

Safety and efficiency intra articular hyaluronate injections of treatment knee**Osteoarthritis**

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Abstract

Osteoarthritis is a chronic disease characterized by degradation joint that may cause cartilage loss and morphological deterioration to another joint tissue, more delicate biochemical changes occur in the early stages of Osteoarthritis progress. healthy cartilage content water that make balanced by compressive force driving water out while hydrostatic and osmotic pressure drawing water in. Collagen fiber make the pressure force and cartilage proteoglycan create osmotic pressure which draw water in, Without the protective effect of the proteoglycan the fiber and collagen of the cartilage can become susceptible to degradation and degeneration.

Hyaluronic acid is major component of synovial fluid and articular cartilage, and is responsible for viscosity and elasticity of synovial fluid. The quantity and molecular weight of Hyaluronic acid in the synovial flu-id is decrease in the osteoarthritis patient. The purpose of injecting intra-articular HA is to replace HA so that the natural viscosity of synovial fluid is maintained, so relieve pain and improve function of knee Osteoarthritis. HA injections have been used in treating knee osteoarthritis for over two decades in most developed countries, but in Iraq begin used late and slow due to lack of patient education about the injection, study diagnosed two group of knee Osteoarthritis for both gender and observed benefit and effectiveness to pre-and post of HA injection, the results were various significant during one month under study.

Keyword: Hyaluronic Acid; Osteoarthritis; Synovial fluid

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Introduction

Osteoarthritis (OA) is prevalent disease recognize by the degeneration of cartilage underlying bone changes and reduce in concentration of molecular weight of HA

within the joint, Bony overgrowth can also occur (Figure 1). OA typically begin at age forty and worsens gradually. the common symptom of OA is permanent pain so

different treatments are used to treat OA and most of which address pain symptoms associated with the disease. The most common treatments are non-steroidal anti-inflammatory drugs (NSAID) which carry potential gastrointestinal risks and cardiovascular complications as well as [8, 9].

Include basic analgesics, topical capsaicin,

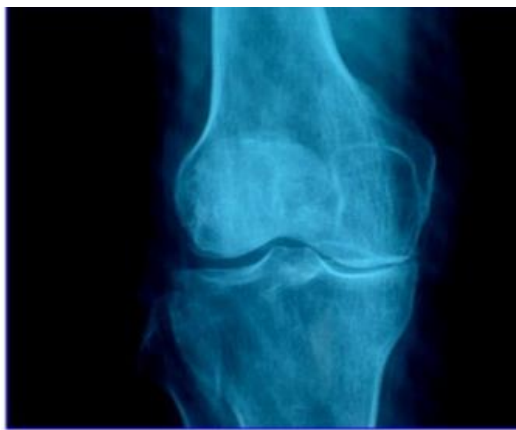


figure 1. knee with OA

OA with injections of HA to alleviate symptoms, HA improves viscosity of synovial fluid and protects the surface of articular cartilage; inhibits inflammation; induces its own endogenous biosynthesis, reduces pain perception and may inhibit cartilage degeneration [3]. According to traditional approach visco-supplementation can be made with the three consecutive intra articular injections (2 ml) in patients with knee OA. Lightly cross-linking HA consists of HA gel derived from high molecular-

intra-articular steroid, glucosamine sulfate, physiotherapy methods, ancillary equipment, surgical treatments, exercises, and patient education. Finding treatments that act locally in the joint without systemic side effects has led to the practice of replacing the diseased synovial fluid associated with

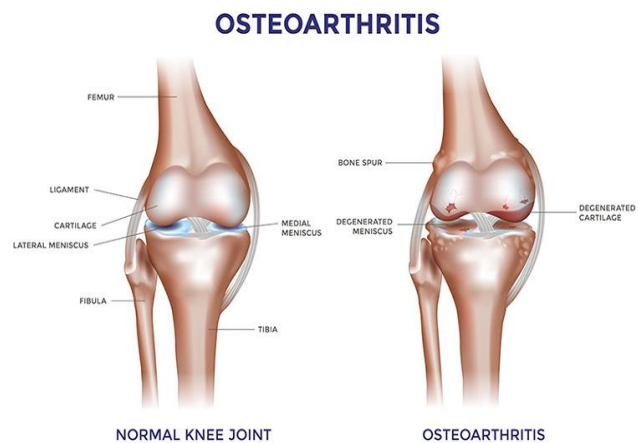


Figure 2. Show Normal and Osteoarthritis Knee

weight, ultra-pure fermented source hyaluronan in phosphate buffered saline. According to claim, cross-linking HA is likely to create a biocompatible gel with improved viscosity properties and a prolonged residence time in joint contrast to non-cross-linked HA.

