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Original Research Article

Comparative evaluation of Intra articular injection of steroid and Hyaluronic acid in treatment of osteoarthritis knee

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ABSTRACT

Background

Knee osteoarthritis (KOA) is a chronic and progressive condition of the knee joint marked by the degradation of articular cartilage.. Numerous therapies are employed for the therapy of KOA; nevertheless, the significance of intra-articular injections in KOA treatment remains little researched. The present study was conducted to compare and evaluate Intra articular injection of steroid and Hyaluronic acid in treatment of osteoarthritis knee.

Methods

The present hospital based prospective study was conducted at department of orthopaedics of a tertiary care centre among 40 patients of knee osteoarthritis during the study period of 2022 to 2024. Patients were divided into groups of 20 each on the basis of type of injection given. Group C was given Methyl prednisolone acetate. 80 mg. (Depopred) Two weekly interval - 4 such and Group H was given Hyalgan 1% sodium hyaluronate at weekly interval, 5 such. Results were analyzed using SPSS version 25.0.

Results

Of the 40 patients, 30(75%) were women, and 10 (25%) were men. The mean age of patients was 56.90 ± 7.76 years. In 28 (70%) patients, the right knee was affected by osteoarthritis, whereas in the remaining 12 (30%) patients, the left knee was affected. (figure 1) Likewise, regarding the grade of KOA, 25 (62.5%)

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patients had grade I KOA, and 15 (37.50%) patients had grade II KOA. Mean VAS and WOMAC score was high at baseline and decrease at 6 months & one year for both groups but more significantly for group H.

Conclusion

This study indicates that HA provides a comparable more amount of pain relieve as compared to CS. Comprehending the duration of clinical efficacy and undesirable effects of these two medications is beneficial for clinicians in formulating a therapy regimen for osteoarthritis patients.

Keywords- intra-artiular injection, Hyaluronic acid, knee, management, osteoarthritis, steroid.

INTRODUCTION

Knee osteoarthritis (OA) is a prevalent, chronic joint condition marked by the degradation of articular cartilage and subsequent hyperosteogeny. [1] Osteoarthritis frequently induces intense pain in the knee joint and impacts 35% of those aged over 65 years. Osteoarthritis necessitates a range of therapies to alleviate discomfort and enhance functionality. [2,3] At now, several therapeutic modalities are employed, encompassing rest, pharmacotherapy, noninvasive therapies, minimally invasive procedures, and surgical interventions [4]. However, if pain continues despite rest or medication and other noninvasive treatments have proven ineffective, intra-articular injections of various medications may be delivered prior to surgical surgery. These often comprise hyaluronic acid (HA), corticosteroids (CS), and diclofenac.

Corticosteroids mitigate the synovial inflammatory phase by downregulating aggrecans and collagenases, as well as modulating proinflammatory mediators and mononuclear cells . The mechanism of action is intricate, resulting in reduced synovial blood flow, diminished leukocyte count, and the release of inflammatory mediators. Joint inflammation in knee osteoarthritis correlates with the advancement of cartilage deterioration; hence, IASI may mitigate disease progression. A wide array of corticosteroids is available, including triamcinolone acetonide (Kenalog), dexamethasone (Decadron) LA, betamethasone (Celestone), and methylprednisolone acetate (Depo-Medrol). The most commonly utilized are methylprednisolone acetate (DepoMedrol) and triamcinolone acetonide (Kenalog).[5-7]

Hyaluronic acid (HA) is a naturally occurring high-molecular-weight glycosaminoglycan found in synovial fluid and the extracellular matrix, composed of chains of repeating disaccharide units. Its purpose is to lubricate the joint and absorb shocks during movement, hence enhancing the viscosity of synovial fluid. IAHA is suggested in refractory patients after continuous or intermittent treatment with as acetaminophen, NSAIDs, and symptomatic slow-acting drugs. IAHA has been acknowledged as a dependable and safe therapeutic method for knee osteoarthritis. [8]

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Numerous studies have investigated the effects of HA and other placebos or CS and placebos however, there are few studies that have compared HA and CS. Hence the present study was conducted to compare and evaluate Intra articular injection of steroid and Hyaluronic acid in treatment of osteoarthritis knee.

