain and functional impairment[13,18-22] showing improvement in these outcomes upto 30-60%.

As far as changes in quality of life are concerned, they could be considered as the outcomes related with reduced physical ability providing the patient a greater sense of well-being psychologically and improving his/her social ties. Similar to findings of present study, where psychological and social components showed a higher increase in QoL, Raeissadat *et al.*[23] also found that PRP treatment was successful in bringing about a positive change in quality of life particularly in physical and mental domains of SF-36 tool used by them. Positive quality of life changes in knee OA patients have also been reported amongst patients undergoing total knee replacement[24] and alternate treatments like ozone therapy[25]. Fernández Cuadros *et al.*[26] too in another study reported that PRP treatment helps to improve pain, functional and quality of life related outcomes in Knee OA patients.

The findings of the study show that PRP could be considered to have a positive impact not only on physical pain and functional outcomes but also affects the quality of life of patients in a positive manner. One of the limitations of present study was the small sample size and shorter duration of follow-up. Further studies with longer follow-up and larger sample size are recommended t validate the reliability and sustainability of outcomes seen in present study.

CONCLUSION

The findings of present study showed that PRP helps in improving not only the physical pain and functional outcome but also has positive impact on quality of life too. The findings were suggestive of quality of life as a major treatment outcome in knee OA patients.

Table 1: Demographic Profile and Patient Characteristics

SN	Variable	Statistic
1.	Mean age±SD (Range) (Years)	52.23±7.20 (40-65)
2.	Sex	
	Male	12 (40.0%)
	Female	18 (60.0%)
3.	Habitat	
	Rural	6 (20.0%)
	Urban	24 (80.0%)
4.	Mean BMI±SD (Range) (kg/m^2)	27.4±3.97 (20.2-35.0)
5.	Occupation	
	Homemaker	12 (40.0%)
	Service	6 (20.0%)
	Teacher	5 (16.7%)
	Shop owner	4 (13.3%)
	Businessman	2 (6.7%)
	Retired	1 (3.3%)
6.	Side involved	
	Left	13 (43.3%)
	Right	17 (56.7%)
7.	KL Grade	
	2	15 (50.0%)
	3	15 (50.0%)
8.	No. of PRP Injections needed	
	One	19 (63.3%)
	Two	11 (36.7%)

Table 2: Baseline VAS scores for Pain, WOMAC scores and WHO-BREF QoL

SN	Variable	Mean	SD
1.	VAS scores	6.17	0.95
2.	WOMAC scores	56.37	6.50
3.	WHO-BREF QoL Scores		
	Physical domain	48.63	12.89
	Psychological domain	32.33	15.37
	Social domain	31.20	15.41
	Environmental domain	39.70	15.53

Table 3: Side effects / Complications

SN	Variable	No.	%
1.	Transient pain	1	3.3
2.	Transient pain + Synovitis	2	6.7
3.	No complication	27	90.0

Table 4: Evaluation of Change in VAS scores for pain, WOMAC scores and Quality of Life at final follow-up

SN	Variable	Baseline (Mean±SD)	Final FU (Mean±SD)	% Change in Mean Scores	Significance of change (Wilcoxon signed rank test)
1.	VAS scores	6.17±0.95	3.70±1.15	- 401	z=4.65; p<0.001
2.	WOMAC scores	56.37±6.50	47.03±8.59	- 16.6	z=4.64; p<0.001
3.	WHO-BREF QoL Scores				
	Physical domain	48.63±12.89	66.33±12.12	36.5	z=4.80; p<0.001
	Psychological domain	32.33±15.37	61.50±14.00	90.2	z=4.79; p<0.001
	Social domain	31.20±15.41	52.07±17.75	66.9	z=4.71; p<0.001
	Environmental domain	39.70±15.53	48.93±15.80	23.2	z=4.58; p<0.001

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