e-ISSN: 0976-822X, p-ISSN:2861-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2023; 15(5); 347-353

Original Research Article

Outcome Assessment in Patients of Early Osteoarthritis Knee when Treated with Intra-Articular Steroids Versus Intra-Articular Hyaluronic Acid: A Randomized Clinical Study

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Received: 12-01-2023/ Revised: 09-02-2023 / Accepted: 19-03-2023
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Conflict of interest: Nil

Abstract

Aim: The aim of the present study was to assess compare the pain sensitivity and functional outcome in patients of early osteoarthritis knee when treated with intra-articular steroids versus intra-articular hyaluronic acid.

Methods: This study was conducted at department of Orthopaedics, JLNMCH, Bhagalpur, Bihar, India to analyze the pain sensitivity and functional outcome in patients of early osteoarthritis knee when treated with intra-articular steroids versus intra-articular hyaluronic acid using VAS and WOMAC scoring system for the period of 1 year. A total of 100 patients were included in the study of which 50 patients were given intra-articular steroid injection and 50 patients were given hyaluronic acid.

Results: A major number of patients in steroid Group were in the age group 60 – 65 years i.e. 56%. On the other hand, 48% of patients in H.A. group were in the age group 60 – 65 years. A major number of patients in steroid Group were in the age group 60 – 65 years i.e. 56%. On the other hand, 48% of patients in H.A. group were in the age group 60 – 65 years. In steroid group, male population accounted for 36% and female was 64%. In HA group, male population accounted for 46% and female was 54%. In steroid Group, 23 patients (46%) that were given treatment were right side as compared to 11 patients (22%) on left side while 16 where bi- lateral (32%). In H.A. Group, 26 patients (52%) that were given treatment were right side as compared to 12 patients (24%) on left side while 12 where bi- lateral (24%). In steroid Group, 14 patients (28%) were of grade I while 36 patients (72%) were of grade II. In H.A. Group, 18 patients (36%) were of grade I while 32 patients (64%) where of grade II.

In steroid Group, 16 patients (32%) having mild activity level while 23 (46%) having moderate and 11 (22%) having heavy activity level. In steroid Group, 14 patients (28%) having mild activity level while 23 (46%) having moderate and 13 (26%) having heavy activity level.

Conclusion: In conclusion, our study showed that the Pain sensitivity and functional outcome of Intra articular therapy performed via H.A. group are similar till three months in comparison to Steroid group. Persistance of decreased pain sensitivity and improved functional outcome was shown in H.A. group up to one year.

Keywords: Intra-Articular Steroids, Intra-Articular Hyaluronic Acid, Osteoarthritis Knee.

Introduction

Osteoarthritis (OA) is the most common cause of knee pain and a leading cause of disability globally. It is a progressive disorder caused by gradual loss of articular cartilage. Many mechanical and biochemical factors have been suggested as the responsible causes for cartilage destruction leading to OA. Cytokines and various growth factors (GF) may also play a role in the regulation of catabolic and anabolic process in the pathophysiology of knee OA. The catabolic process is mainly mediated by Interleukin-1 and tumor necrosis factor-b that activate proteolytic digestion of articular cartilage. Various GF as tissue GF-b and insulin GF-1 may help body's attempt to repair the degenerated cartilage. Various conservative treatment modalities including both pharmacological and the non-pharmacological modalities are recommended in clinical guidelines.[1,2] However, if these are ineffective then intraarticular (IA) injections (corticosteroids, viscosupplements, blood-derived products) are considered as the second line of the non-operative modality of treatment.[3]

OA is a major source of disability owing to pain and loss of function. It is the most common form of joint disease, and among the top 10 causes of disability worldwide.[4] With aging of the population and increasing obesity, OA arises as a major public health problem and an important financial burden for the global economy.[5] For the knee OA, various conservative treatment modalities are recommended by clinical guidelines.[2,4,6] The non-pharmacological modalities are patient education and self-management, exercises, weight reduction, walking supports (crutches), bracing, shoe and insoles modification, local cooling/heating, acupuncture, and electromagnetic therapy. The major contraindication for IA injections is septic arthritis. In addition, in the presence of overlying soft tissue infection, there is risk of iatrogenic seeding to the joint. Osteoarthritis may occur in any joint, but the spine, hands, hips, knees and feet are predilection sites.[7] In most arthritic knees, some degree of instability, deformity, contracture or a combination of these elements, can be found.[8-10] The common causes of arthritis of the knee include Osteoarthritis (OA), Rheumatoid Arthritis (RA), Juvenile Rheumatoid Arthritis (JRA), Post traumatic Arthritis or secondary Osteoarthritis and other types of inflammatory arthritis.