MATERIAL & METHODS

The present hospital based prospective study was conducted at department of Orthopaedics, SRIMS, Malandighi, Durgapur, on patients of knee osteoarthritis during the study period of 2022 to 2024. Ethical clearance was taken form institutional ethics committee of college and hospital and informed consent was taken from patients after explaining them the complete procedure of study.
Through consecutive sampling a total of 40 patients of knee osteoarthritis were divided selected on the basis of inclusion and exclusion and criteria.

Inclusion criteria

- Radiographically confirmed knee osteoarthritis patients (Grade I and Grade II OA knee (Mild and moderate OA knee)).
- Patients having knee pain and/or knee swelling for at least 3 months
- Patients willing to participate in the study

Exclusion criteria

- Patients younger than 18 years of age
- Contraindication for magnetic resonance imaging
- Pregnancy
- Allergic reactions to the applied medications (hyaluronic acid, iodinated contrast media, steroids)
- Symptomatic chronic fibromyalgia
- Anticoagulant therapy and/or coagulation disorders
- Inflammatory disease: rheumatoid arthritis, spondyloarthritis, collagenosis, crystal deposit disease
- Severe heart disease (NYHA Grade IV)
- Infection
- Immunosuppressive therapy of immunocompromising disease

Patients were divided into groups of 20 each on the basis of type of injection given. Group C was given Methyl prednisolone acetate. 80 mg. (Depopred) Two weekly interval - 4 such and Group H was given Hyalgan 1% sodium hyaluronate at weekly interval, 5 such. Follow up was done at 6 month and one year.

A self-designed proforma was utilized for data collecting. It consisted of two elements. The demographic data of the study population, including age and gender (male or female), was documented in the initial section of the proforma. The clinical evaluation of patients was recorded at baseline, six months and one

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year on the second section of the proforma. The clinical assessment of patients concerning pain and functionality of the affected knee with osteoarthritis was conducted utilizing the Visual Analog Scale (VAS) and the Western Ontario and McMaster Universities (WOMAC) index. The Visual Analog Scale (VAS) quantifies pain intensity, with values ranging from 0 (indicating no pain) to 10 (representing the most severe agony imaginable). The WOMAC instrument comprises three subscales pertaining to pain, joint stiffness, and functionality, with scores spanning from 0 to 96. Reduced scores indicate less discomfort, decreased joint stiffness, and fewer restrictions in joint function, whereas elevated values signify increased pain, heightened joint stiffness, and greater limitations in joint function. VAS and WOMAC have also been utilized in international investigations [10]. The side of the injured knee and the grade of KOA were recorded in the second section of the proforma.

Data analysis was conducted utilizing descriptive and inferential statistics through SPSS version 25 (IBM Corp., Armonk, NY, USA). The frequency and percentage of qualitative data were assessed, whereas the means and standard deviations (SD) of the quantitative data were computed using descriptive statistics. An independent-sample t-test was utilized to compare the means of VAS and WOMAC scores between the two groups at various time intervals. P-values below 0.05 were deemed statistically significant.

RESULTS

Of the 40 patients, 30(75%) were women, and 10 (25%) were men. The mean age of patients was 56.90 ± 7.76 years. In 28 (70%) patients, the right knee was affected by osteoarthritis, whereas in the remaining 12 (30%) patients, the left knee was affected. (figure 1) Likewise, regarding the grade of KOA, 25 (62.5%) patients had grade I KOA, and 15 (37.50%) patients had grade II KOA (figure 2) as shown in table 1.

Baseline characteristics		**N (%)**
Mean age (years)		**56.90 ± 7.76**
Gender	Male	10 (25%)
	Female	30 (75%)
Knee affected	Right	28 (70%)
	Left	12 (30%)
Grade of KOA	Grade I	25 (62.5%)
	Grade II	15 (37.5%)

