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Original Research Paper

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COMPARATIVE STUDY OF SHORT TERM OUTCOME OF PATIENTS WITH KNEE OSTEOARTHRITIS TREATED WITH PLATELET RICH PLASMA AND STEROIDS (TRIAMCINOLONE). A PROSPECTIVE, RANDOMIZED, DOUBLE BLIND STUDY

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ABSTRACT

Background and Objectives:
This study aims to assess whether intraarticlar injection of platelet rich plasma (PRP) and triamcenolone (steroid) are effective treatment for knee osteoarthritis, and compare both of them in terms of pain, knee joint stiffness and function and side effects.

Methodology:
This prospective study was carried out at the Department of orthopedics, Sir T hospital, Bhavnagar. In this study, around 60 patients (29 males, 31 females; mean age 51.3 years range; 40 to 70 years) with osteoarthritis knee (kellgran Lawrence grade 1-3) were included. Patients were randomized into two groups; one group including 30 patients received intraarticular PRP injection and other group including 30 patients received intraarticular steroid. The patients were evaluated using VAS score and WOMAC score before the treatment and at 1month, 2month and 6 month after the treatment.

Results:
In the PRP and steroid groups, when pretreatment VAS and WOMAC scores were compared with each other, there was no significant difference was seen, In PRP groups, VAS and WOMAC scores decreased significantly at 1st month, 2nd month and 6th month follow-up. In Steroid group, VAS and WOMAC scores decreased significantly at 1st month and 2nd month followup; however at 6th month follow-up, VAS and WOMAC scores were increased while no significant difference was found with baseline. When groups were compared at 6 month follow-up, VAS and WOMAC scores of PRP group were significantly lower than steroid group.

Interpretation and Conclusion:
In conclusion, our findings have shown that intraarticular PRP injections are more safe and effective treatment than intraarticular steroid in 6 months follow-up study. Treatment response obtained with corticosteroid injection has a shorter duration than PRP treatment.

KEYWORDS : platelet rich plasma, steroid, triamcenolone

INTRODUCTION:

Osteoarthritis (OA) is the most common chronic joint disorder, and it causes detrimental effects on the quality of life and functional status. . Osteoarthritis (OA) is a slowly progressive, chronic degenerative disease that is characterized with varying degrees of joint cartilage loss with local inflammation and periarticular bone rebuild.(1) The progression of cartilage lesions manifests with pain, stiffness, swelling, decreased joint range of motion while significantly affecting the quality of life. Treatment is focused on reducing symptoms and slowing the progression of the disease.

Conservative treatments have been reported to increase the quality of life of patients particularly in the early phases. It includes physical therapy modalities, orthoses and pharmacological treatments. The effects of pharmacological treatments (NSAIDS) are short term and their systemic side effects (gastrointestinal, hepatic and renal toxicity) cause frequent problems. Patients resistant to topical and oral pharmacological treatments can benefit from intraarticular injections.(2) Corticosteroid and hyaluronic acid injections are the most commonly used agents for intraarticular treatment. Intraarticular steroid injections in knee OA are also among the ii Arch Rheumatol recommendations of "Osteoarthritis Research Society International 2014" and "American College of Rheumatology 2012" guidelines.(3,4) The disadvantage of corticosteroid injections is its short duration of benefit.(5) Another commonly used treatment in knee OA is synthetic hyaluronic acid due to its modulating effects on inflammatory reactions and viscosupplementation. Hyaluronic acid's natural form can be found in healthy joint fluid and studies that demonstrate superiority over corticosteroid injections are available; however, an up-to-date meta-analysis has emphasized clinical ineffectiveness and increased risk of serious side effects. (6) Therefore, recent studies have focused on stimulating cartilage healing processes through administration of growth factors (GF), cytokine inhibitors, matrix metalloproteinase inhibitors, or IL-1 receptor antagonists.

Platelet-rich plasma (PRP) is an autologous concentration of a high number of platelets in a small volume of plasma, and it is prepared by centrifugation of blood. Platelets contain significant amounts of cytokines and growth factors which are capable of stimulating cellular growth, vascularization, proliferation, tissue regeneration, and collagen synthesis. Delivery of high concentrations of cytokines and GFs to damaged tissues by PRP is considered to have a beneficial effect on tendon and cartilage tissue regeneration. In some in vitro and in vivo studies, anti-inflammatory and reparative effects of PRP on cartilage, tendon, and ligament recovery have been shown; however, there is no consensus on eligible patient selection, the number and frequency of injections, the preparation technique, or the appropriate platelet concentration. It is a simple, low-cost and minimally invasive method for obtaining autologous growth factors. (7)

In knee OA, PRP injections aim to promote cartilage repair and relieve osteoarthritic symptoms, potentially delaying the need for joint replacement surgery. Some studies have reported a reduction in PRP efficacy in moderate and advanced (Kellgren Lawrence grade 3–4) knee osteoarthritis, as this group of patients has higher pain and functional impairment, which require more medical attention. Grade 4 OA generally requires surgical treatments such as tibial osteotomy and total knee replacement. There are many case series in the literature that show positive results regarding intraarticular PRP injections.

