

Role of Intra-Articular Corticosteroid with Xylocaine Vs Plate Rich Plasma for the Treatment of Early Grade II Knee Osteoarthritis at Akhtar Saeed Teaching Hospital Lahore: A Randomized Controlled Trail

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ABSTRACT

Aim: To compare the treatment outcome of corticosteroid and platelet rich plasma injection for grade II osteoarthritis knee joint (OA) in pain relief.

Methods: This randomized controlled trial was done using simple random sampling technique at the Department of Orthopedic Surgery, Akhtar Saeed Trust Teaching Hospital, Lahore from February 2017 to July 2018. Our sample size was 150 patients randomly divided into two groups as group-A and group-B by lottery method. Our inclusion criterion was adult patient with knee pain between age 40 years and above, either gender, Kellgren / Lawrence grade 2 diagnosed clinically, and fulfilling American College of Rheumatology (ACR) criteria of osteoarthritis of patient who failed to respond conservative treatment for past three months. Physical examination was done on each visit after every two weeks using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) criteria.

Results: In group-A, there were 12 (23.5%) male and 39 (76.5%) were females. In group-B, male were 13 (25.5%) and females were 38 (74.5%). The mean age in group-A was 52.089±12.1year and in group-B mean age was 50.912±13.07year.

Conclusion: Females were affected more than male with knee pain and in young adult had stiffness with pain with advancing age.

Keywords: Platelet rich plasma, knee pain, osteoarthritis, corticosteroid.

INTRODUCTION

Osteoarthritis (OA) is most common cause of pain knee, disability and arthritis in elderly¹. IN United States, 12.1% people are affected with this degenerative condition after the age of 25year². It causes articular cartilage fibrillation, erosion and exposed subchondral bone. Recently, it has been found that this degenerative condition affects all tissues of the involved joint^{3, 4}.

The role of each soft tissue in affected joint has not been elucidated in overall condition of OA. With the progression of the disease that underlie the articular cartilage adopts the hyper mineralized behaviors and become stiff⁵. This change alters the mechanical properties of the affected joint and altered the nutrient transport across the vascular bone and marrow⁶. This cascade of degeneration further causes the alteration of the synovial fluid chemistry and increase in the inflammatory cytokines and products of cartilage matrix breakdown⁷. Joint synovium is an innervated tissue and develops changes⁸, and it suggests the cause of pain in this condition in addition to the inflammatory cytokines. The inflamed cell lost its ability to produce lubricin that lines the articulating surface⁹, resulting in altered lubrication during mechanical loading¹⁰.

Intra-articular corticosteroids have been used for decades for pain relief and control inflammation^{11,12,13}. There reported minimum to no benefits of intra-articular corticosteroid injection in knee osteoarthritis while other has concluded the evidence for efficacy of intra-articular

corticosteroids in knee OA is relatively weak^{14,15}. Recently Platelet-rich plasma has shown remarkable results. It is the alpha granules of platelets which contains growth factors, coagulation proteins, cytokines, chemokines & the adhesion proteins¹⁶. A single Injection of PRP may improves pain more than the steroid injection and these improvement may persists over time without any significant complication^{17,18}.

There is no concordance with effect of one treatment of non-surgical management of grade-II osteoarthritis. We postulated that intra-articular platelet rich plasma injection may have beneficial effects through different mechanisms and that they may act additively or synergistically. The aim of the study was to evaluate the effects of corticosteroid and PRP injection for pain relief, stiffness and improvement in functional activity.

METHODOLOGY

It was a randomized controlled trial, done using probability simple random sampling technique at the Department of Orthopedic Surgery Akhtar Saeed Trust Teaching Hospital, Lahore from February 2017 to July 2018. Our sample size was 150 patients randomly divided into two groups as group-A and group-B by lottery method. Our inclusion criterion was adult patient with knee pain between age 40 years and above, either gender, Kellgren / Lawrence grade 2 diagnosed clinically, and fulfilling American College of Rheumatology (ACR) criteria of osteoarthritis of patient who failed to respond conservative treatment for past three months. The exclusion criterion of the study were patients with past history of acute trauma and tumor involving knee joint diagnosed on history and radiograph. Patients who had received intra-articular steroid injection and patients with absolute contraindication for steroid.

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After taking all ethical considerations and explaining procedure to the patient, we took written consent and a questionnaire was filled from each participant. The group-A patients were given corticosteroid with xylocaine and group-B patients were given intra-articular platelet rich plasma. The injection was repeated after two months till six months. Physical examination was done on each visit after every two weeks using the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) criteria. It is 24 items divided into 3 subscales included pain (5 items): stiffness (2 items): after first waking and later in the day physical function (17 items). All question in the questionnaire are scored on the scale of 0 to 4 wherein 0 score is taken as none, 01 as mild, 02 as moderate, 03 score as severe and 04 as extreme. All scores are summed up on subscale and pain has possible score from 0 to 20, stiffness from 0 to 8 and 0 to 68 for functional activity. Summation of all sub score in three groups give total WOMAC score. When WOMAC score is high it indicate worse pain, stiffness, and functional limitations¹⁹. The severity of pain was observed on Visual Analogue Scale (VAS 0-10) with 0 no pain, 1 to 3 score as mild, score 4 to 6 as moderate and score 7 to 10 as severe pain.