Table 1 Baseline characteristics of patients

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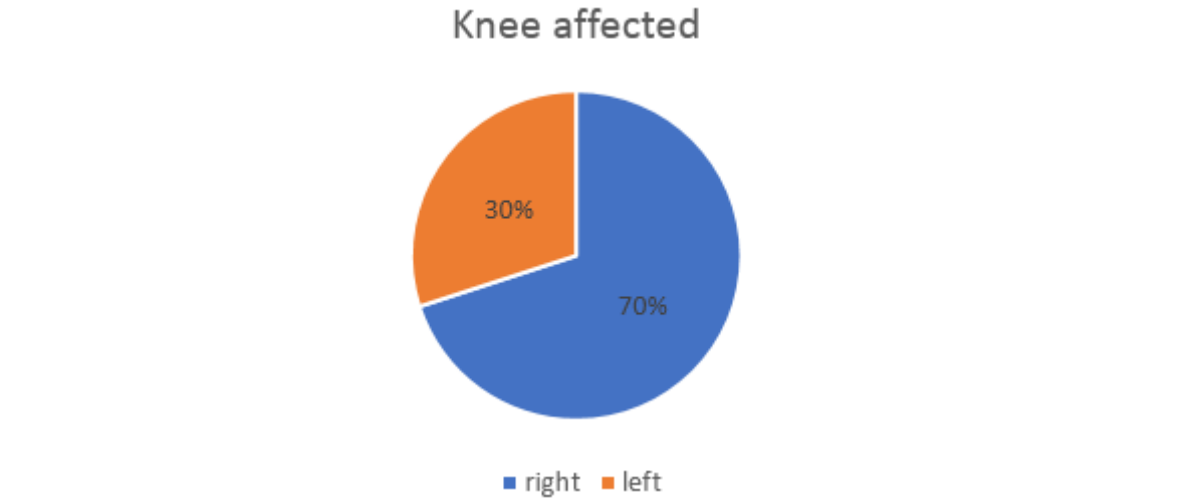

Figure 1 distribution of patients on the type of knee affected

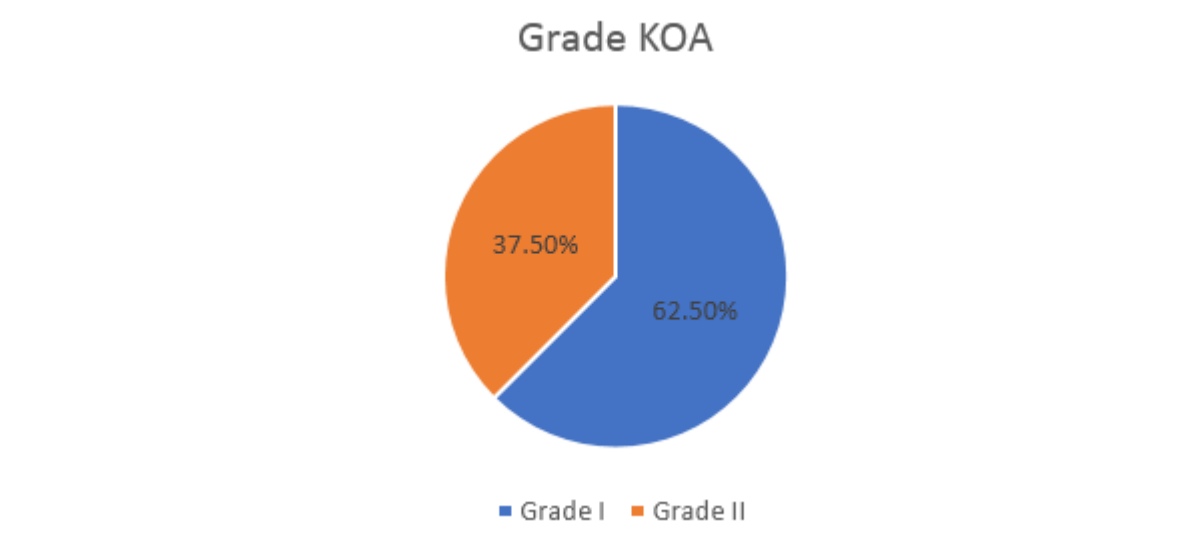

Figure 2 distribution of patients on the basis of grade KOA

The disparity in the means of VAS scores between group C (70.67±7.23) and group H (71.54±8.94) was negligible at baseline; however, the difference in means between the study groups was significant at the six-month and one-year follow-up visits. In group H, the decline in the VAS mean score occurred at a more rapid rate compared to group C as shown in table 2.

