

## Original article

# Intra-articular hyaluronic acid is superior to steroids in knee osteoarthritis: A comparative, randomized study



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## ABSTRACT

**Background:** To compare the short and mid-term results of intraarticular triamcinolone hexacetonide and hyaluronic acid (HA) in knee osteoarthritis.

**Methods:** A prospective randomized study including 40 patients in steroid and 42 patients in HA group. The outcome was evaluated with Knee Society Score (KSS) and Visual Analog Scale (VAS).

**Result:** On KSS function and VAS score, there was no difference till four weeks. On KSS pain there was no difference till 12 weeks ( $P > 0.05$ ) after that score of steroid group deteriorated rapidly. At six months HA was significantly better than a steroid.

**Conclusion:** The HA seems to be better for pain relief and functionality in the short and mid-term periods.

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## 1. 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- $\beta$  that activate proteolytic digestion of articular cartilage. Various GF as tissue GF- $\beta$  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.<sup>1,2</sup> 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.<sup>3</sup>

We compared the outcomes of the two most commonly used intra-articular therapy of steroids and hyaluronic acid (HA) in a

prospective, randomized cohort study, in adults with the moderate degree of knee OA (Kellgren grade II and III).

## 2. Material and method

All the patients with moderate OA knee, Kellgren–Lawrence (KL) grade II and III were enrolled in the study. Patient with systemic disorders such as diabetes and thyroid disorder, inflammatory arthritis, major axial deviation at knee joint (varus  $>5$ , valgus  $>5$ ), hematological diseases, e.g. coagulopathy, severe cardiovascular diseases, any infective foci anywhere in the body, immunosuppression, malignancy, age  $> 80$  years, case with history of previous IA injection were excluded from study. A total of 82 patients (142 knees) of both the sexes with a unilateral or bilateral knee pain of more than three months were selected for this study. All of these patients were randomized by computer generated random number table and were given steroid or HA accordingly. Our bilateral knee pain cases were symptomatic for both knee from beginning of study and both knee was injected simultaneously. Forty patients (68 knees) were included in the steroid group. The patients of this group were given IA 40 mg triamcinolone hexa acetate (THA). Forty-two patients (72 knees) were included in HA group and were given IA 6 ml (48 mg) HA (Synvisc-one™, Sanofi, Genzyme). Synvisc (Hylan polymer A and B, G-F 20) contains high molecular weight (HMW) elastoviscous fluid with long chain polymer chemically cross-linked. All the

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**Table 1**  
Baseline demographic and clinical parameters.

	Steroid group No. of cases (%age)	HA group No. of cases (%age)
Male	15 (37.5%)	13 (31%)
Female	25 (62.5%)	29 (69%)
Unilateral	11 (27.5%)	11 (26%)
Bilateral	29 (72.5%)	31 (74%)
KL grade II	22 (55%)	18 (43%)
KL grade III	18 (45%)	24 (57%)

injections were given after aspiration of synovial fluid, under sterile conditions.

Evaluation of pain and function – all patients were examined and data collected as per Knee Society Score (KSS) pain and function score, and Visual Analog Scale (VAS) before injection and at subsequent follow-ups at 1, 4, 12, and 24 weeks.<sup>4</sup> All the data was compared both within the group as well as with one another at different follow-up time. Bilateral knee pain case was considered as one patient, because it is difficult to calculate function of

individual knee in these patients. Wilcoxon sign rank test is used to compare data within a group. Wilcoxon rank sum test was used to compare data between two separate groups.

**3. Results**

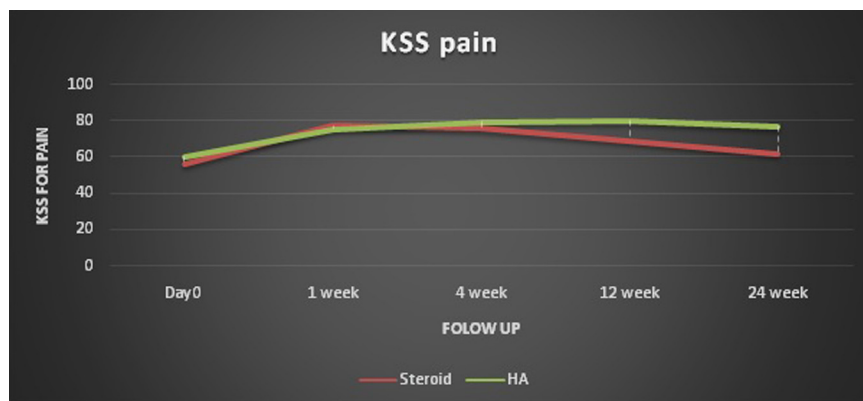
In both the groups, the patients were matched similar (Table 1). None of the patients, in either group, had any significant complication. However, in steroid group, one patient developed a mild infection, which responded to antibiotic therapy and three patients had a transient rise in blood sugar levels. In HA group, one patient had an acute inflammatory reaction at the site of injection, which settled down in 5 days with ice therapy, anti-inflammatory drugs, and rest.

**3.1. KSS and VAS in different groups**

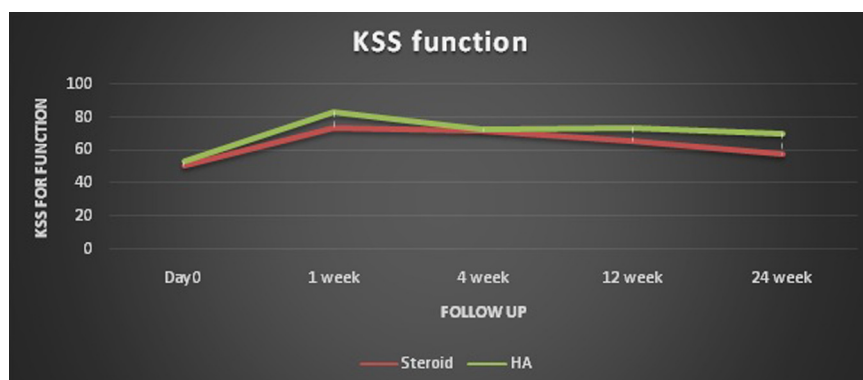
With the improvement in knee pain, the mean of KSS pain and function score increased while VAS decreased, in both groups (Table 2). All the three variables (KSS pain, KSS function, and VAS) had similar trends of improvement. In both the groups, the scores

**Table 2**  
KSS pain, KSS function and VAS score in steroid and HA group.

	KSS pain score			KSS function score			VAS score		
	Steroid	HA	p-value	Steroid	HA	p-value	Steroid	HA	p-value
Baseline	55.92	60.14	0.14	50.62	52.92	0.12	4.82	5.19	0.09
1st week	77.30	75.56	0.47	73.25	83.41	0.16	1.75	1.87	0.34
4th week	75.35	79.56	0.01	71.50	73.17	0.22	2.07	1.95	0.26
12th week	68.82	80.24	<0.01	65.25	73.90	<0.01	2.8	2.34	<0.01
24th week	61.75	76.80	<0.01	57.50	70.60	<0.01	3.6	3.14	0.03



**Fig. 1.** Graph showing KSS pain of steroid and HA at different follow-up period.



**Fig. 2.** Graph showing KSS function of steroid and HA at different follow-up period.

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