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COMPARISON OF FUNCTIONAL OUTCOME AND PAIN RELIEF BETWEEN STEROID INJECTION AND PLATELET RICH PLASMA INJECTION IN EARLY OSTEO ARTHRITIS KNEE

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ABSTRACT: Introduction: Osteoarthritis Knee (OA) is the most common form of joint disability in elderly individuals. Various treatment modalities have been established for OA. This study is to compare the functional outcome and pain relief following IA (intraarticular) steroid versus PRP (platelet-rich plasma) injection. **Methods:** In this study 30, patients were selected and segregated into two groups 15 each with knee pain for more than 1 year. Each patient would either be treated with IA steroid injection or PRP injection. Patients immediate post-injection VAS and HSS scoring were recorded. **Result:** Group A and Group B were treated with IA steroid and PRP respectively. BMI (body mass index) was found to be of great significance. Patients were reassessed after injection at 1-month intervals of 1, 2, and 3 months. Visual Assessment Scoring also was used pre-injection. Post injection reduction in pain was recorded with a reduced score in 1month and 2month post-injection follow-up. In this comparative study, patients with PRP injection had better pain improvement over a long period with excellent results of 60% and good results in 26.6%. In the steroid group, excellent results were seen in 46.6% and good results in 40% in the PRP group. **Conclusion:** Our experience indicates that IA injections are safe and positively affect patient satisfaction. In conclusion, both the treatment approach has promising results. But PRP has a longer duration of pain relief but taking into consideration for acute pain experienced by a few patients.

INTRODUCTION: Osteoarthritis Knee (OA) is a clinical condition refers to pain in knee joint with multifactorial etiology characterized by a gradual reduction in articular cartilage with osteophyte formation and inflammation of joint. It is the most common form of joint disability. OA is one of the top 10 causes of disability worldwide [1].

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OA poses a major burden financially to the patients [2]. Various treatment modalities have been established for OA. The non-pharmacological treatment for OA is weight reduction, exercises, walking with support, bracing, local cooling, and heating therapies [3]. Pharmacological therapies are such as paracetamol, NSAIDs, glucosamine, chondroitin sulfate, and opioids.

Direct Intra Articular (IA) injection of corticosteroids, viscosupplementation, and Platelet Rich Plasma are more effective than oral pharmacotherapies [4]. The major contraindication of IA injections is septic arthritis in which there is iatrogenic infestation of organism into the joint.

The benefits related to IA injection is short-lived. The short-term pain reliving from steroids and clinical experiences vary with prolonged pain reliving for rheumatoid arthritis. Certain studies state that long-term treatment could promote joint destruction and tissue atrophy [5]. Some studies state that these changes are rather due to disease than the steroid action.

Platelets are small cytoplasmic fragments derived from bone marrow. Platelet, when exposed to collagen and other extracellular matrix protein, stimulates the activation and releases cytoplasmic granules. In general, platelet contains over 800 proteins and molecules, cytokines, chemokines, membrane proteins and growth factors. Numerous studies have been described for the septation of PRP [6]. This study was performed to compare the functional outcome and pain relief following IA (intraarticular) steroid versus PRP (plate rich plasma) injection in the management of osteo arthritis of the knee.

MATERIALS AND METHODS: A prospective comparative study was conducted on a randomly selected 30 patients (15 male and 15 female) who came to our hospital with complaints of knee pain for the past 1 year. The selected patients were symptomatic with radiologically confirmed OA knee. The patients selected were either Grade II or Grade III based on Kellgren-Lawrence classification **Fig. 1.**