The aim of the present study was to assess compare the pain sensitivity and functional outcome in patients of early osteoarthritis knee when treated with intra-articular steroids versus intra-articular hyaluronic acid.

Materials And Methods

This study was conducted at Department of Orthopaedics, JLNMCH, Bhagalpur, Bihar, India to analyze the pain sensitivity and functional outcome in patients of early osteoarthritis knee when treated with intra-articular steroids versus intra-articular hyaluronic acid using VAS and WOMAC scoring system for the period of 1 year.

Before procedure patients were divided into following two groups:

1. Steroid Group

2. Hyaluronic acid Group

A total of 100 patients were included in the study of which 50 patients were given intra-articular steroid injection and 50 patients were given hyaluronic acid. Patients were assessed on the basis of VAS and WOMAC scoring system. The patients were followed up at 1 weeks, 3 months, 6 months and 1 year. The study was conducted at the Department of Orthopaedics, JLNMCH, Bhagalpur, Bihar, India.

Inclusion Criteria

- Adults aged 40 or above.
- Radiologically diagnosed patients of early
- Osteoarthritis knee up to K.L. grade II
- Exclusion Criteria-
- Glucocortico steroid injections in previous 3 months
- Sepsis knee
- Poly neuropathy
- Associated medical co-morbidity such that the patient is unfit for procedure.
- Patient not willing for procedure

Clinical Assessment

Detailed history of all patients was taken. All patients were assessed clinically and functionally using the VAS and WOMAC scoring system. The preoperative medical evaluation of all the patients was done to prevent potential complications that can be life threatening or limb threatening. Any limb length discrepancies were noted. Presence of any hip or foot deformity was assessed. The extensor mechanism was assessed for any quadriceps contractures. The knee deformities were examined for any fixed varus or valgus deformities or presence of any flexion contracture.

Radiographic Assessment

Standard guidelines were utilized to get knee radiographs – standing anteroposterior view and lateral view and skyline view of patella. Any collateral ligament laxity, subluxation of tibia, presence of osteophytes, any bony defects in the tibia and femur and the quality of bone was assessed. Patients belongs up to K.L. grade II were included in study.

Treatment Procedure

All patients after thorough pre-procedure evaluation were taken up for procedure by the same team, patient in supine position. Sterile preparation is done from thigh to toe and the patient is draped. We used superolateral approach patient lies supine with the knee almost fully extended with a thin pad support underneath the knee to facilitate relaxation. The clinician's thumb is used to gently rock then stabilize the patella while the needle is inserted underneath the supralateral surface of patella, aimed towards the center of the patella, and then directed slightly posteriorly and inferomedially into the knee joint. Same approach is used in both groups, one group treated with 80mg glucocorticosteroid (depomedrol) and another one with 4 ml vial containing 60 mg sodium hyaluronate with molecular weight of (500,000-730,000 daltons) fraction of purified natural sodium hyaluronate.

Results

Table 1: Demographic data

Age	Steroid	H.A.
60-65 yrs	28	24
66-70 yrs	9	10
71-75 yrs	7	7
76-80 yrs	3	5
80-85	3	4
Gender		
Males	18	23
Females	32	27
Side involved		
Right	23	26
Left	11	12

BI-lateral	16	12
Grade of O.A. Knee		
Grade I	14	18
Grade II	36	32
Level of activity		
Mild	16	14
Moderate	23	23
Heavy	11	13

A major number of patients in steroid Group were in the age group 60 – 65 years i.e. 56%. On the other hand, 48% of patients in H.A. group were in the age group 60 – 65 years. In steroid group, male population accounted for 36% and female was 64%. In HA group, male population accounted for 46% and female was 54%. In steroid Group, 23 patients (46%) that were given treatment were right side as compared to 11 patients (22%) on left side while 16 where bi- lateral (32%). In H.A. Group, 26 patients (52%) that were given treatment were right side as compared to 12 patients (24%) on left side while 12 where bi- lateral (24%). In steroid Group, 14 patients (28%) were of grade I while 36 patients (72%) were of grade II. In H.A. Group, 18 patients (36%) were of grade I while 32 patients (64%) where of grade II. In steroid Group, 16 patients (32%) having mild activity level while 23 (46%) having moderate and 11 (22%) having heavy activity level. In steroid Group, 14 patients (28%) having mild activity level while 23 (46%) having moderate and 13 (26%) having heavy activity level.

