A comparative clinical study of intraarticular injection of steroid, sodium hyaluronate and platelet rich plasma in osteoarthritis of knee

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Introduction
Osteoarthritis is a disease of age related degeneration and inflammation in a load bearing joint. The prevalence of OA in India is reported to be in the range of 17 to 60.6%, more in urban area than in rural area. As per planning commission 2011, OA accounts for half of all chronic conditions in persons aged over 65 with about 25 % of people over the age of 60 have significant pain and disability from OA.

Method:
Total 209 knees of 124 patients studied in three groups, one group had steroid, and second group had hyaluronic acid and third had platelet rich plasma. For clinical evaluation knee society score and visual analogue scale score were used.

Results:
In my study steroid gives shortest post injection pain relief only for few weeks. Hyaluronic acid gives pain relief for few months and is better for older patients with higher grade of OA. PRP gives pain relief for months and better result in younger patient with lower grade of OA.

Conclusions:
It is not a curative treatment but only short term solution for chronic knee pain. Steroid was cheap and effective for short duration, can be used for acute exacerbation. Hyaluronic acid was better in older and degenerated joint while PRP was good in younger patients with lower grade of degeneration.

Keywords: Osteoarthritis, intraarticular, steroid, viscosupplement, platelet rich plasma.

Thesis question: In front of clinicians there are many choices available for intraarticular injections for knee osteoarthritis (OA) with no established clear guideline for a particular injection. We have done an observational study, to compare the effect of intraarticular steroid, hyaluronic acid, and platelet rich plasma in patients suffering from moderate OA of the knee.
the stage of the disease. Early OA of knee is usually managed with non-pharmacological and non-surgical measures (physical therapy, weight reduction). In moderate OA (Kellgren Laurence grade 2 and 3) above measures usually fail and may require either stronger systemic analgesic, intraarticular injections or some surgical intervention. Since elderly people have more health challenges, it is not preferable to use long term stronger systemic analgesics, which may have dangerous side effect. In intraarticular injections, there are many options available e.g. steroid, hyaluronic acid, and platelet rich plasma (PRP). Platelet rich plasma is newer option in this field used for the repair and regeneration of cartilage. Local steroids are being used for pain relief in OA due to its strong anti-inflammatory and immunosuppressive property. Viscosupplementation with hyaluronic acid (HA) is another option. In body HA remains in the form of sodium hyaluronate instead of proton donor acid form. Exact guideline and indication of these three injections is yet to be established. We have done a comparative clinical study of intra articular steroid, sodium hyaluronate and platelet rich plasma in moderate OA of knee, to compare the result and efficacy of different injections.

**Aims and Objectives**

Our aim was to measure efficacy of intra-articular injections (THA, HA and PRP) in knee OA. The primary objective was to measure pain relief as measured by visual VAS and KSS at 0, 1, 4, 12, and 24 weeks after the IA injections. Our secondary objective was to measure functional status by KSS at 0, 1, 4, 12, and 24 weeks after the IA injections.

**Material and Method**

**Study design:** It was hospital based observational prospective cohort study.

**Sample size:** Two hundred and nine (209) knees of 124 patients of Kellgren Laurence grade 2 and 3OA knee came to Indraprastha Apollo hospital New Delhi, and got intraarticular injection as treatment for knee OA.

**Inclusion criteria**

1. Any patient with a history of uni or bilateral knee pain for at least three months duration not responding to other non-interventional treatments.
2. Patients with X-ray findings of moderate OA (Kellgren Lawrence grade II/III).

**Exclusion criteria**

1. Systemic disorders such as diabetes and thyroid disorder
2. Inflammatory arthritis e.g. Rheumatoid arthritis
3. Major axial deviation at knee joint (varus >5°, valgus > 5°)
4. Hematological diseases e.g. coagulopathy
5. Severe cardiovascular diseases
6. Any infective foci anywhere in the body
7. Immunosuppression
8. Malignancy
9. Age > 80 years
10. Previous IA injection