Time interval	Group C	Group H	P value
Baseline	70.67±7.23	71.54±8.94	0.82
6 months	65.78±5.78	63.98±5.23	0.04
1 year	56.82±4.98	53.25±4.62	0.01

Table 2 Comparison of mean VAS scores at various time intervals in the study groups

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The difference in WOMAC score between group C and group H was minimal at baseline; however, the gap in averages between the study groups was significant at the six-month and one-year follow-up assessments. In group H, the WOMAC mean score decreased at a faster rate than in group C, as illustrated in table 3.

Time interval	Group C	Group H	P value
Baseline	7.8±1.5	7.6±1.3	0.05
6 months	2.89±1.2	2.34±1.1	0.03
1 year	1.98±0.8	1.45±0.2	0.02

Table 3 Comparison of mean WOMAC scores at various time intervals in the study groups

DISCUSSION

Contemporary nonsurgical interventions for osteoarthritis prioritize symptomatic pain alleviation and encompass physical therapy, oral anti-inflammatory medications, and intra-articular injections utilizing glucocorticoids, hyaluronic acid, or platelet-rich plasma (PRP). Intra-articular injections have been utilized for over 50 years and have demonstrated efficacy in alleviating pain and enhancing functionality in individuals with osteoarthritis. Present study was conducted with an aim to compare and evaluate Intra articular injection of steroid and Hyaluronic acid in treatment of osteoarthritis knee.

This study found that KOA was more prevalent in women than in men. Numerous global studies have found a higher prevalence of KOA in females, particularly post-menopause, compared to males. The increased prevalence of osteoarthritis in postmenopausal women may be attributed to diminished estrogen levels, which serve an anti-inflammatory function.[9-11] This study found that the right knee joint was more impacted by KOA than the left knee joint. The asymmetry in the distribution of KOA may be constitutional, physiological, or pathological. Furthermore, in the majority of individuals, the right side of the body is the dominant side. Consequently, the right side of the knee joint has greater utilization and endures more repetitive stress than the left, resulting in a higher prevalence of knee osteoarthritis (KOA) on the right side. A prior study corroborated this finding by observing a greater prevalence of KOA on the right side [12].

In the present study at baseline, there was little variation in the mean VAS ratings between groups C and H; however, at the six-month and one-year follow-up visits, there was a significant difference in the means of the study groups. Compared to group C, group H experienced a faster reduction in the VAS mean score. At baseline, there was little difference in the WOMAC scores of groups C and H; however, at the six-month and one-year follow-up evaluations, there was a substantial difference in the study groups' averages. The WOMAC mean score dropped more quickly in group H than in group C.

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Similar findings have been reported by a number of research in the literature. According to an American study, HA helps individuals with KOA improve gradually and over time, while corticosteroids help them improve quickly but temporarily [13]. Consistent results about the role of HA and corticosteroids in the treatment of KOA were reported by another Chinese study [14]. Similar to this, an Iranian investigation confirmed that both HA and corticosteroids are useful in the treatment of KOA; however, the benefits of HA are more long-lasting than those of corticosteroids [15]. The results of this investigation were also validated by a meta-analysis [16,17]. In a research by Tammachote et al, corticosteroid injections improved knee discomfort, function, and range of motion similarly to one-shot hyaluronic acid at the 6-month mark.[18] The benefits of HA are gradual and long-lasting because it contributes to the reconstruction of the articular cartilage and synovial fluid of joints, whereas the effects of corticosteroids in the treatment of KOA are acute and transient because they change the inflammatory mechanism for a brief period of time. Therefore, we advise using HA for long-term KOA care and corticosteroids for acute KOA management.

Our study's single-center design and image-guided injection of contrast media, which guaranteed proper intra-articular application—a critical component—were among its strong points whereas its small sample size serves as a limitation that’s why results of this study can only be applied to small or regional populations. To generalize these results regarding the intra-articular injections of HA and corticosteroids in the management of KOA, studies with a large sample size and longer follow-ups are required.

CONCLUSION

In conclusion, this study indicates that HA provides a comparable more amount of pain relieve as compared to CS. The likelihood of adverse events is comparable for the two therapies. Comprehending the duration of clinical efficacy and undesirable effects of these two medications is beneficial for clinicians in formulating a therapy regimen for osteoarthritis patients. Nonetheless, future research necessitates additional high-quality randomized controlled trials (RCTs) with extended follow-ups and substantial sample sizes.

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