

Knee vs hip single-joint intra-articular hyaluronic acid injection in patients with both hip and knee osteoarthritis: a pilot study

Demirhan Dıraçoğlu · Kerem Alptekin · Bahar Teksöz · İlker Yağcı · Levent Özçakar · Cihan Aksoy

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Abstract This paper aims to compare the results of single-joint knee vs hip hyaluronic acid (HA) injections in patients with osteoarthritis (OA) involving both the knee and hip joints. Thirty-eight patients who were diagnosed to have both hip and knee OA were enrolled. Patients were divided into two groups to receive HA injection three times at 1-week intervals either to the hip or knee joints. Pain level during activities and rest was measured by using visual analog scale (VAS). Western Ontario and McMaster University Osteoarthritis Index (WOMAC 5-point Likert 3.0) was also used prior to the injections and 1 month after the 3rd injection. In the knee injection group, the intragroup analysis revealed significant improvements in VAS activity

pain, VAS rest pain, and WOMAC pain values following injection when compared with preinjection values, while no significant difference was detected in WOMAC stiffness, WOMAC physical function, and WOMAC total values. In the hip injection group, VAS activity pain, VAS rest pain, WOMAC pain, WOMAC stiffness, WOMAC physical function, and WOMAC total values showed significant improvement after the injection when compared with preinjection values. Although statistically not significant ($p>0.05$), the comparison of the differences (preinjection–postinjection) between the groups demonstrated higher values in the hip injection group. We imply that intra-articular single-joint HA injections either to the knee or hip joints in OA patients with involvement of both of these joints are effective with regard to pain and functional status.

D. Dıraçoğlu · K. Alptekin · B. Teksöz · C. Aksoy
Department of Physical Medicine and Rehabilitation,
Istanbul University Istanbul Medical Faculty,
Istanbul, Turkey

İ. Yağcı
Department of Physical Medicine and Rehabilitation,
Marmara University Medical School,
Istanbul, Turkey

L. Özçakar
Department of Physical Medicine and Rehabilitation,
Gülhane Military Medical Academy Haydarpaşa
Training Hospital,
Istanbul, Turkey

L. Özçakar
Department of Physical Medicine and Rehabilitation,
Hacettepe University Medical School,
Ankara, Turkey

D. Dıraçoğlu (✉)
Istanbul Üniversitesi, İstanbul Tıp Fakültesi,
Fiziksel Tıp ve Rehabilitasyon Anabilim Dalı,
34093 Capa, İstanbul, Turkey
e-mail: demirhan1@yahoo.com

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Introduction

Osteoarthritis (OA) is the most common chronic joint disease worldwide and it is one of the most significant causes of disability and chronic pain in the elderly population [1]. Concerning the two major weight-bearing joints, the risk factors for OA of the knee and hip joints show similarities. Further, the principles of therapy are almost the same [2]. For both joints, patient training, weight loss, muscle-strengthening exercises, supportive devices, physical therapy agents, paracetamol, nonsteroidal anti-inflammatory drugs, and intra-articular injections are the most preferable nonsurgical modalities of treatment [3].

Regarding intra-articular injections, hyaluronic acid (HA) supplementation has been shown to provide symptom

management and decrease the rate of deterioration of joint structure [4, 5]. It has been also included in the OA recommendations by the European League Against Rheumatism and American College of Rheumatology [6, 7]. Intra-articular HA application is mostly preferred for the knee joint; however, it has been increasingly used recently also in hip OA. There are numerous trials investigating the effects of intra-articular injections in isolated single-joint groups either in hip or knee OA [8, 9]. However, to our best notice, there are no studies evaluating the effects of HA injections in patients with respect to both their knee and hip joint involvements. Accordingly, this trial was designed to compare the results of single-joint knee vs hip HA injections in patients with OA involving both the knee and hip joints.

Materials and methods

Thirty-eight patients who were diagnosed to have both hip and knee OA according to the American College of Rheumatology criteria [10, 11] and who were classified to have radiological stages of I or II according to Kellgren and Lawrence [12] were recruited. Patients with active synovitis, limited knee/hip joint range of motions, trauma, surgical intervention, or intra-articular injection within the last 6 months in the hip/knee joints were excluded.

According to the order of presentation to our outpatient clinic, patients were divided subsequently into two groups, one patient assigned to the knee injection group and the next to the hip injection group. In both groups, patients received single-joint injections three times at 1-week intervals. The side to be injected (right vs left) was decided according to the complaints of the patients. All patients were informed about the procedure and they gave written consent to participate.

The knee joint injections were performed under sterile conditions by inserting a 21-gauge needle into the patellofemoral joint space by superolateral approach while the patients were in supine position. The hip joint injections were performed under sterile conditions on fluoroscopy by inserting an 18-gauge 90-mm needle close to the femoral neck 1 cm over the trochanter major while the patients were in lateral decubitus position (Fig. 1).

In both groups, pain level during activities and rest was measured by using visual analog scale (VAS). Western Ontario and McMaster University Osteoarthritis Index (WOMAC 5-point Likert 3.0) was also used prior to the injections and 1 month after the 3rd injection [13].

SPSS 15.0 software was used for analysis. Paired-sample *t* test was used for comparing parametric variables before and after the injections in each group. Chi-squared test was used for comparing categorical variables and



Fig. 1 A fluoroscopic view during a hip joint intra-articular injection

Mann Whitney *U* test was used in case variables did not display a normal distribution.

