Original Article

Role of Glucosamine and Chondroitin Sulfate in Management of Osteoarthritis of Knee Joints

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ABSTRACT

Objective: To determine efficacy of glucosamine and chondroitin sulfate along with other conservative measures like education, analgesics, physiotherapy and intra-articular corticosteroids injections in management of osteoarthritis of knee joints

Study Design: A prospective observational study

Place and Duration of Study: This study was conducted at the Department of Orthopedic Surgery of different public and private hospitals of Karachi, during February 2017 to January 2018.

Materials and Methods: There were 1732 patients in this study. The inclusion criteria were proper examination & radiological evidence for diagnosis of osteoarthritis of knee joints. Every patient was given Glucosamine 1500 mg per day and Chondroitin Sulfate 1200 mg per day. Analgesics were given as per requirement of the patient; physiotherapy was recommended to all the patients of knee joints osteoarthritis and intra-articular corticosteroid were given to patients with mild to moderate osteoarthritis of knee joints.

Results: In our study out of 1732 patients 69% were female and 31% were male. Age ranges from 35 years to 60 and above years. All types of socio-economic classes were affected equally. Out of 1732 patients 69 % were female while 31% were male patients. 62% of the patients having involvement of osteoarthritis of both knee joints. We found 24% of patients have excellent improvement in quality of life, 37% of patients have good improvement in quality of life and 39% of patients have no significant improvement in quality of life.

Conclusion: It is concluded that Glucosamine 1500 mg per day and Chondroitin Sulfate 1200 mg per day has shown effective results in management of osteoarthritis of knee joints of mild to moderate osteoarthritis.

Key Words: Osteoarthritis, Glucosamine, Chondroitin Sulfate, Knee joint

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INTRODUCTION

Osteoarthritis (OA, also known as degenerative arthritis, degenerative joint disease), is a group of diseases and mechanical abnormalities involving Degradation of joints, including articular cartilage and the subchondral bone next to it.[1]

Clinical manifestations of OA may include joint pain, tenderness, stiffness, creaking, locking of joints, and sometimes local inflammation.

In OA, a variety of potential forces—hereditary, developmental, metabolic, and mechanical—may initiate processes leading to loss of cartilage.[2,7] When bone surfaces become less well protected by cartilage, subchondral bone may be exposed and damaged.[3] The patient increasingly experiences pain upon weight bearing, including walking and standing.[4] Humid and cold weather increases the pain in many patients.[8]

OA is the most common form of arthritis,[5] & is leading cause of disability in older ages.[6] Osteoarthritis (OA), the most widespread type of arthritis, is a degenerative disease of the joints with approximately 16 million sufferers requiring medical care. Glucosamine and chondroitin have been widely promoted as a treatment for OA. Glucosamine, an amino sugar, is thought to promote the formation and repair of cartilage. Chondroitin, a carbohydrate, is a cartilage component that is thought to promote water retention and elasticity and to inhibit the enzymes that break down cartilage. Both compounds are manufactured by the body.

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Glucosamine supplements are derived from shellfish Shells; chondroitin supplements are generally made from cow cartilage. [9,10] Glucosamine and chondroitin have been educated save and effective option for management of symptoms of OA and delay its progression.[11-16]

In 2006, the researchers reported on a 24-week study that involved 1583 patients who were randomly assigned to receive glucosamine hydrochloride and sodium chondroitin sulfate or a placebo. The study found that this experiment drug group did about 17% better than the placebo group.[10] Trials on efficacy of Glucosamine 1500 mg per day and Chondroitin are going over worldwide. Certain studies have shown significant efficacy and excellent results while certain have shown good results and certain have shown insignificant results. The combination of analgesics, physiotherapy, Glucosamine, Chondroitin and Intra Articular injection if required has shown that quality of the patient life has improved as patients' knee joint pain is decreased and range of movement has increased**.**

MATERIALS AND METHODS

This study includes 1732 patients, who were having pain in knee joints and diagnosed as a case of osteoarthritis after proper clinical examination and radiological evidences. This study was carried out in Department of Orthopedic Surgery Hamdard University Hospital, Department of Orthopedics Civil Hospital and Dow University of Health Sciences, Karachi, National Medical Center, Karachi, Uncle Saria Hospital and Orthopedic and Medical Institute (OMI) Hospital Karachi from February 2017 to January 2018. Numerical rating scale is taken for pain in this study while Medscape "The global system of Kellgren and Lawrence[17] is taken for joint space narrowing based on radiographic changes". Every patient was given Glucosamine 1500 mg per day and Chondroitin Sulfate 1200 mg per day. Analgesics as required, physiotherapy and intra-articular corticosteroid as required. Patients were advised for follow up after 6 weeks with fresh X-rays of knee joint and they were evaluated for pain and range of movement, which are indicators for improvement in the quality of life. Patients were advised to follow up on regular basis with intervals of six weeks.

