ORIGINAL ARTICLE

Comparison of Intra-Articular Steroids Injection Versus Platelets Rich Plasma Injection in Patients with Osteoarthritic Knee Joints

SHAHID HUSSAIN PHUL[1], MUHAMMAD MOBUSHIR[2], RIZWAN-UL-AHSAN JILANI[3], *IMRAN SIKANDAR KHAN[4], RIZWAN HAMEED MALIK[5], GHIAS JAN[6]*

ABSTRACT

Aim: To compare the mean pain between intra-articular steroids injection versus platelets rich plasma injection in patients with osteoarthritic knee joints.

Methods: This randomized controlled trial was carried out at Department of Orthopaedics, Pakistan Institute of Medical Sciences, Islamabad from 20th February to 21st August 2015. Eighty patients presenting with knee joint OA were included. They were divided in two groups; Group A receiving platelets rich plasma (PRP) injection while group B receiving corticosteroid injection. Two hours before injection, a single dose of acetaminophen-codeine was given to the patients. Baseline and 3 months follow-up pain scores were recorded by asking patient to rate VAS as per the pain they feel on movement and outcome is difference of mean pain score.

Results: There were male to female ratios were 1:2.4 and 1:1.8, mean ages were 54.45±4.54 years and 57.65±10.36 years and mean duration of symptoms were 1.93±0.57 years and 2.03±0.61 years in platelets rich plasma injection and corticosteroid injection groups. Statistically the difference between platelets rich plasma injection and corticosteriod injection groups were significant (P<0.05) in mean pain scores.

Conclusion: It was found that platelets rich plasma is safe as well as effective technique for knee osteoarthritis treatment than intra-articular steroids.

Keywords: Pain score, Intra-articular steroids injection, Platelets rich plasma, Osteoarthritic knee

INTRODUCTION

Among ten most common pathological causes of human disability around the globe one is joint pain caused by osteoarthritis (OA). Among common chronic diseases, osteoarthritis is one of them. According to an estimate, its overall prevalence in young population is 24% for knee osteoarthritis and 11% for hip osteoarthritis[1]. It is a clinical syndrome of joint pain which is characterized by the gradual loss of articular cartilage, osteophyte formation, sub-chondral bone remodeling, and inflammation of joint. Due to pain and function loss of joint, osteoarthritis of knee joint is most common and most debilitating. Osteoarthritis is as a major public health problem and leads to not only physical but financial burden on individual as well as national economy[2].

In initiation and continuation process of osteoarthritis, a pivotal role plays by the inflammatory mediators and in symptoms & structural progression of osteoarthritis synovial inflammation play a critical role. Mostly acute pain and osteoarthritis general indication[1,3]. There is pain related activity in the early stage of osteoarthritis and after that with the passage of time pain increasing as the disease increased and convert to persistent with associated strong paint attack. There are different techniques used to alleviate the knee osteoarthritis symptoms for the purpose to relief from knee osteoarthritis pain, including different types of medication and supplements i.e. (chondroitin-sulfate, glucosamine, NSAIDs), intra articular injections (hyaluronic acid, glucorticoids) as well as physical agents like exercise, laser therapy, shoes and insoles, heat application etc. and surgical interventions[2,4].

[1,2,3]Senior Registrars Orthopaedic Surgery,
[4]Professor of Orthopaedics and Trauma,
[5]Professor of Orthopaedics,
[6]Associate Professor of Orthopaedics, PIMS Hospital, Islamabad
Correspondence to Dr. Shahid Hussain Phul
Email: drshahid.phul85@gmail.com

Use of IA corticosteroid injections is frequent since long time to treat acute and chronic inflammatory conditions which reduced sever episode of pain and enhance joint mobility.[4-7] In a study by Lambert etal.[8] It was observed that mean pain score decrease 49.2% (decrease from 3.10±0.54 to 1.57±0.12) at 2 months post-injection in patients receiving corticosteroid, compared with a decrease of 2.5% (from 3.14±0.76 to 3.06±0.12) in group of placebo (P value <0.0001).

Another useful option is PRP (platelet rich plasma) which obtained through centrifugation of autologous blood to get a high intensive platelet sample, which is 4 - 5 times high then the usual blood[9]. Many studies have found that platelet rich plasma (PRP) is capable to alleviating pain, improve knee functions and quality of life.[10-12] Intra-articular knee injections of homologous platelet-enriched plasma have been shown to improve function and quality of life in patients with degenerative lesions of the knee cartilage and osteoarthritis at 6 months post-injection. PRP injections have shown greater and longer efficacy than hyaluronic acid injections in reducing pain and symptoms and improved articular function but it has not been compared with corticosteroids[13].

