

Original article:

A clinical study to evaluate the efficacy of intra articular injection of Autologus PRP and Hyaluronic acid in mild to moderate OA knee

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ABSTRACT:

BACKGROUND - The effects of HA on OA pain have been established, its effects on function in patients with knee OA remain unclear. The objective of this study were to explore the impact of Hyaluronic acid on functional outcomes and compare it with AUTOLOGUS PRP in mild to moderate OA knee.

METHODS - 50 patients with mild to moderate primary osteoarthritis knee were selected randomly divided in groups N_a = 25 given single intra-articular autologous platelet rich plasma injection and N_b = 25 given single 4ml (60mg) intra-articular HMW Hyaluronic injection. Follow up was done at the interval of 3rd, 8th, 16th and 24th week using visual analogue score and WOMAC score. data thus collected entered were presented in the form of tables, figures, graphs, diagrams. statistical tests were done using SPSS ver. 20.

RESULTS- There was decrease in VAS score but not significantly different at 3 weeks on follow up lower in Group A as compared to Group B at 24 weeks (p<0.001). WOMAC pain score decrease in both groups (p<0.001) but insignificant till 16 weeks on follow up lower in Group A as compared to Group B at 24 weeks (p<0.001). WOMAC stiffness was found to be significantly lower up to 24 weeks (p <0.001). WOMAC physical activities and WOMAC total score was not found to be significantly different between both the groups up to 16 weeks but on 24 week in Group A as compared to Group B at 24 weeks (p <0.001).

CONCLUSION – The AUTOLOGUS PRP had great pain relief and greater functional outcomes then HMW Hyaluronic acid.

KEYWORDS - platelet rich plasma, hyaluronic acid ,Osteo arthritis, comparison.

INTRODUCTION

Osteoarthritis (OA) is the most common form of arthritis, affecting approximately 15% of the population^{1,2}. The prevalence rates of 17% for symptomatic knee OA^{3,4}. Osteoarthritis usually has no known cause and is referred to as primary osteoarthritis. When the underlying cause is present such as previous trauma or injury, the condition is referred to as secondary osteoarthritis. Pain is the most prominent symptom of OA and most often is the reason patients seek medical help. Although subjective, osteoarthritis pain can be measured and is presently the best criterion for evaluating potential therapies. Age is one of the strongest predictors of OA⁵. Females are associated with a higher prevalence and severity of OA and are more often affected with hand, foot and knee OA than men⁶. A recent meta-analysis⁷ found that a dose-response relationship exists between obesity and the risk of knee OA. Repetitive joint use has been associated with an increased risk of OA. Topical medications are often used intra-articularly to relieve pain and increase joint functions, but they are not effective in cases of severe OA⁹. Intra-articular hyaluronic acid (HA) injection is widely used for treating knee OA, which provides

treatment efficacy due to its visco-induction properties of increasing joint lubrication, as reported in many studies and meta-analysis^{10,11}.

The promotion of growth factors in cartilage repair has been studied in vitro and in vivo,^{12,13,14,15} to stimulate cell functions, such as proliferation and differentiation, matrix synthesis, and chondrocyte metabolism¹⁶. Nevertheless, the complex OA process involves an inter-play of several growth factors needed in joint homeostasis and cartilage metabolism. Platelet-rich plasma (PRP) is an autologous concentration of human platelets by centrifugation of the patient's blood¹⁷, which contains many components, including growth factors, cytokines, and many other mediators^{18,19}. Thus we intended to study the effect of autologous platelet rich plasma and Hyaluronic acid when injected locally in knee with mild to moderate osteoarthritis.

AIMS AND OBJECTIVE

A comparative evaluation of clinical efficacy between autologous platelet rich plasma injection and Hyaluronic Acid injection in Mild to moderate osteoarthritis knee.