Results

Demographic and clinical characteristics of the patients are summarized in Table 1. The two groups were statistically similar in this regard. In the knee injection group, the intragroup analysis revealed significant improvements in VAS activity pain, VAS rest pain, and WOMAC pain values following injection when compared with preinjection values, while no significant difference was detected in WOMAC stiffness, WOMAC physical function, and WOMAC total values (Table 2). In the hip injection group,

Table 1 Patient characteristics

		Knee injection group (n=19)	Hip injection group (n=19)	<i>p</i>
Age (year)		64.5±8.6	66.1±9.3	>0.05
Sex	Female	16	15	>0.05
	Male	3	4	
Education	Nonliterate	1	2	>0.05
	Elementary school	12	10	
	Secondary school	4	2	
Profession	High school	2	5	>0.05
	Housewife	13	15	
	Officer	1	0	
	Retired	5	4	
Predominant knee side	Right	12	10	>0.05
	Left	7	9	
Predominant hip side	Right	9	8	>0.05
	Left	10	11	

Table 2 Preinjection and postinjection VAS and WOMAC values in knee injection group

	Preinjection		Postinjection		<i>p</i>
	Mean	SD	Mean	SD	
VAS activity pain	7.00	2.60	3.50	2.91	0.00
VAS resting pain	5.06	2.41	3.22	2.94	0.02
WOMAC pain	4.94	1.77	3.50	1.54	0.03
WOMAC stiffness	3.52	1.95	3.20	1.58	0.69
WOMAC physical function	4.56	1.75	3.48	1.24	0.14
WOMAC total	13.01	4.99	9.69	3.91	0.18

VAS activity pain, VAS rest pain, WOMAC pain, WOMAC stiffness, WOMAC physical function, and WOMAC total values showed significant improvement after the injection when compared with preinjection values (Table 3). Although statistically not significant ($p > 0.05$), the comparison of the differences (preinjection–postinjection) between the groups demonstrated higher values in the hip injection group. An adverse event due to injections did not occur in any of the patients.

Discussion

In this study, we have compared the results of knee vs hip joint injections in patients with both knee and hip OA. Both groups showed improvement regarding pain and functional parameters. Although the differences between the groups were higher in the hip joint group, they were statistically not significant.

Among the weight-bearing joints of the body, the two most common joints involved in OA are knee and hip joints, respectively [1, 14]. Intra-articular HA injection is most commonly administered to the knee joint [15]. A meta-analysis by Aggrawal et al. [9] reported that administration of viscosupplementation with HA to the knee joint is a good therapeutical choice in patients

Table 3 Preinjection and postinjection VAS and WOMAC values in hip injection group

	Preinjection		Postinjection		<i>P</i>
	Mean	SD	Mean	SD	
VAS activity pain	6.88	0.99	3.12	1.22	0.00
VAS resting pain	3.35	1.37	1.47	0.94	0.00
WOMAC pain	5.88	0.93	4.21	0.81	0.00
WOMAC stiffness	5.15	1.32	3.53	1.27	0.00
WOMAC physical function	6.23	0.78	4.57	0.63	0.00
WOMAC total	17.26	2.49	12.27	2.40	0.00

who do not respond to conservative treatment or those who are not eligible for surgery. Another important point for choosing HA is the grade of the pathology. In human and animal studies, it has been shown that intra-articular HA was not effective in high-grade OA [16, 17]. Likewise, we have included early-stage OA patients in our study.

In one meta-analysis, it was demonstrated that significant improvements with limited undesirable effects ensued in activity pain, resting pain, and functional status [18]. On the other hand, Arceih et al. [17] indicated that most of the relevant trials had low methodological quality and that, although HA was superior to placebo with respect to the effects on activity pain, it was not effective on resting pain and did not enhance joint function. When compared with studies on knee joint HA injections, fewer trials have been performed on HA injection in hip OA. Significant improvements in pain, functional status, and duration of pain-free walking have been observed in such studies [19–22].

All of the above-mentioned trials were performed in patients with either hip or knee OA. However, in daily practice, physicians come across many patients with both knee and hip involvement. These two joints are also closely related from the biomechanical point of view and, in cases of concomitant hip and knee OA, patients' functional status would be affected by both joints. Our results demonstrated that intra-articular HA injection in either of these two joints might provide significant improvements in pain (VAS activity and VAS rest, WOMAC pain). Moreover, injections to the hip joint also displayed beneficial effects on WOMAC stiffness, WOMAC physical function, and WOMAC total values.

The most important limitation of our trial was the lack of a long-term follow-up; as such, our results are applicable only for the early stage. Another drawback of our study would be the absence of a group in which both knee and hip joint injections could have been performed. Such a group was not included first due to the fact that hip injections are not simple interventions and usually require fluoroscopic or sonographic guidance and second due to the fact that two simultaneous injections are generally not preferred by the patients.

To summarize, in the light of our first and preliminary results, we may conclude that intra-articular single-joint HA injections either to the knee or hip joints in OA patients are effective with regard to pain and functional status. In this sense, we imply that, during the management of patients with OA, both knee and hip joints should be taken into consideration alike. Further, according to the experience of the physicians, HA injections either in the knee or hip joints can be planned. Long-term follow-up results after such injections remain to be investigated in future studies.

Disclosures None

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