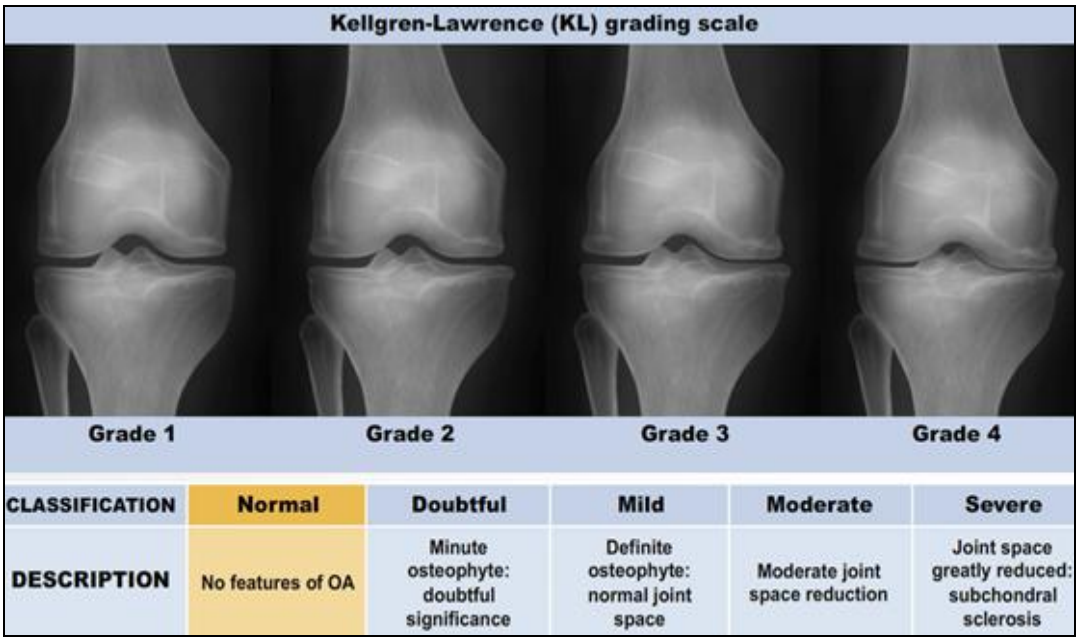

FIG. 1: KELLGREN LAWRENCE GRADING SCALE

Ethical committee approval was obtained (IEC No: SMC/IEC/2020/11/54), the study was conducted for 2 years, from June 2019 till June 2021. Inclusion criteria were all the patients above age of 50 with a history of chronic knee pain not reduced with oral analgesics and physiotherapy. Patients were diagnosed clinically and radiologically with OA knee in AP and lateral views standing.

Patients with post-traumatic knee arthritis, endocrine disease (gout), Rheumatoid arthritis, clotting disorders, allergic to the drugs used, and patients not willing to participate in the study were excluded. Patients were randomly segregated into Group A and Group B. Group A patients were treated with intraarticular steroid injection Triamcinolone acetonide injection (40mg kenocort 1ml + 2ml of lignocaine0.25%) and Group B with intra articular PRP (3ml). Both the groups were asked to avoid the oral NSAID 1week before injection. PRP was prepared with 20ml of peripheral blood, and 2ml of 3.8% sodium citrate was added.

The sample collected was centrifuged at 1800rpm for 10 min. 3ml of PRP solution was obtained and used for intra-articular injection. An anterolateral approach was used for Arthrocentesis in both the groups **Fig. 2.**

