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Research article

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The Efficiency of Conservative Methods of the Treatment at Early Stages of Osteoarthritis

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Abstract

Osteoarthritis (OA) is one of the leading causes of disability in the elder population. OA is a chronic disorder characterized by joint pain and inflammation, increasing physical disability and continuous cartilage degeneration.The changes of lubricating properties of synovial fluid lead to significant pain and loss of function. One of the strategies uses the high molecular weight molecule hyaluronic acid as either an injectable treatment. The injection of hyaluronic acid in the joints, improves the biochemical properties of synovial fluid into osteoarthritis of knee joints. The clinical effect is pain relief and disease modifying activity. Hyaluronic acid is a relatively new treatment that has shown varied results through several clinical trials. It can be used as a scaffold for engineering new treatments and several new preparations have been just added to the markets.

Key words: Intra-articular injections, Osteoarthritis, Glucocorticosteroid, Hyaluronic acid.

Introduction

Osteoarthritis is the most common joints disease one of the main causes of disability in older peoples and affected 303 million globally in 2017 [1]. In 1986, the Subcommittee on Osteoarthritis of the Committee on Diagnostic and Therapeutic Criteria of the American College of Rheumatology (ACR) proposed the following definition of OA "Osteoarthritis is a heterogeneous group of diseases that lead to the appearance of joint symptoms due to the violation of the integrity of the articular cartilage, as well as changes underlying bone" [2].

According to different authors, the frequency of occurrence of OA in the population ranges from 3 to 10%. In United States 52,5 million adults have been diagnosed with osteoarthritis according to data analyzed between 2010 and 2012 in the National Health Interview Survey (NHIS) [3]. In addition, OA is considered as one of the main causes of functional disability in (estimated) 22,7 million US adults [4]. The patient with OA is suffering not only from the persistent pain, stiffness and limited mobility. However, it also directly affects their quality of life with physical and mental co-morbidity [5]. OA substantially increases health care expenditures which is estimated around $128 billion. When considering productivity loss due to OA estimates are between 0,25 and 0,50% of the Gross Domestic Product (GDP) [6].

Osteoarthritis is poorly understood because of vast complexity and interplay of various biological factors such as genetic alterations, sex hormone deficit and aging [7]. Many recent evidence has fo-

cused on molecular markers that implicated in the stress-induced senescent state of chondrocytes.The term "Chondrosenescence" has been currently used to describe the age-dependent deterioration of chondrocyte function. The therapeutic approaches for OA are limited because of its complex pathophysiology [8]. In 2016 the large disease burden has led to the submission by Osteoarthritis Research Society International (OARSI) of a White Paper describing osteoarthritis as a serious disease and recommendations for OA management, a core set of evidence based modalities of therapy has been established [9].

In general, the number of patients with OA Bangladesh is 10-12% of the population, about a third of them have some degree of disability [10]. At the same time, the incidence of the disease increases with age among peoples over 50 years old it reached 27,3% and over 60 years old 97%. Clinical manifestations of OA begin mainly at the age of 40-50 years, although signs of degenerative changes in the articular cartilage can be detected much earlier. The most striking clinical pictures are observed at the age of 55-65 years and differing only in the localization of the pathological process. The disease not only worsen the quality life of older peoples but also affects a significant part of the working age population [11].

High functional requirements for the knee joints, the uniqueness of the anatomical structure and biomechanics, all these factors determine the high frequency, its damage throughout a person's life. OA is the result of mechanical and biological phenomena that upset the equilibrium between the synthesis and degradation of cartilage and that affect all of the articular (Synovial, synovial fluid, subchondral bone, capsule, ligaments) and per articular (tendons and muscles) structures.