Table 2: VAS Score

Time of assessment	VAS of steroid group	VAS of H.A. group	P- value
Pre-Treatment	8.425+0.5025	8.344+0.4780	0.0710
1 Week after treatment	4.250+1.024	4.520+1.232	0.3332
3 months after treatment	3.8640+0.8340	3.2448+0.6649	0.0008
6 months after treatment	5.5442+1.075	4.1530+0.9380	0.0001
1 year after treatment	6.8290+0.6439	5.115+0.5967	0.0001

The mean Pre procedure VAS Score in steroid Group is 8.425 which had reduced to 6.829 by the end of one year. The mean Pre procedure VAS Score in H.A. Group is 8.344 which had reduced to 5.115 by the end of one year.

Table 3: WOMAC Score

Time of assessment	WOMAC of steroid group	WOMAC of H.A. group	P- value
Pre-Treatment	85.5535+3.640	85.835+3.820	0.4755
1 Week after treatment	58.350+3.120	61.2130+10.220	0.4920
3 months after treatment	55.120+2.980	54.210+7.015	0.0450
6 months after treatment	62.4110+8.220	52.3020+8.831	0.0001
1 year after treatment	76.7730+6.425	58.8272+5.435	0.0001

The mean Pre procedure WOMAC Score in steroid Group is 85.55 which had reduced to 76.77 by the end of one year. The mean Pre procedure WOMAC Score in H.A. Group is 85.83 which had reduced to 58.82 by the end of one year.

Discussion

Osteoarthritis (OA) is a common disease that affects all structures of the synovial joint. Besides articular cartilage, the subchondral bone, synovial tissue and soft tissue structures around the joint may be more or less involved.[11] Osteoarthritis may occur in any joint, but the spine, hands, hips, knees and feet are predilection sites.[12] In most arthritic knees, some degree of instability, deformity, contracture or a combination of these elements, can be found.[13-15] IA CS injections are often prescribed before secondary care referral, attempting to provide symptomatic management and delay surgery. Although CS injections appear to improve pain scores in osteoarthritic patients for a limited time period[16], they are associated with side-effects[17] and do not appear to offer symptomatic improvement for longer than 6 weeks.[16] Indeed, some authors[17] have advised against using IA CS therapy because of the deleterious effects on articular cartilage[18], leading to a deterioration of the underlying joint OA. Previous studies have shown a statistically significant additional deterioration in articular cartilage compared to placebo, as well as an increased propensity for knee replacement in patients treated with CS injections.[17,19]

Valtonen (Valtonen 1981 A)[20] reported that the duration of effect of triamcinolone was substantially longer than that of betamethasone. The explanation for the variability in response to IA corticosteroids is contentious. S.Pietro[21] (2008) meta-analysis in progress are further establishing a role for viscosupplementation in ameliorating the symptoms of knee and hip osteoarthritis. At the moment it is clear that viscosupplementation is more efficacious in the initial and intermediate stages of OA more than at an advanced stages and that this therapy is exceptionally safe compared with other OA treatments. M Goldberg 2010.[22] In conclusion pain is a central symptom of OA and requires an integrated approach to its treatment. Both non-pharmacological and pharmacological treatments offer the best chance for pain relief. Pharmacological treatments include NSAIDs, cox-2 inhibitors, opioids, anti-inflammatory creams and IA corticosteroids. IA corticosteroids have been shown to be effective in relieving pain during the first 2 weeks after treatment.

Amir Fakhari[23] (2013) Hyaluronic acid is a naturally occurring biomolecule abundantly available in body tissues and fluids. Due to the prevalence of hyaluronic acid in the body and its desirable properties, HA has been utilized in several types of biomedical products. This article reviewed the physical and chemical characteristics of HA as applied to tissue engineering, dermal filling, and viscosupplementation. In each application, difficulties such as potential toxicity of crosslinking techniques, high viscosity of HA solutions, and rapid elimination have been raised as limitations to improve biomedical products derived from HA. To overcome these limitations, current and emerging strategies to modify HA were reviewed as potential approaches. Trueba Davalillo 2015[24] Both treatments effectively controlled OA symptoms. BM showed higher short-term effectiveness, while HA showed better long-term effectiveness, maintaining clinical efficacy in a large number of patients 1 year after administration.

Conclusion

Intra articular therapy improves the functional ability of the patient and the ability of the patient to get back to pre-disease state, which is to have a pain free mobile joint, as reflected by improvement in the post treatment VAS and WOMAC Score. In conclusion, our study showed that the Pain sensitivity and functional outcome of Intra articular therapy performed via H.A. group are similar till

three months in comparison to Steroid group. Persistance of decreased pain sensitivity and improved functional outcome was shown in H.A. group up to one year.

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