Properties of Osteoarthritis

OA incurable joint disease hurts people more than their joints: Their finances and lifestyles also are affected [2]. It's a progressive, slow deterioration of the joint.

Localized loss of cartilage associated with Osteophytosis, cyst formation, and synovial thickening. Pain and impaired mobility. Eventually may lead to total joint replacement surgery.

Osteoarthritis incidence

OA affects approximately 1 in 13 people in USA each year that's 7.35% of total population or 20 million people annually in USA (www.nih.gov). Worldwide estimates 18% of women and 9% of men \geq 60 years have symptomatic OA. Knee OA became the fourth prevalence disease of women and eighth important in men in 2010. Most common in older men and younger develop it of joint damage, joint deformation or genetic disorder in cartilage (Figure 2). Effects on both gender [2], and before 45 of age occur common in man; after 45 of age occur common in women; after age 65, the risk is high for both sexes.

Characteristics of Hyaluronic Acid (HA)

Hyaluronic Acid (hyaluronan) is a polymer consisting of repeats of the disaccharide, D- glucuronic acid and D, N acetyl glucosamine linked in alternative (β -1,4 and β -1,3) glycosides bond. HA is found throughout the body and observed to be the dominant component in the synovial fluid of articulated joints and was later extracted from rooster comb tissue for commercial use [4]. First generation HA treatments for treat

OA were relatively low in average molecular weight and required multiple (typically 5) weekly injections for optimal efficacy [9]. Second generation formulations of higher molecular weight were then developed. Single injection of HA products was developed recently. These third-generation products seek to provide safe and durable pain relief with the convenience of a single treatment.

Synovial joint and fluid

Its present in most joints including knee, hip and shoulder and approximately (3 ml) in knee [2, 5]. Normal synovial fluid contains 2.5-4.0 mg/ml of HA, while normal HA molecular weight in the knee is up to 10 million Daltons. The functions in shock absorption, lubrication and cartilage nutrition.

Effects of OA on synovial fluid

OA reduces the molecular weight and concentration of the natural HA within synovial fluid [7]. Proteoglycans and HA lose their physicochemical properties. Cytokines cause synthetase to break down the native HA to below 0.5 million Daltons in molecular weight.

Study population

A total of 20 subjects were enrolled in this study in accordance to various criteria. These included gender (man and woman), age (40-80 years) and Grade of disease by

Kellgren-Lawrence (K-L) severity grade I, II and III OA of the knee. All subject collects of different city and diagnoses by specialists Doctors.

Methods

Twenty patients who were diagnosed with knee OA by Orthopedists and Rheumatologists whose used X-rays were graded as stage I, II and III according to Kellgren and Lawrence scale. All patient divided into two groups. first group N=10 (4man and 6woman) ,4ml lightly cross-linking HA (Monovisc®, Anika Therapeutics, Inc.) [3], was injected intra-articularly into knee joint for once. In the second group N=10 (4man and 6 woman), 2ml standard HA injection was injected intra-articularly into knee joint for once and follow- up effect for one month. WOMAC scores [11, 12] used and patient assessment scores were measured initially and after injection.

Results

All patients were classified according to grade of disease, age and gender, there was no significant different between the group according to age and gender. In within group analysis, WOMAC pain, WOMAC physical function and WOMAC-total scores (Figure-3) has been found better and improved after injection (s) in both groups ($p < 0.05$). while there was no change in WOMAC-stiffness scores ($p > 0.05$) in both group. In between group analysis after Injected by (2ml and 4ml of HA) there was no significant difference ($p > 0.05$) between HA injected according patient's assessment (Table1). Adverse event was observed after injection for both groups have found limited that in the first week, three cases (2 man and 1 woman) has dropped to one case only (1man) in the second week, it has disappeared in other weeks (Figure 4).

