

Original Research Article

Randomised controlled trial comparing the intra-articular hyaluronic acid versus intra-articular steroid in osteoarthritis of knee

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ABSTRACT

Background: Osteoarthritis of knee is a chronic degenerative joint disease which leads to pain, swelling and stiffness. Intra-articular hyaluronic acid or steroids are being used for its treatment. The purpose of the present study was to assess the effect of intra articular hyaluronic acid in comparison to steroids for knee osteoarthritis.

Methods: A prospective randomized study including 70 patients (121 knees) diagnosed with osteoarthritis of knee, were randomly divided into two groups: 35 patients (58 knees) were given intra-articular hyaluronic acid and 35 patients (63 knees) were given intra-articular methylprednisolone. The outcome was evaluated with knee society score (KSS) and visual analog scale (VAS) before the injection and 1, 3 and 6 months after the injection.

Results: The mean KSS pain and function scores increased while VAS decreased in both the groups. All the scores showed improvement at 6 months follow up. In both the groups, the scores at 6 months were significantly better than the pre injection values, and the scores of hyaluronic acid group were significantly better compared to steroid group.

Conclusions: Intraarticular hyaluronic acid seems to be better for long term pain relief and preservation of function in comparison to intraarticular steroids in osteoarthritis of knee.

Keywords: Osteoarthritis, Hyaluronic acid, Steroid, Intraarticular

INTRODUCTION

Osteoarthritis of the knee is a slowly progressive chronic degenerative joint disease, characterized with varying degrees of joint cartilage loss with local inflammation, usually affecting the elderly population.¹ The patients present with pain, swelling, stiffness, deformity and decreased range of motion, thereby significantly affecting the quality of life. Treatment is aimed at reducing symptoms and slowing the progression of the disease. It includes non-operative measures such as weight loss, physical therapy, oral analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), and intra-articular injections, or operative measures such as arthroscopic debridement, high tibial osteotomy, or total knee arthroplasty.

Intra-articular injections are common non-operative measures used in patients resistant to topical and oral drugs with corticosteroids and hyaluronic acid (HA) being the two most commonly used agents.^{2,3} Although widely used, there is a great controversy on the management of osteoarthritis via intra-articular injections.⁴⁻⁷

The purpose of the present study was to evaluate the effect of intra-articular hyaluronic acid in comparison to corticosteroids for osteoarthritis of knee.

METHODS

This prospective, randomized study was conducted in a tertiary care hospital in central India from November 2016 to November 2017. Seventy patients (121 knees)

between 45 and 70 years of age with primary osteoarthritis of knee Kellgren Lawrence Grade II or III, who had symptoms for more than 3 months were included in the study. Patients with secondary osteoarthritis, valgus or varus deformity >5°, flexion deformity >10°, diabetes mellitus and past history of intra-articular injection were excluded from the study. There were 19 unilateral knee cases and 51 bilateral knee cases. Bilateral knee pain case was considered as one patient.

The patients were randomized into 2 groups:

Group A (35 patients; 58 knees): received single intra-articular injection of 6 ml (8mg/ml) of high molecular weight Hyaluronic acid, and

Group B (35 patients; 63 knees): received single intra-articular injection of 40 mg of methylprednisolone.

All the patients were given injection via lateral parapatellar approach. Knee society score for pain (KSS pain), knee society score for function (KSS function) and visual analogue scale (VAS) scores were evaluated just before the injection and then at 1, 3 and 6 months. The use of NSAIDS was discouraged throughout the study period.

Data analysis (scores) was done using SPSS software with categorical values being compared using a Pearson's chi-square test and pre-treatment continuous variables using the Student t test. The level of clinical significance was set at p=0.05.

RESULTS

Seventy patients (121 knees) were included in the study with 24 males and 46 females, with mean age of 53.97 years. Group A (Hyaluronic acid) consisted of 35 patients (10 males, 25 females; mean age 53.05±1.8. Group B (Steroid) consisted of 35 patients (14 males, 21 females; mean age 54.88±2.23).

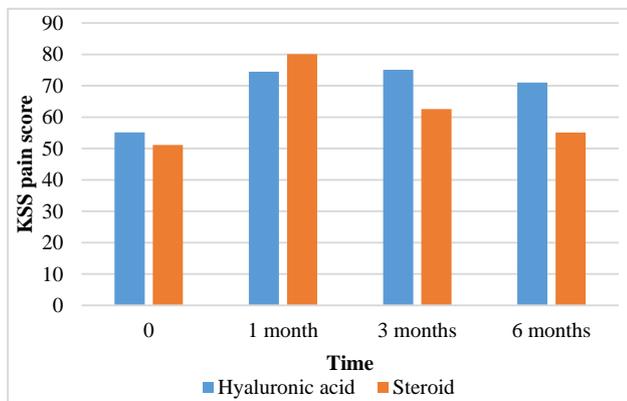


Figure 1: Bar graph showing the KSS pain score of the two groups at different time.

At the initial visit before injection, the Group A patients and Group B patients had a mean KSS pain score of 55.15 and 51.1 respectively. At 1 month, the mean KSS pain score showed a significant increase in group B (80.1) as compared to group A (74.5). At 6 months post injection, KSS scores of Group A and B were 71 and 55.1 respectively, as shown in Figure 1.

At the initial visit before injection, the mean KSS function score of Group A and B was 45.2 and 48.1 respectively. At 1 month, the mean KSS function score also showed a significant increase in group B (65.1) as compared to group A (50.5). At 6 months post injection, KSS function scores of Group A and B was 66.1 and 53.8 respectively, as shown in Figure 2.