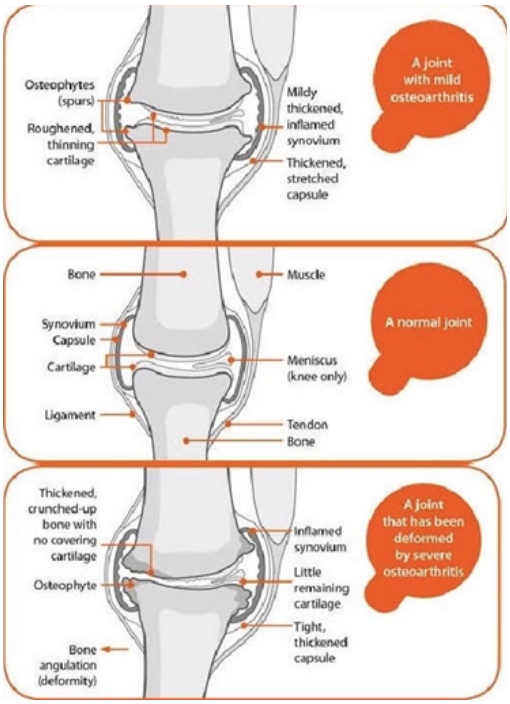

Figure 1: A joint with normal, mild and severe osteoarthritis.

The prevalence of osteoarthritis increases with age and life expectancy. The frequency is strongly correlated with age. It is rare to find anyone over 65 years of age who does not have one or several arthritic lesions. We should just remember that one in every two cases are visible on radiography that one radiographic case of in two is symptomatic. OA is not a fatality linked to age certain joint and certain subject show more resistance than others. The cartilage is one of the target tissues of OA [12].

The modern treatment of OA should be aimed at the main link of the pathogenesis of the disease not only to help reduce the severity of pain but also to restrain the progression of structural changes in the affected joint. The modern approaches to the treatment of OA is decrease in pathological symptoms and an improvement in the quality of life patients using various methods of treatment [13].

The numerous experimental and clinical studies have shown the possibility of treating cartilage with the suspension of further destruction and even with restoration, although the pathogenesis of changes in isolated lesions of the articular cartilage is still insufficiently studied. The clinical experience has shown that if the lesion is left untreated, the lesions are difficult to heal and involve the rest of the articular surface in the degenerative process. Therefore, treatment of an isolated defect can delay or even prevent the development of generalized OA. W. Hunter noted "From the time of Hippocrates to the present day, it is generally known that damage to cartilage is a serious condition and hyaline cartilage is not able to repair itself, if it was once destroyed" [14].

Currently, the effectiveness of the use of chondroprotectors in OA has been proven. The choice of drugs is wide and includes more than a dozen names. The combination drugs are increasingly used along with chondroitin sulfate, which contains glucosamine sulfate or glucosamine hydrochloride. In general, glucosamine and chondroitin sulfate affect those biologically active compounds that are responsible for the development of chondritis, synovitis and osteitis in patients with OA. Chondroitin sulfate optimizes the composition of the synovial fluid and glucosamine hydrochloride independently stimulates the production of chondroitin sulfate [15].

Osteoarthritis of the knee joints, glucocorticosteroid are indicate are used for vb 7chronic synovitis and in case of ineffectiveness of NSAIDs. Prolonged corticosteroids are not used in clinical practice to relieve the inflammatory process [16].

Now a day, hyaluronic acid is widely used. The study of the effect sodium hyaluronate on synovial fluid and cartilage tissue showed that it corrects the metabolism of cartilage tissue, increasing the synthesis of own proteoglycans, suppresses the synthesis of prostaglandins and has an anti-inflammatory effect. It has been proven that hyaluronic acid can not only effectively relieve pain but also delay surgical treatment and reduce the dose of NSAIDs [17, 18].

Material and Methods

At the early stages of our examination, we used clinical diagnostics of conservative treatment of patients with hyaluronic acid. The study included patients who treated for primary OA in one or both knee joints.

Osteoarthritis of the knee joints are wide spread pathology among the middle age and older population of all over the world. Total 75 patients (60 women and 15 men) were included in the study. The average age of patients was 61 ± 9,2 years and the majority of patients 89,3% were overweight in our study. The ratio of women to men are 4:1. The duration of the disease averaged 7,2 ± 3,4 years and body mass index (BMI) averaged 32,9 ± 4,3 kg/m.

The examined patients showed the dynamics of intense pain in the knee joints during the movement and the morning stiffness according to the visual analog scale (VAS) an average of 68,5 mm. There was a significant improvement in the total functional OA according to the index Liquesce an average of 10,2 points. The identified pronounced measurements of the physical function of the joint according to the WOMAC scale an average of 48,5 points. However, the general questionnaire for assessing the quality of patient's life according to the EQ-5D was an average 9 points.