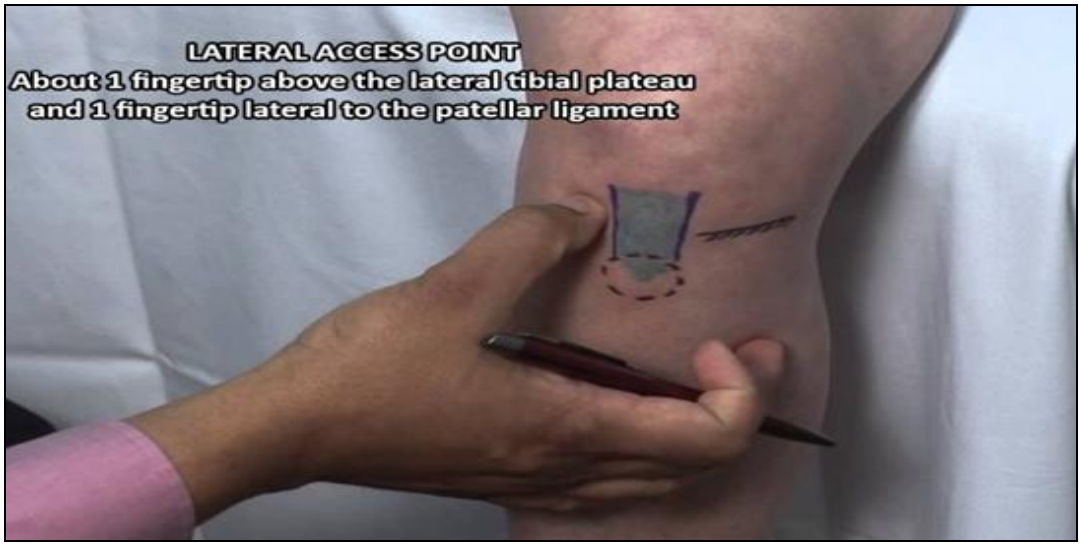

FIG. 2: NEEDLE ENTRY POINT

Intra articular injections were performed Under aseptic precautions with the help of a 20-G needle and a 5ml syringe. After manipulation, the aseptic bandage was applied, and NSAIDs were avoided for 10 days post-injection. Pts were assessed with Hospital for Special Surgery Knee-Rating Scale (HSS) pre and post-injection and were followed up at 1-month intervals of 1, 2, and 3 months. Visual Assessment Scoring also was used pre-injection and immediate post-injection. Flexion and extension of the knee were performed several times after the injection for equal distribution. The Special Surgery Knee-Rating Scale (HSS) hospital consists of 90 points. A score >85 is excellent, 70-84 is good, 60-69 is fair, and <60 is poor. All patients were advised to walk full weightbearing walking and take oral antibiotics for 3 days. Statistical analysis was performed using SPSS 11 software. A P-value of <0.05 was found to be statistically significant.

RESULTS: This study comprises two groups, A and B. Each group consists of 15 patients. Group A is to study the functional and pain reliving in osteoarthritis knee after intra-articular PRP injection. Group B is to study functional and pain reliving in OA Knee after intraarticular steroid injection. Group A was segregated via Age, sex and side **Table 1.**

TABLE 1: DEMOGRAPHIC DATA

Age	PRP	Steroid
40-45	3	2
45-50	4	5
55-60	5	4
65-70	3	4

Which were found to be of no significance. BMI was found to be of great significance and influenced the outcome of the study, as patients with high BMI had poor pain relief than low BMI. Patients suffering from knee pain ranging from 6 months to 2 years were selected with mean months of symptoms were 12 months **Table 2.**

TABLE 2: DURATION OF SYMPTOMS

Duration of symptoms	PRP	Steroid
6 months	3	4
12 months	7	6
18 months	4	3
24 months	1	2

Pts were assessed with Hospital for Special Surgery Knee-Rating Scale (HSS) and were reassessed after injection with 1 month interval of 1, 2, and 3 months **Fig. 3.** Visual Assessment Scoring also was used pre-injection. HSS scoring system showed 8 pts scored <60, 4 pts with 60–69, and 4 pts 70 – 84 **Table 3.**

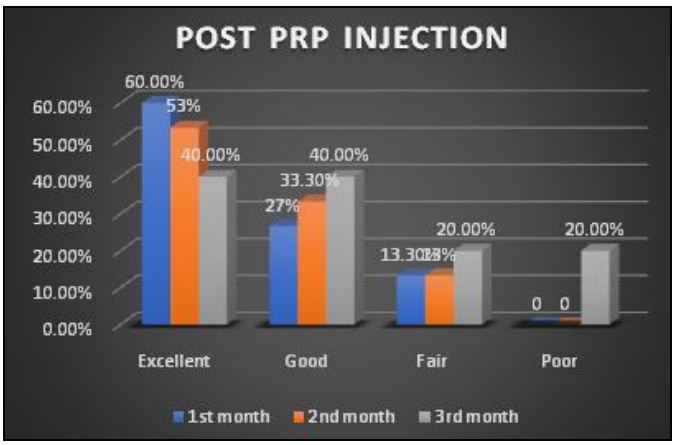

FIG. 3: POST PRP INJECTION

TABLE: 3 PRE PRP-INJECTION

Score	Patients
Excellent = >85	-
Good = 70-84	4
Fair = 60- 69	5
Poor = <60	6

Post injection reduction in pain was recorded with a reduced score in 1month and 2 month post-injection follow-up **Table 4.**