METHODOLOGY:

The present study was carried out in Department of Orthopaedics, Trauma centre, Sardar Patel Medical College And Associated Group Of Hospitals, Bikaner for 1 year (May'16-June'17).Total 50 patients attending OPD, Trauma centre,Sardar Patel Medical College, Bikaner with mild to moderate primary osteoarthritis knee between the age of 35-70 years of both male and female gender with Radiological Kellgren and Lawrence GRADE 1 to 3 were included in study using double blinding. Inclusion criteria were non-response to conventional analgesics for 2 months, able to walk and availability for the duration of entire study period and giving written informed consent. Selected patients were divided into 2 groups (A & B) randomly. Group A was given single intra-articular autologous platelet rich plasma injection and group B was administered single 4ml (60mg) intra-articular HMW Hyaluronic injection. They had to undergo local examination, blood investigations,radiological examination and follow up at the interval of 3rd, 8th, 16th and 24th week.Assessment was done by intervener other than investigator and co-investigator using two scores viz. visual analogue score and WOMAC score.

OBESERVATION AND RESULTS

Table -1

Risk factors	PRP Group(N _a =25)		HA Group(N _b =25)	
	N	%	N	%
≤ 50 years	11	44	13	52
51 – 60 years	9	36	11	44
>60 years	5	20	1	4
Female	17	68	15	60
Male	8	32	10	40
Radiographic OA grade I	5	20	4	16
Radiographic OA grade II	12	48	14	56
Radiographic OA grade III	8	32	7	28

Table – 2 Comparison of VAS score between the study groups at different follow up time

Time point	PRP Group(N _a =25)		HA Group(N _b =25)		P value
	Mean	SD	Mean	SD	
Base line	6.60	0.50	6.36	0.57	0.120
3 weeks	6.32	0.63	6.0	0.58	0.068
8 weeks	5.32	0.56	5.0	0.41	0.026
16 weeks	4.24	0.66	4.12	0.53	0.482
24 weeks	3.36	0.64	4.12	0.60	<0.001

Table 3: Comparison of WOMAC PAIN between the study group at different time

Time point	PRP Group(N _a =25)		HA Group(N _b =25)		P value
	Mean	SD	Mean	SD	
Base line	12.08	2.16	12.0	1.61	0.883
3 weeks	11.0	1.55	11.24	1.30	0.556
8 weeks	9.56	1.36	9.0	1.15	0.122
16 weeks	8.36	1.44	8.12	0.88	0.480
24 weeks	6.48	1.50	7.92	1.19	<0.001

Table 4: Comparison of WOMAC STIFFNESS score between the study group

Time point	PRP Group(N _a =25)		HA Group(N _b =25)		P value
	Mean	SD	Mean	SD	
Base line	5.83	0.81	6.12	0.44	0.122
3 weeks	5.45	0.72	5.84	0.55	0.036
8 weeks	4.70	0.75	5.08	0.49	0.039
16 weeks	4.0	0.51	4.20	0.58	0.202
24 weeks	3.25	0.60	4.32	0.75	<0.001

Table 5: Comparison of WOMAC PHYSICAL ACTIVITIES OF DAILY LIVING between the study group at different time

Time point	PRP Group(N _a =25)		HA Group(N _b =25)		P value
	Mean	SD	Mean	SD	
Base line	40.96	4.42	39.83	3.78	0.336
3 weeks	37.04	4.24	36.54	3.05	0.634
8 weeks	30.20	3.86	29.75	2.97	0.646
16 weeks	24.48	3.16	23.50	1.74	0.181
24 weeks	18.84	3.67	23.75	1.98	<0.001

Table 6: Comparison of WOMAC TOTAL SCORE between the study group at different time

Time point	PRP Group(N _a =25)		HA Group(N _b =25)		P value
	Mean	SD	Mean	SD	
Base line	58.88	6.42	57.92	5.35	0.568
3 weeks	53.84	5.67	53.36	4.34	0.738
8 weeks	44.64	4.72	43.88	3.76	0.532
16 weeks	36.84	4.06	35.76	2.31	0.253
24 weeks	28.64	4.53	35.68	3.18	<0.001