However, relatively few randomized controlled trials are available.

Most often, these trials have been conducted to compare short term clinical outcomes with hyaluronic acid. In conclusion, PRP has been reported as a welltolerated, appropriate treatment option in early stage knee OA.(8) There are studies in the literature that include PRP-PRP, PRP-placebo, and PRP-hyaluronic acid comparisons; however, studies comparing corticosteroid-PRP injections in knee OA are significantly fewer.(9) Therefore, in this study, we aimed to assess whether PRP is an effective treatment for knee OA, and compare its efficiency with corticosteroid treatment in terms of pain control, physical function, and quality of life.

Material and method

A prospective study was conducted at Sir T. Hospital , Bhavnagar After Obtaining The Ethical Clearance for Study. During The Period of 6 Months, detailed history regarding personal data, history of mechanism, pre- injury ambulatory status, pre-existing local and systemic condition, menopausal status taken that may affect recovery. Full clinical examination was done to assess the general condition of the patient, range of movement and any associated injuries. Radiographs were taken in planes- antero- posterior and lateral view to assess the condition of joint. After deciding the appropriate plan, patient was prepared for PRP treatment. Every patient was treated upon as early as possible. All patients were assessed with regard to procedure time, hospital stay and post-treatment complications. Patients were discharged after 1 hour of PRP treatment. Patients were followed on, 1st Month, 2nd month and 6th month. On follow up visits patient's VAS score and WOMAC scores were evaluated with general and systemic examination.

Result:

The Analysis was done using Visual Analouge Score and the following results were obtained.

Table No: 1:- PRP AND VAS SCORE AT 6 MONTHS FOLLOW UP

Grading (according to VAS Score)	Number of Cases	Percentage %
Excellent (0)	1	3%
Good (1 -3)	22	73%
Fair (4 -6)	6	21%
Poor (7 -10)	1	3%

Table: 2:- STEROID AND VAS SCORE AT 6 MONTH FOLLOW UP

Grading (according to VAS Score)	Number of Cases	Percentage %
Excellent (0)	0	0%
Good (1 -3)	1	3%
Fair (4 -6)	4	14%
Poor (7 -10)	25	83%

Table:3 :- Comparison of average Pre-treatment , 1st , 2nd and 6th month VAS sores of the groups

VAS Score (Average)	PRP Group	Steroid Group
Pre-treatment	7.8125	8.333333
Post-treatment 1st month	4.4375	5.266667
Post-treatment 2nd month	3.59375	4.7
Post-treatment 6th month	2.84375	7.2

Sixty patients including – males and – females in the age group of 40-70 years were included in the study. The study had thirty patients in each group. out of which one group received prp and other group received steroid. The mean age of all patients was 51.3 . Between the patients of both groups, no statistically significant difference was determined with respect to gender, age, osteoarthritic stage or involvement (unilateral/ bilateral). No infection, deep venous thrombosis or similar serious complications were seen during or after treatment. In prp administrated group, swelling occurred at 5 knees. Which was recovered after applying ice. And steroid administered group, 1 had allergic reaction and one had skin depigmentation.

The average VAS score of prp group was determined 7.8 before treatment, which decreased upto 4.4 at 1 month, 3.5 at second month and 2.8 at 6 months. In the prp group, when pre treatmet vas score was compared with post treatment 1 month, 2nd month and 6 month scores, statistically significant difference was seen.

The average VAS score of steroid group was determined 8.3 before treatment, which decreased uptp 5.2 at 1 month, 4.7 at second month and then increased significantly but lower than baseline at pre treatment , around 7.2 at 6 months. In the steroid group, when pre treatmet VAS score was compared with post treatment 1st month and 2nd month scores, statistically significant difference was seen while there was not much difference between pretreatment VAS score and 6 month followup VAS score ,but 6 month follow up VAS score was lower than baseline pre treatment score.

Table;4: Comparison of Pre-treatment , 1st , 2nd and 6th month WOMAC sores of the groups '

WOMAC Score	PRP Group	Steroid Group
Pre-treatment	65.1	67.2
Post-treatment 1st month	38.3	44.7
Post-treatment 2nd month	34.8	44.3
Post-treatment 6th month	31.5	58.7

The average WOMAC score of prp group was determined 65.1 before treatment, which decreased upto 38.3 at 1 month, 34.8 at second month and 31.5 at 6 months. In the prp group, when pre treatment WOMAC score was compared with post treatment 1 month, 2nd month and 6 month scores, statistically significant difference was seen.