Data was entered and analyzed using SPSS 21.0. Quantitative variables like age, pain score on visual analogue score was presented as Mean±SD. Qualitative variables like age was presented as frequency and percentage. Paired t test was applied to see the clinical outcome of two treatments and pvalue<5% was regarded significant.

Injection Technique: For group A, one ml (40mg) of triamcinolone acetone and 4 ml of 1% lidocaine

hydrochloride mix in 10 ml syringe with 26 guage needles was administered in group-A. Intra-articular injection was given using superolateral approach. The patient position was supine with knee was in full extension supported by thin pad of pillow beneath the knee. Patella was stabilized with the help of thumb of one hand and needle was passed underneath the superolateral surface forward towards the center and directed posteriorly and infero-medial to the knee.

In Group B patients were injected with 5ml platelet rich plasma injection alone through same technique. After two months of injection each patient was examined clinically to find early clinical response. Effectiveness of treatment in two groups was documented by reduction in severity of pain and improvement in functional activity. These were primary outcomes to be measured in this study. Secondary outcomes considered were continuous pain, pigmentation of skin. Failure was defined with absence of any of the three findings or pain score improvement was less than 90%.

RESULTS

In group-A, there were 12 (23.5%) male and 39 (76.5%) were females. In group-B, male were 13 (25.5%) and females were 38 (74.5%). The mean age in group-A was 52.089±12.1 year and in group-B mean age was 50.912±13.07 year. The body mass index in group-A was 26±5 and in group-B was 28±4 (Table 01). The paired t test of pre-operative and post-operative visual analogue score (VAS) and Western Ontario and McMaster University Osteo-arthritis index in two groups are given in table 02.

Table 1: Demographic data of gender, age and body mass index of the patients

Variables	Group-A (n=51)	Group-B (n=52)	Frequency (n=101)
Male	12 (23.5%)	13 (25.5%)	25 (24.5%)
Female	39 (76.5%)	38 (74.5%)	77 (75.5%)
Mean age of the patients in year	52.089±12.1	50.912±13.07	
Body Mass Index	26±5	28±4	

Table 2: Paired t test of the Visual analogue score and WOMAC score after six months

Variables	Mean	Standard Deviation	t	p-value
Visual Analogue score Group A				
Pre-operative VAS	4.52	1.528	12.735	<0.001
Post-operative VAS	1.22	1.2		
Visual Analogue Score Group B				
Pre-operative VAS	4.44	1.116	12.728	<0.001
Post-Operative VAS	1.705	1.18		

Variables	Pre-operative	Post-operative	t	p-value
WOMAC Score Group A				
Pain	7.34±4.28	4.34±2.251	3.86	<0.001
Stiffness	2.82±2.182	1.32±1.557	3.878	<0.001
Function	30.22±17.91	6.94±7.16	12.049	<0.001
WOMAC Score Group B				
Pain	8.02±5.28	3.26±3.97	4.76	<0.001
Stiffness	2.54±2.154	1.6±1.54	2.528	<0.015
Function	29.26±13.41	8.58±5.88	10.893	<0.001

*WOMAC=Western Ontario and McMaster Universities Osteoarthritis Index

DISCUSSION

Osteoarthritis is age related disease with gradual onset of pain stiffens and reduce function of the affected knee. It

results into degeneration of the cartilage with secondary component of inflammation [20-23]. It presents with pain, stiffness and pain radiates to the calf muscle. In OA, chondrocytes are deficient in glucocorticoids receptors [24].

It results in decrease response of OA cell to circulation glucocorticoids and it may be the reason of increase level of cytokines and metalloproteinase in the damage cartilage [25]. The reason behind the use of steroid drug is to subside inflammatory response in the degenerative cartilage.

The present study showed that patient who received triamcinolone and platelet rich plasma had improvement in pain on visual analogue score at six months of the follow up. This difference was statistically significant in both group (p-value<0.001). Dieppe et al²⁶ reported the reduction of pain, stiffness and tenderness with the use of corticosteroid. The findings of our study are consistent with reported data. Jones et al²⁷ in his randomized controlled trial with single blinding reported good result in OA patients six month follow up with triamcinolone hexacetonide.

We used Western Ontario and Mc Master University Osteo-arthritis Index for evaluation of pain, stiffness, and function in both groups. The results were similar in two groups in relieving pain and improving the function (p-value 0.001). Corticosteroids showed better results in improving the stiffness (p-value <0.001) in OA patients while in PRP group this difference was not statistically significant (0.015). Kon et al²⁸ repeated injection in patients with OA and reported significant improvement on 6 to 12 months. The result of the PRP are due to the effect of growth factor that effect of cartilage to improve the knee pain and function.

American association of orthopedic surgery reported the intra-articular PRP as inconclusive as benefits for the patients with symptomatic osteoarthritis [29]. In clinical studies, they reported PRP is safe with no serious complications [30, 31]. Our study has 77 (75.5%) female population showed that females has more effected by osteoarthritis in our population as compared to the male. There was no difference in the body mass index of two groups.

Our study has limitation of small sample size with shorter follow up. We didn't evaluate the adverse effect of two treatment. Further studies can be conducted to extend the findings of our data.

CONCLUSION

It was concluded that both corticosteroid and platelet rich plasma has role in relieving pain, and improving function in Kellgran Lawrence grade II osteoarthritis of the knee while steroid has additional effect of improving stiffness in knee.

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