Kellgren-Lawrence system for classification of OA, the examined group of knee joints were stage I - 20%, stage II - 53,33% and stage III - 26,67% of patients. All patients were moderate and intense joint pain (not less than 50 mm according to the VAS scale) and all of them required to the use of hyaluronic acid preparations.

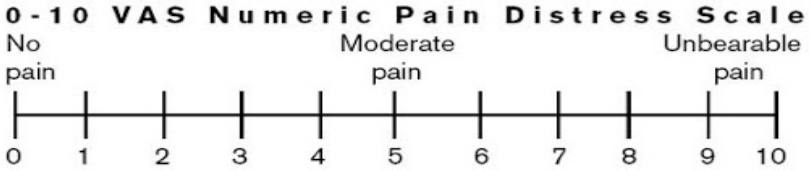

Figure 2: Visual analog scale (VAS)

Results

The duration of therapy was 1 month, it is weekly dose of hyaluronic acid preparation was 2 ml, which was divided into 5 intra-articular injections. The control of main parameters of therapy was carried out 1, 2, 3, 4 and 5 weeks. The effectiveness of therapy was assessed by the dynamics of the intense pain at rest, during the movement and the morning stiffness according to the visual analog scale (VAS), the total functional index Lequesne, the physical function measurement scale WOMAC and EQ-5D quality of life questionnaire. The positive dynamics of the main subjective symptoms of OA was observed by the end of the first week of treatment in all patients.

Every week, the main parameters of the treatment are checked. The results of treatment were assessed according to the dynamics of pain expressiveness at rest, during the movement and the morning stiffness according to the visual analog scale (VAS), the total functional index Lequesne, the physical function measurement scale WOMAC and EQ-5D quality of life questionnaire. The dynamics of the decisive symptoms of OA was traced to all patients end of the treatment.

Table 1: The difference scores between the groups assessed at each stage of observation.

The functional in-dex WOMAC		The functional index Lequesne		Visual analog scale (VAS)		EQ-5D questionnaire	
Before therapy	After therapy	Before thera-py	After therapy	Before thera-py	After therapy	Before thera-py	After therapy
48.5	5.5	10.2 Points	1.9 Points	68.5 MM	8 MM	9.0	4.9

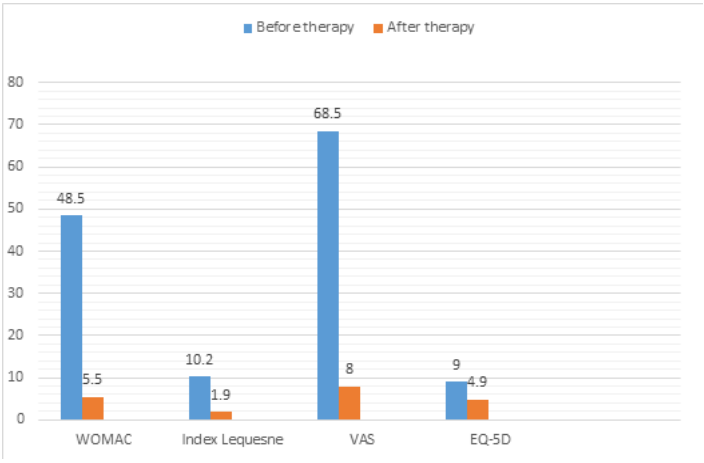

Figure 3: Dynamic indicators by the groups at each stage of observation.

Discussion

The ongoing studies continue to further our understanding of the fundamental mechanisms that likely underlie the therapeutic benefits of this treatment. This analysis in progress are further establishing a role for hyaluronic acid in ameliorating the symptoms of knee OA. At the moment it is clear that hyaluronic acid is more efficacious in the initial and intermediate stages of OA more than an advanced stages and this therapy is exceptionally safe compared with other OA treatments.

Conclusions

Osteoarthritis is a debilitating disease that affects a large portion of the population. As the general age of the population continues towards an older age, the prevalence of the disease is only going to grow up. Intra-articular injection of hyaluronic acid preparation are most effective in the initial (I-III) stages of OA, which can be traced already after one month of treatment. In the future, it is necessary to continue monitoring as well as from comparison group,

possibly with options for combination therapy.It is encouraging that hyaluronic acid based therapy is proving to be safe and effective for many patients with symptomatic knee joints OA.

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