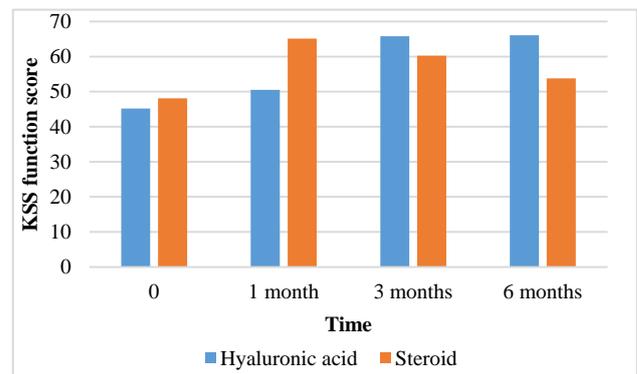


Figure 2: Bar graph showing the KSS function score of the two groups at different time.

The VAS scores of Group A and B before injection were 5.5 and 5.8 respectively, which improved to 1.75 and 1.5 at 1 month; 1.8 and 2.3 at 3 months follow up respectively. At 6 months, the values were 2.9 and 4.2 respectively, as shown in Figure 3.

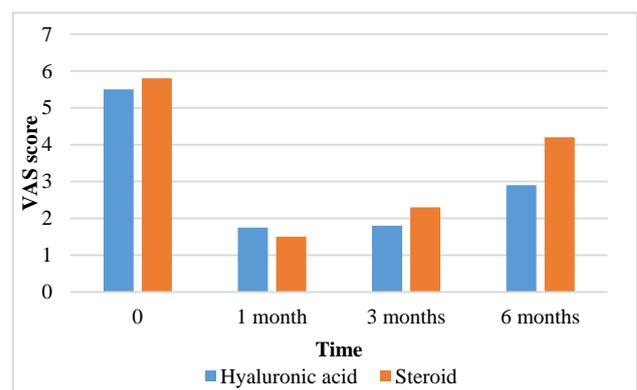


Figure 3: Bar graph showing the VAS score of the two groups at different time.

The steroid group showed improvement in VAS score at 1 month post injection. The HA group showed significant improvement in mean VAS scores as compared to Steroid group after 6 months of the injection. Steroids failed to show long term decrease in VAS score (p<0.05).

At 6 months follow up there was statistically insignificant difference in the VAS scores in the two groups.

DISCUSSION

Hyaluronic acid is a glycosaminoglycan, and a natural component of synovial fluid⁸. It is synthesized by type B synoviocytes of the joint capsule.⁹ It is about 3–5 ml in a knee. Its function is to provide lubrication and nutrients to the hyaline cartilage. Its concentration could be reduced with age, thus resulting in an increased cartilage breakdown leading to osteoarthritis.¹⁰⁻¹² The mechanisms of action of exogenous hyaluronic acid is unknown, but it is thought to enhance synthesis of endogenous hyaluronic acid, stimulate chondrocyte metabolism and inhibit chondrodegenerative enzymes; thus reducing the inflammation in the joint.¹³⁻¹⁵

Corticosteroids are anti-inflammatory and immunosuppressive agents acting directly on nuclear receptors and interrupting the inflammatory and immune cascade. They reduce vascular permeability and inhibit the synthesis and secretion of several inflammatory mediators.¹⁶⁻¹⁸

Intra-articular injection of steroid decreases erythema, heat, swelling, and tenderness of the inflamed joints and also increases the relative viscosity of joint fluid.¹⁸ It decreases pain and increases joint mobility in osteoarthritis of knee.¹⁹

In our study, the mean KSS pain and function scores increased while VAS decreased in both the groups. All the three scores showed improvement at 6 months follow up. In both the groups, the scores at 6 months were significantly better than the pre injection values, and the scores of hyaluronic acid group were significantly better compared to steroid group. This shows that during the first month post injection, the steroid group has better improvement in scores as compared to hyaluronic acid group, but in long term at 6 months follow up, the results were better with hyaluronic acid.

Askari et al compared intra articular hyaluronic acid with steroid in 140 cases.²⁰ They evaluated Western Ontario and McMaster University Osteoarthritis Index (WOMAC), Knee Injury and Osteoarthritis Outcome Score (KOOS), and the visual analog pain scores and found superior results with intraarticular hyaluronic acid as compared to intraarticular steroid for osteoarthritis of knee, which is similar to our study.

In our study, it was found that both the medications were more or less equally effective in pain reduction in first month after intervention. However, the effectiveness was more durable with intraarticular hyaluronic acid as compared to steroid. The results were similar to a previous study by Ray et al.²¹

Heyworth et al did a prospective, randomized clinical study comparing hyaluronic acid, steroid, and placebo.²² They found that the both steroid and placebo groups showed significant pain relief for ten weeks and its effect disappeared by 12 weeks, whereas, the patients in hyaluronic acid group continue to have pain relief until 26 weeks.

A review study of meta-analysis on comparative analysis of intra-articular hyaluronic acid versus NSAIDs, intra-articular steroids, intra-articular platelet rich plasma (PRP), or intra-articular placebo by Campbell et al in 2015, included 14 meta-analysis with total 20,049 patients and found the highest level of evidence suggests that intra-articular hyaluronic acid is a viable option for osteoarthritis of knee.²³

CONCLUSION

Intraarticular hyaluronic acid seems to be better for long term pain relief and preservation of function in comparison to intraarticular steroids in osteoarthritis of knee.

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Ethical approval: The study was approved by the institutional ethics committee

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