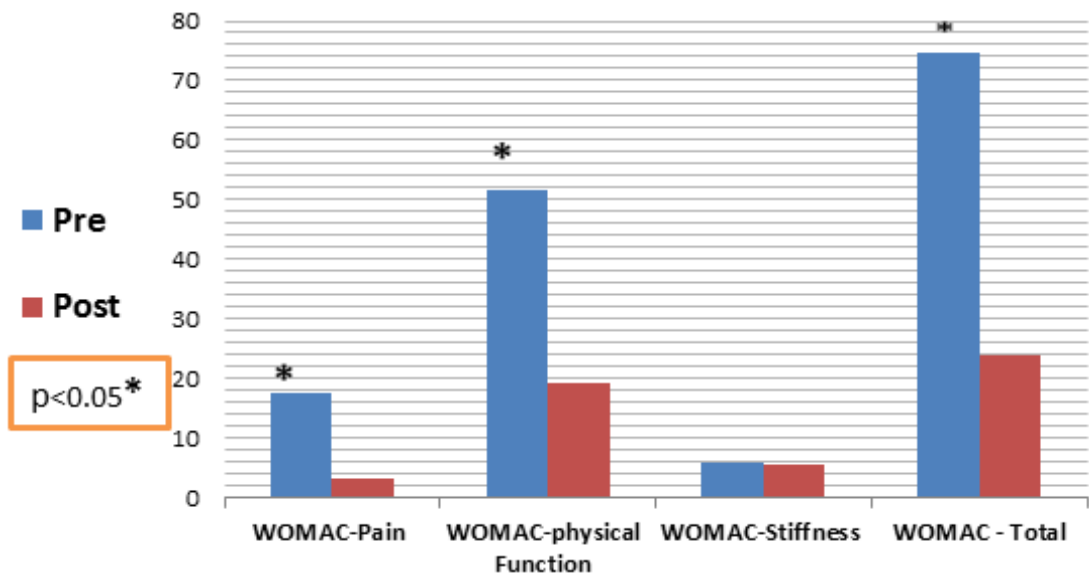


Figure 3.

Comparison of group in pre -and post- injection differences of WOMAC values

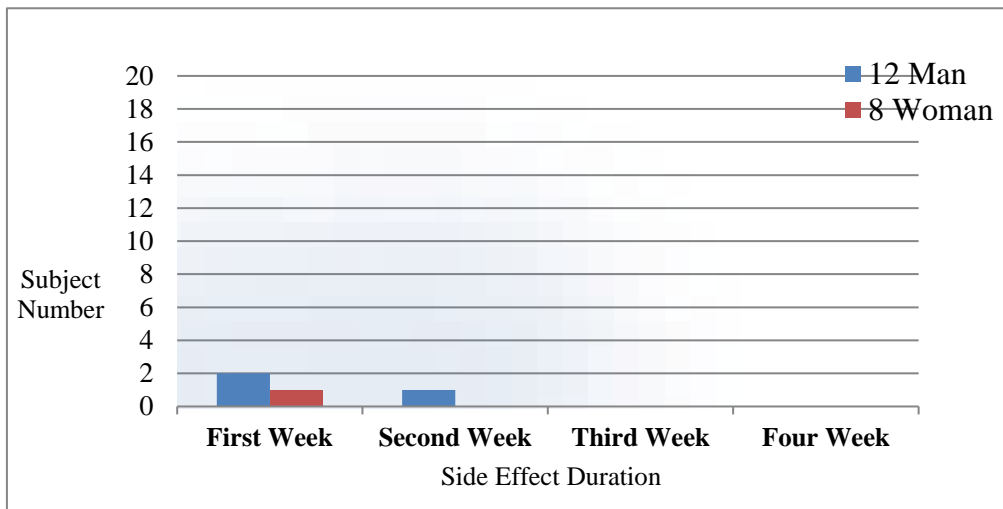


Figure 4.

Adverse effect during one month after injected HA to both gender

(Options: worse; no effect was seen; satisfactorily good; excellent therapy) $p > 0.05$

Options	4ml, HA	2ml, HA
Worse	1	0
No effect was seen	0	1
satisfactorily good	6	8
excellent therapy	3	1

Table-1.
Patient's assessment

Conclusion

Intra articular HA injection was higher effective in improve and relief pain in patients have knee osteoarthritis with very few local adverse events, treatment with HA products appeared is widely used in most developed countries, but in our country appeared recently used because of lack of patient to education, high product price and fear of injection. Through the results obtained in the study proved being HA Injecting more comfortable treatment for patients with knee osteoarthritis. we recommend that observed patient follow-up through radiograph, we advise by using a high efficiency and safety HA product like Anika Company, USA (MonoVisc and Orthovisc), FDA approved that used in these studies.

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