TABLE 4: POST PRP INJECTION

Post injection	1st Month	2nd Month	3rd Month
Excellent = >85	9 (60%)	8(53.3%)	6(40%)
Good = 70-84	4 (26.6%)	5(33.3%)	6(40%)
Fair = 60- 69	2(13.3%)	2(13.3%)	3(20%)
Poor <60	-	-	0

No complications or allergic events were noted. Co-morbidities like DM and hypertension didn't show any significant difference. Group B was segregated via age, sex and side. Which were found to be of no significance. BMI was found to be of great significance and influenced the outcome of the study, as patients with high BMI had poor pain relief than low BMI. Patients suffering from knee pain ranging from 6 months to 2 years were selected, with the mean months of symptoms being 12 months. Pts were assessed with Hospital for Special Surgery Knee-Rating Scale (HSS) and were reassessed after injection with 1 month intervals by 1, 2 and 3 months **Fig. 4.**

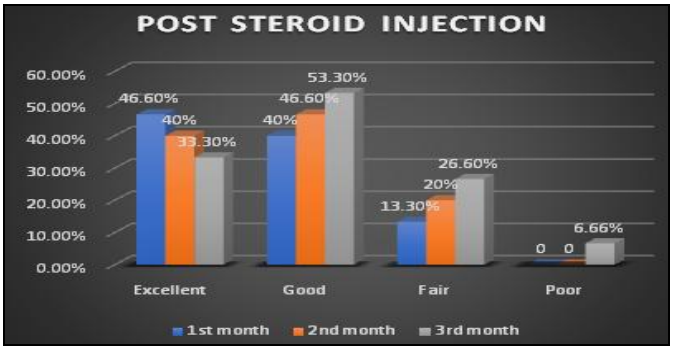

FIG. 4: POST STEROID INJECTION

Visual Assessment Scoring also used a pre-injection HSS scoring system showed 6 pts scored <60, 5 pts with 60–69, and 4 pts 70 – 84 **Table 5.**

TABLE 5: PRE-STEROID INJECTION

Score	Patients
Excellent = >85	-
Good = 70-84	3
Fair = 60- 69	4
Poor = <60	8

Post injection reduction in pain was recorded with a reduced score in 1month and 2month post-injection follow-up **Table 6.**

TABLE 6: POST STEROID INJECTION

Post injection	1st Month	2nd Month	3rd Month
Excellent = >85	7(46.6%)	6(40%)	5(33.3%)
Good = 70-84	6(40%)	7(46.6%)	8(53.3%)
Fair = 60- 69	2(13.3%)	3(20%)	4(26.6%)
Poor <60	-	-	1(6.66%)

In this comparative study, patients with PRP injection had better pain improvement over a long period of time with excellent results of 60% and good results in 26.6%, and the steroid group had46.6% excellent results, good results in 40%, as shown in Bar diagram and results were recorded **Table 7 & 8**. No complications or allergic events were noted. Co-morbidities like DM and hypertension didn't show any significant difference.

TABLE 7: MASTER CHART GROUP A STEROID INJECTION

S. no.	Age (Yrs)	Sex	Side	Duration of symptoms (months)	Knee scoring HSS system 90	Vas	Vas	HSS score system post-injection (month)
				Pre-injection	Post injection	1	2	3
1	41	F	R	6	69	89	88	89
2	44	F	L	12	60	72	69	59
3	46	M	L	12	58	85	85	80
4	48	M	L	6	61	74	70	68
5	45	F	R	18	57	86	85	85
6	56	F	L	12	60	86	83	80
7	47	M	L	6	72	84	82	79
8	59	M	R	24	56	79	76	69
9	49	F	R	18	64	87	86	85

10	58	F	L	12	59	69	65	62
11	68	M	R	12	79	80	77	70
12	57	F	L	12	57	68	66	63
13	66	M	L	18	63	88	87	86
14	67	M	L	18	84	83	80	75
15	69	F	R	12	58	89	86	85