In our study Most of the study subjects in both group A and Group B were in ≤ 50 years and 51 – 60 years age group. The mean age of Group A was 52.88 ± 7.13 years, while that in Group B was 50.52 ± 5.46 years. There were 17 (68%) females and 8 (32%) male in Group A, while in Group B there were 15 (60%) females and 10 (40%) males. Most of the subjects in Group A had grade II (48%) OA followed by Grade III OA (32%), while in group B also most (56%) had grade II OA followed by Grade III (28%). There was decrease in VAS score in both groups but on inter group comparison VAS was not significantly different at 3 weeks. On further follow up the VAS score was significant lower in Group A as compared to Group B at 24 weeks follow up ($p < 0.001$). There was decrease in WOMAC pain score in both group but on inter group comparison WOMAC pain was not significantly different till 16 weeks of follow up. On further follow up the WOMAC pain score was found to be significantly lower in Group A as compared to Group B at 24 weeks ($p < 0.001$). On inter group comparison WOMAC stiffness was found to be significantly lower in Group A as compared to Group B at 3 week ($p = 0.036$), 8 weeks ($p = 0.039$) and 24 weeks ($p < 0.001$) of follow up. On inter group comparison WOMAC physical activities was not found to be significantly different between both the groups at 3, 8 or 16 weeks follow up. On further follow up the WOMAC physical activities was found to be significantly lower in Group A as compared to Group B at 24 week ($p < 0.001$). On inter group comparison WOMAC total not significantly different till 16 weeks of follow up. On further follow up the WOMAC total was found to be significantly lower in Group A as compared to Group B at 24 weeks ($p < 0.001$).

DISCUSSION

Most of the patients in both Group A and Group B were in ≤ 50 years. The mean age of Group A was 52.88 ± 7.13 years, while that in Group B was 50.52 ± 5.46 years. No significant difference was observed in mean age of the two groups ($p=0.195$). In **kon et al**¹² study mean age for PRP group was 50.3 years and mean age for hyaluronic acid was 54.9. There were 17 (68%) females and 8 (32%) male in Group A, while in Group B there were 15 (60%) females and 10 (40%) males. The two groups were found to be similar in relation to their gender composition ($p=0.768$). **Lana et al**⁶⁷ included 3 males and 33 females in group A and 8 males and 29 females in group B.

Most of the subjects in Group A had grade II (48%) OA followed by Grade III OA (32%), while in group B also most (56%) had grade II OA followed by Grade III (28%). No significant difference was observed in grade of OA among study groups.

There was decrease in VAS score with time in both the groups, on inter group comparison VAS was not significantly different at 3 weeks. On further follow up the VAS score was significantly lower in Group A as compared to Group B at 24 weeks follow up ($p<0.001$).

On inter group comparison WOMAC pain was not significantly different till 16 weeks of follow up. On further follow up the WOMAC pain score was found to be significantly lower in Group A as compared to Group B at 24 weeks ($p<0.001$). On inter group comparison WOMAC stiffness was found to be significantly lower in Group A as compared to Group B at 3 weeks ($p=0.036$), 8 weeks ($p=0.039$) and 24 weeks ($p<0.001$) of follow up.

On inter group comparison WOMAC physical functional score was not found to be significantly different between both the groups at 3, 8 or 16 weeks follow up. On further follow up the WOMAC physical functional score was found to be significantly lower in Group A as compared to Group B at 24 weeks ($p<0.001$). When PRP was compared to HA, the PRP group had significantly greater median VAS improvement at 8th, 16th and 24th week and significantly greater WOMAC improvement at 24th week compared to the HA group. This supports the findings of other studies that showed PRP having superior results versus HA in the treatment of knee OA. **Sanchez et al**⁷⁵ showed that PRP is better in pain, physical activity and overall WOMAC scores in 5 weeks compared to HA. **Spakova et al**⁷⁶ showed statistically significant better results in the PRP group compared to HA at 3 and 6 month follow up periods in both WOMAC and numeric rating scale (NRS) scores.

Few patients reported localised pain at injection site and localized inflammation for few days. However, at first follow up at 3rd week no such observation was made in either group. This temporary localised adverse effect can be because of leucocytes in PRP, which may trigger localised inflammation. There was no conflict of interest, no disclosure and no sponsorship for the research.

CONCLUSION

In this study we conclude that for short term (24 weeks), PRP injection and HA injection has improved pain and functional scores (WOMAC and VAS Score). So both of these injections were effective in reducing pain and improving physical activity of daily living for short term time period.

When PRP was compared to HA, the PRP group had significantly greater median VAS improvement at 8th, 16th and 24th week and significantly greater WOMAC improvement at 24th week compared to the HA group.

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