**Methodology**

It was a clinical comparative study of intraarticular steroid (triamcinolone hexacetinate), hyaluronic acid (HA) and platelet rich plasma (PRP) in KL grade 2 and 3 OA. Forty patients (68 knees) were included in the steroid (first) group; patients of this group were given IA 40mg THA along with 10ml of 0.25% Bupivacaine. Forty-two patients (72 knees) were included in HA (second) group and were given IA 6ml (20mg) HA. Synvisc (Hylan polymer A and B, G-F 20) containing HMW elastoviscous fluid with long chain polymer chemically cross-linked was used. Forty-two patients (69 knees) were included in PRP (third) group and given IA PRP 6ml in each knee. All the injections were given after aspiration of excessive synovial fluid. The written informed consent of each patient was taken on the prescribed proforma. All the patients were examined and data was collected as per KSS and VAS score before injection and at subsequent follow-ups at 1, 4, 12, and 24 weeks. All the data were compared both within the group as well as with one another at different follow-up time.

To see response of these injections in different age group, each group was divided into two main subgroups, patients aged over 50 years and those aged 50 years or younger, and the result of each sub-group was analyzed. To see how these injections respond in different grade of each group was sub-divided into subgroup of KL grade 2 and KL grade 3 and result of both subgroups was compared. Wilcoxon sign rank test is used to compare data within a group, Wilcoxon, rank sum test, was used compare data between two different groups.

**Result**

The mean age of all patients of three groups was 52 years with 32% of patient was male and 53% were of Kellgren Laurence grade 2 OA. KSS pain: Baseline score of all the three groups had insignificant differences. All three groups had initial improvement in baseline pain score. Initial large improvement was seen in steroid (from 55.92 before injection to 77.30 at first week) and HA (60.14 to 75.56 at first week) group compared to PRP group (57.83 to 63.45 at first week). After 4 weeks of follow-up steroid group had rapid deterioration of score (at 24 weeks 61.75). In HA group deterioration started after 12 weeks but it was slow and maintained good result at the end of 24 weeks (76.80). In PRP group the KSS pain scores continuously improved gradually with time, and highest score (81.54) were noted at the end of study that is at 24 week.

KSS function: Baseline score difference of all the three groups was also insignificant in KSS function score. Similar to KSS pain score, a large improvement in first week KSS function score was seen in steroid and HA groups (50.62 to 73.25 and 52.92 to 83.41 respectively). Steroid group had rapid deterioration of score after 4 week while HA had gradual decrease after 12 weeks while PRP group had progressively increasing highest score at the end of study(score at 24 weeks 5.50, 70.60 and 77.26 respectively).
VAS score: Before the start of treatment there was significant difference in score between HA and PRP group. Trend of improvement of VAS score was similar to the KSS pain score but only difference seen was in PRP group VAS score started declining after 12 week follow-up. Affect of patient’s age on these treatment outcomes: Statistically better response from younger patients (age < 50 years) subgroup than older one, in all the three groups. After fourth weeks in steroid and twelfth weeks in HA, score of both subgroups score becomes comparable. While in PRP group significantly better result seen in younger age subgroup till 24 weeks. When elderly subgroup of HA compared with elderly subgroup of PRP, better result was seen in patient treated with HA.

Affect of grade of OA on treatment outcome: Better KSS pain score were seen in patients of subgroup KL grade 2 then those of KL grade 3, in all the three treatment groups. Steroid and HA had only short duration of significant difference while in PRP group it was till 24 weeks. KSS function has similar trend as of KSS pain. On VAS scale there was no difference between steroid and HA subgroups at any follow-ups, while significant difference seen in PRP group.

**Conclusion**

In the treatment of moderate OA, when physical therapy and other pharmacological therapy fails to relieve pain then intraarticular injection can be used, as short term measure. It is safe and effective. Though it is not a permanent solution for knee OA but it relieves pain, improve function and quality of life. In acute exacerbation of pain, intraarticular steroid can be given, it relieves pain rapidly and its effect lasts for 8-10 weeks. Effect of intraarticular hyaluronic acid lasts for few months, had good result in both grade 2 and grade 3. Hyaluronic acid was found to be better than PRP in grade 3 OA. Intraarticular PRP comparatively gives longer duration of pain relief and cost wise it is intermediate between HA and steroid. PRP is more effective in relatively younger age patients and lower degree of cartilage degeneration.

**Clinical Message**

In younger patients with mild to moderate knee OA, intra articular PRP is the better option whereas for older patients with moderate knee OA, either intra articular steroid or hyaluronic acid can be selected. Intraarticular steroid gives shorter duration of pain relief

**References**