A study by Raeissad at et al[14] used PRP and found that the mean pain score decreased from 8.36 to 4.38. Patel et al[15] compare PRP with placebo and found that the mean score for pain among patients receiving 2 injections of PRP were 10.18 at baseline and 5.00 at final follow-up while in placebo group these score were deteriorated from 9.04 at starting position to 10.87 at final follow up. Similar study found that VAS score at pre-injection was 4.64±0.56 and was 2.54±1.71 at 6 months follow-up among PRP group while it was 4.57±0.62 and was 4.61±0.74 at 6 months follow-up among placebo group (P value = 0.001).

MATERIALS AND METHODS

This randomized controlled trial was carried out at Department of Orthopaedics, Pakistan Institute of Medical Sciences, Islamabad from 20th February to 21st August 2015. Patients age 40 to 75 years, body mass index (BMI) ≤33 kg/m^2, Primary osteoarthritis with grade 2–4 of Kellgren-Lawrence radiological grading as given in operational definitions and history of knee pain or swelling for at least 4 months were included. Those patients who have already treated with steroids and anti-coagulant or anti-platelet aggregation, history of infectious, systemic diseases, immune deficiency and coagulation disorders and collagen vascular disorders, infection or active wound/ current history of harsh trauma to knee, history of knee articular injections of corticosteroids, hemodynamic instability or septicemia, with Hb ≤11, Platelet ≤1,50,000/mm^3, genu varum >10 degrees or Genu valgum >10 degrees, relative contraindications to PRP knee injections and cancer, particularly of bone or blood were excluded. Patients presenting with knee joint OA at Orthopaedics OPD of PIMS hospital was approached to participate in the study. The patients were randomly allocated one of the two groups; Group-A receiving platelets rich plasma (PRP) injection in the knee joint while group-B receiving corticosteroid injection. In group A; to prepare 4–6 µmL of platelet rich plasma with concentration of 4–5 times standard usual values, 35–40µmL of blood firstly obtained from limb cubital vein of the patients by using 18µG needle. After that 5µmL of ACD-A added to sample as an anti-coagulant. One µmL of the blood sample was sent for CBC (complete blood count). The remaining sample passed two stages of centrifuge (to separate erythrocytes, first with 1600µrpm for 15 minutes and 2800 µrpm for next-with for seven minutes in order to platelets concentration). The last outcome was 4–6µmL of platelet rich plasma contains leukocytes. Two hours before injection, a single dose of acetaminophen-codeine was given to the patients. The skin of the injection site was prepped and draped and the liquid platelet rich plasma was injected in a sterile condition by using 22µG needle through classic approach for intra-articular injection (suprapatellar or medial). After the rest of fifteen to twenty minutes, patients asked to actively move flex, extend their knees, so that platelet rich plasma can reach consistently across the space of joints before changing into gel. Group B patients were received a fluoroscopically guided IA injection of anesthetic (10 mg bipuvicaine) and corticosteroid (40 mg triamcinolone hexacetonide [2ml at 20mg/ml]). Triamcinolone hexacetonide is active IA treatment. A dose of 40 mg in conjunction with a local anesthetic was given in accordance with the ACR recommendations for IA use in large weight-bearing joints. All data was entered and analyzed in SPSS version 17.

RESULTS

There were 12 males (30%) and 28 females (70%) in platelets rich plasma injection group while in corticosteroid injection group, there were 14 males (35%) and 26 females (65%). Male to female ratios were 1:2.4 in platelets rich plasma injection group and 1:1.8 in corticosteroid injection group (Table 1). There were 21 patients (52.5%) in age group forty to fifty five years and 19 patients (47.5%) in the age group of 56-70 years in platelets rich plasma group while in corticosteriod injection group, in the age group of forty to fifty five years and fifty six to seventy years, there were 17-patients (42.5%) and 23 patients (57.5%) respectively. The mean±SD ages of groups were 54.45±4.54 years and 57.65±10.36 years respectively (Table 2).

Thirty four patients (85%) have duration between 1-2 years and 6 patients (15%) have duration between 2.1-3 years in platelets rich plasma injection group while in corticosteriod injection group, 26 patients (65%) have duration between 1-2 years and 14 patients (35%) have duration between 2.1-3 years. The mean±SD of duration of symptoms were 1.93±0.57 years and 2.03±0.61 years of the groups. Twenty eight patients (70%) have pain score between 4-5 and 12 patients (30%) have pain score between 6-7 in platelets rich plasma injection group while in corticosteriod injection group, 27 patients (67.5%) have pain score between 4-5 and 13 patients (32.5%) have pain score between 6-7. Statistically the difference between the groups was significant (P<0.05) in mean pain scores.