The average WOMAC score of steroid group was determined 67.2 before treatment, which decreased upto 44.7 at 1 month, 44.3 at second month and then increased significantly but lower than baseline at pre treatment , around 58.7 at 6 months. In the steroid group, when pre treatmet WOMAC score was compared with post treatment 1 month, 2nd month and 6 month scores, statistically significant difference was seen.

DISCUSSION:

Osteoarthritis is a major public health problem which causes pain and disability in one third of all affected patients [10]. It is one of the crucial musculoskeletal disorders characterized by imbalanced homeostasis and destruction of the articular cartilage, in which pro-inflammatory cytokines are important catabolic regulators during OA cascade [11]. Both pharmacologic and non pharmacologic treatments are available for osteoarthritis knee. Combined use of these two alternatives are recommended. However, still there is not a treatment that can eradicate disease and change the course. Intraarticular injections are prefereed alternatives for symptomatiuc osteoarthritis knee.

Platelet rich plasma (PRP) is a natural concentrate of autologous growth factors from the blood. It allows in a simple, low cost and minimally invasive way to obtain a concentration of many growth factors [12]. The application of PRP to treat OA knee can be considered a relatively new therapeutic indication [13].

There are more than 30 bioactive proteins in the alpha granules of the platelets. The platelet origin growth factor, transforming growth factor, venous endothelial growth factor, insulin like growth factor, etc. and the proteins, such as fibrin, fibronectin, vitronectin and thrombospondin contained in PRP play a role in many stages of tissue recovery. The growth factors activate the cells that function in tissue recovery. PRP's mechanism of action on the degenerative knee joint can be stated as recurring inflammation and angiogenesis through its proteins and growth factors, anabolic and

cartilage protecting activity, cell differentiation and synovial cell modulation. PRP is derived from the patient's blood and the platelet ratio it contains is much higher than the full blood. PRP contains a high concentration of platelets, growth factors, proteins and cytokines.In another study, it was reported that the efficacy of prp is maximized when the platelet concentration is 2.5 times the basal platelet count it was determined as 4.8 times in our study. Prp can be easily prepared in laboratory centrifuges, outpatient clinics and similar units.

In our study, when VAS scores at 1,2 and 6 months were compared with pre treatment VAS scores, statistically significant difference was demonstrated.

Platelet rich plasma has been reported as a safe treatment with no serious complications. Minor side effects reported are pain, swelling and mild effusion that can last a few days. In our study we only observed mild Swelling on five patient's knee, which regressed with cold application in 2 days.

Intraarticular corticosteroid injections are widely used to reduce pain and limitation of joint movement in knee OA, particularly in the presence of inflammation and joint effusion.[14]

In the Cochrane review at 2006, intraarticular corticosteroid injections were found effective in reducing pain up to three weeks when compared with placebo in knee OA, but not in terms of functional improvement. There was no significant improvement in pain and function at 24 weeks after injection. When compared with hyaluronic acid injections, there was no difference in the first four weeks after injection. However, hyaluronic acid was found to be superior in terms of WOMAC scores, pain control, and joint range of motion improvement between fifth and 13th weeks. Its efficacy was found similar to corticosteroids but then, more durable.(15)
In our study; all VAS and WOMAC scores decreased significantly in the first and second month follow-up in patients who were injected with intraarticular corticosteroids. However , its effect wear off in 6 months. VAS and WOMAC scores increase at the end of the sixth month, and no difference was detected compared to baseline scores. Sixth month VAS and WOMAC scores were worse compared to the second month, but were significantly lower than before the treatment.

In a randomized controlled trial conducted by Gobbi et al.,(16) intraarticular single dose PRP and corticosteroids were compared in patients with grade 2-3 OA. Pain, symptoms, activities of daily living and quality of life were significantly improved in the PRP group compared to the corticosteroid group at second and sixth month follow-ups. In our study, there was no difference between the groups in terms of WOMAC and VAS scores at first and second month. However In the sixth month follow- up, VAS and WOMAC pain scores of the PRP groups were also significantly lower than the corticosteroid group.

Among the limitations of our study were the relatively small sample size and short followup. In addition performing objective studies such as MRI and pathologic assessments would be useful in evaluation of PRP effectiveness in patients with OA.

CONCLUSION:

In the treatment of moderate OA when physical therapy and other pharmacological therapy fail to relieve pain, then intraarticular injection can be used as a short term measure.

In conclusion, our findings have shown that intraarticular prp injections are more safe and effective treatment than intraarticular steroid in 6 months follow-up study. Intraarticular steroid relieves knee pain rapidly up to 2 months and effect wears off in 6 month follow up. While effect of intra articular prp lasts longer on 6 month follow up.

So, in short duration study of 6 months, intraarticular prp is better than steroid injections as prp is autologous, natural and has no side effects.

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