TABLE 8: MASTER CHART GROUP B PRP INJECTION

S. no.	Age (yrs)	Sex	Side	Duration of symptoms (months)	knee scoring HSS system 90	Vas	Vas	HSS score system post injection (month)
				Pre-Injection	Post Injection	1	2	3
1	55	M	R	18	83	2	0	86
2	45	M	L	12	59	3	2	72
3	56	F	L	24	80	3	2	85
4	66	M	R	12	69	2	0	87
5	70	F	R	12	58	4	2	64
6	47	F	L	18	60	4	2	74
7	58	M	L	24	82	5	3	85
8	68	M	R	6	58	2	0	69
9	60	F	R	18	62	5	3	89
10	47	F	L	6	63	5	3	88
11	69	M	R	12	60	3	2	83
12	49	F	L	12	65	4	2	86
13	40	M	L	6	66	5	3	89
14	45	M	R	6	58	4	2	82
15	50	F	R	12	82	6	3	85

DISCUSSION: Osteoarthritis Knee (OA) is a condition with pain in knee joint with various etiology characterized by gradual reduction in joint space, articular cartilage with osteophyte formation and inflammation of joint [7]. It is the most common form of joint disability. OA poses a major burden financially to the patients. Various treatment modalities have been established for OA. Direct Intra Articular (IA) injection of corticosteroids, viscosupplements and Platelet Rich Plasma, which are found to be more effective than oral pharmacotherapies [8]. Platelet undergoes the degeneration and release of growth factors (GF) and contains cellular components like cytokines, thrombin and other GFs. PRP was prepared with 20ml of peripheral blood and 2ml of 3.8% sodium citrate was added [9]. The sample collected was centrifuged, and the solution was obtained and used for intra-articular injection. Platelet helps in the healing process by delivering GF (insulin-like growth factor, transforming growth factor, platelet-derived growth factor, and many others) and active cellular components like cytokines, chemokines, arachidonic acid metabolites, extracellular matrix proteins, ascorbic acid [10]. Studies state that PRP injection was related to decreased chondrocyte apoptosis, proteoglycans production, and delayed AO progression. However, the exact mechanism of PRP in OA is unknown. This study was performed to compare the functional outcome and pain relief following IA (intraarticular) steroid versus PRP (plate rich plasma) injection in managing osteo arthritis of the knee. Each patient would either be treated with IA steroid injection or PRP injection. Pts were assessed with Hospital for Special Surgery Knee-Rating Scale (HSS) pre and post-injection and were followed up at 1-month intervals of 1, 2, and 3 months. Visual Assessment Scoring also was used pre-injection and immediate post-injection. The short-term pain reliving from steroids and clinical experiences vary with prolonged pain reliving for rheumatoid arthritis [11]. Certain studies state that long-term treatment could promote joint destruction and tissue atrophy. Some studies state that these changes are rather due to disease than the steroid action [12]. There were only minor complications in both groups. Egemen *et al.*, in their study, stated that PRP is much suited for patients with age <60yrs and mild OA and BMI <30, and with mild deformity [13]. A few drawbacks of this study were that the dose of steroids or PRP required to improve the patients' symptoms was not clear. A study conducted by Ravaud *et al.* and smith *et al.* showed a statistical significance with a

higher dose of steroids [14]. Hochberg *et al.*, in their study, had a positive result for PRP injection [15]. This study had a similar outcome with Patients in the PRP group who showed improvement in HSS knee scoring for 3 months. This shows a longer duration of pain relief with PRP than with Steroid **Table 5** and **Table 6**. The limitation of the study is the small sample size. The dose of steroids or PRP required to improve the patients' symptoms was not clear. Studies showed complications in their study groups, but we didn't have any complications. Further studies are needed to employ intra-articular PRP as the primary mode of treatment.

CONCLUSION: Our experience indicates that IA injections are safe and positively affect patient satisfaction. Regarding our experience, patient characteristics, symptoms, and clinical findings may indicate a practical approach for IA injections. PRP also has a positive effect. On these patients. In conclusion, both the treatment and approach have promising results. But PRP has a longer duration of pain relief but considers acute pain experienced by few patients.

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CONFLICTS OF INTEREST: None to declare.

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