Table 1: Frequency and percentage of genders in both groups (n=80)

Gender	Group A (n=40)		Group B (n=40)	
	No.	%	No.	%
Male	12	30.0	14	35.0
Female	28	70.0	26	65.0
Male to female ratio	1:2.4		1:1.8	

Table 2: Frequency and percentage of ages in both groups (n=80)

Age (years)	Group A (n = 40)		Group B (n = 40)	
	No.	%	No.	%
40 – 55	21	52.5	17	42.5
56 – 70	19	47.5	23	57.5
Mean±SD	54.45±4.54		57.65±10.36	

Table 3: Frequency and percentage of duration of symptoms in both groups (n=80)

Duration of symptoms (years)	Group A (n=40)		Group B (n=40)	
	No.	%	No.	%
1 – 2	34	85.0	26	65.0
2.1 – 3	6	15.0	14	35.0
Mean±SD	1.93±0.57		2.03±0.61	

Table 4: Frequency and percentage of pain score in both groups (n=80)

Pain score	Group A (n = 40)		Group B (n = 40)	
	No.	%	No.	%
4-5	28	70.0	27	67.5
6 – 7	12	30.0	13	32.5
Mean±SD	4.83±0.87		5.73±0.78	
P value	0.000			

DISCUSSION

Osteoarthritis is a noteworthy general medical issue which reason disability as well as pain in 1/3rd of all effected patients[16]. It is one of critical musculoskeletal illness distinguished by the imbalanced homoeostasis & obliteration of articular cartilage, in which pro-inflammatory

cytokines are significant catabolic regulator during osteoarthritis cascade.[17] From blood, the natural distillation of autologous development factor is platelet rich plasma (PRP). It permits in a straightforward, ease and negligibly obtrusive approach to acquire a concentration of numerous development factors[18]. For treatment of knee osteoarthritis, use of platelet rich plasma can consider a new therapeutic indication[9].

In the present study, two injections of intra-articular steroids and platelets rich plasma, with the interval of four weeks, improved the stiffness, and the function capacity of knees of the patients after 6 months. After injections, quality of life improves meaningfully. These progressions were more imperative in physical areas including part confinement because of physical working, wellbeing and torment. The results of the present study were comparable to Wang-Saegusa et al study[11].

At the point when treatment with an intra-articular infusion is being viewed as, the general state of the patient must be altogether evaluated, including his or her comorbidities, the level of osteoarthritis, attending drugs utilized by the patient, past infusions and their impact, and history of past was diseases. One likewise ought to clear up if the patient is a contender for arthroplasty later on. In the event that the patient is a contender for add up to knee substitution, treatment with intra-articular infusions of steroids could put him or her at expanded hazard for building up a profound contamination following arthroplasty, as proposed by Papavasiliou et al[19].

Chang[20] reviewed platelets rich plasma injection effects in knee osteoarthritis evaluated to intra-articular steroids in a review performed in 2014. Study confirmed that platelet rich plasma lead to important functional development in knee cartilage pathology patients, who effects at least from 12 months. The patients fall under the group of platelet rich plasma had longer and more development/improvement as compared to those who received intra-articular steroids. Much better results were also observed among patients who have mild form of osteoarthritis as compared to advanced ones. In another meta analysis, similar results were also obtained. In 2013, Khoshbin etal[21] found the platelet rich plasma (PRP) injection extra affective than intra-articular steroids in mild to moderate osteoarthritis.

In a study conducted by Sanchez et al[22], platelet rich plasma receiving group showed a important development in thirty three percent of patients at five weeks while 80% satisfied patients reported by Kon et al[23] in his study. In group-A, there were 70% satisfied patients in our study and in group-B there were 67.5% satisfied patients at six month follow up (Table 4).

Statistically important improvement for awareness of pain in patients, knee functions, inactivity stiffness duration and VAS score and life quality shows in present study. Good outcomes were attained in young patients as well as those who have minimal period of disease. Pain observed as a main outcome measure, in both groups A & B mean pain score initially reduced, which receive platelets rich plasma and intra-articular steroids. However, our trend of both groups both groups similar to a study conducted by Kon et al[23] and observed a minor trend of deteriorating in International Knee Documentation Committee objective and subjective scores from two to six months which was important.

CONCLUSION

Outcomes of this study supported the short period efficiency of platelet rich plasma injection over an intra-articular steroid for alleviate pain, stiffness & improving functions of knee in initial knee osteoarthritis. It also observed that intra-articular injection of platelet rich plasma is safe and effective technique for treatment of knee osteoarthritis. Maximum development was found in young patients and those with short duration of disease. Our study presented that knee injection of intra-articular of platelet rich plasma can reduce stiffness and joint pain as well as improving life quality of patients in short period than intra-articular steroid injection. In this manner, platelet rich plasma (PRP) infusion might be a substitute treatment in specific patients impervious to current nonsurgical medicines.

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