RESULTS

Out of 1732 patients 69 % of the patients were female while 31% were male. Both knee joints were involved in 62 % of the patients. The ages of patients were 20% of patients 35 years to 45 years, 24% of 45 years to 55 years, 30% of 55 years to 60 years, and 26% of 60 years respectively. It was noted during the study that regular knee flexion, knee banding, associated with squatting and praying was found a major cause. Obesity was found another important cause. It was also found during study that all the sectors of socio-economic classes were equally affected, 36% in rich people, 33% in middle class families while 31% in poor families.

Table No.1: Demographic and Baseline Characteristics of Patients (n=1732).

Variables		Mean ± SD or N (%)
Age		56.8 ± 6.1
Duration of OA (years)		8 ± 2.4
Gender	**Female**	**1195(69%)**
	Male	537 (31%)
BMI		30.9 ± 8.7
BMI categories	Normal	204(11.8%)
	Overweight	703(40.6%)
	Obese	**825(47.6%)**
Education	Matric	342(19.7%)
	Intermediate	309(17.8%)
	Graduate	**650(37.5%)**
	Postgraduate	111(6.4%)
	Not educated	216(12.5%)
	Others	104(6.1%)
Involvement of Knee Joint	Unilateral	658(38%)
	Bilateral	1074(62%)
Types of OA	Mild	450(26%)
	Moderate	606(35%)
	Severe	**676(39%)**

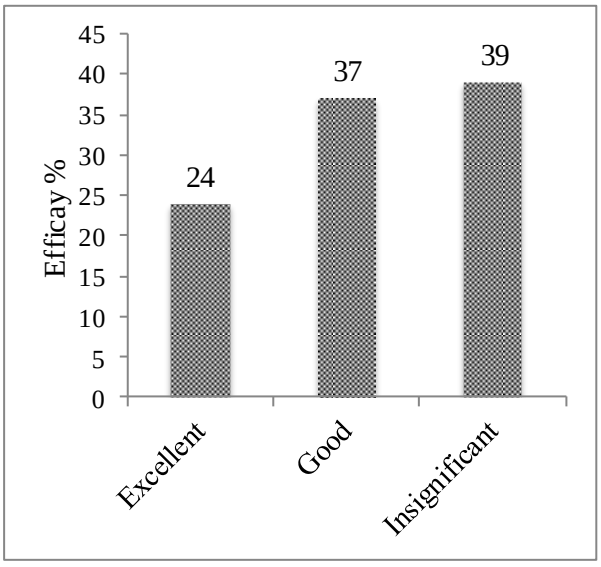

Figure No.1: Efficacy of Treatment (n= 1732)

Results are divided into three categories depending upon decrease in pain, delay in joint space narrowing, improvement in range of movement and delay in deterioration of joint: excellent (pain has decreased up to 5 points or more according to NRS with delay in joint space narrowing and full improvement in range of movement) , good (pain has decreased up to 3 points according to NRS with delay in Joint Space narrowing and improvement in range of movement) and

insignificant (pain has decreased up to 2 points or below according to NRS but there is no delay in Joint Space narrowing radio logically and insignificant improvement in range of movement). 24% of patients have excellent improvement in quality of life, 37% of patients have good improvement in quality of life. 39% of patients have no significant improvement in quality of life. It was also found that the excellent results were found in mild osteoarthritis of knee joint, while good results were found in moderate and severe osteoarthritis of knee joint and insignificant results were found in severe osteoarthritis.

In our study we found no major adverse events of Glucosamine and Chondroitin Sulfate; however, some patients developed dyspepsia, nausea and diarrhea. It was found that no serious adverse events were observed. During study we found types of osteoarthritis as mild 26%, moderate 35%, and severe 39%.

DISCUSSION

Osteoarthritis is the most common type arthritis and is seen commonly in elderly people. We found that females were affected more than male as mentioned in previous studies.[18] Life style, humid and cold weather affects osteoarthritis very much and weight lost can relieve joint stress and delay in progression of Osteoarthritis.

Two systemic reviews and one small trial have compared glucosamine with placebo or NSAID in osteoarthritis of knee joint.[19,20] two double blind, and placebo controlled trials of 3 years duration compared glucosamine sulfate (1500 mg / day) with placebo in 414 patients with osteoarthritis of the knee. Symptom changes were assessed using the WOMAC Osteoarthritis index, a validated, disease specific course of severity of joint pain, stiffness and limitation of physical function. Both trails reported Glucosamine Sulfate significantly improved symptoms.[21]

Research shows people with osteoarthritis who take part in their own care report less pain.[22] Exercise plays a key part in comprehensive treatment plan. Recently a review by Buyers about Glucosamine and chondroitin sulfate for the treatment of knee and hip osteoarthritis concludes that both products act as valuable symptomatic therapies for osteoarthritis disease with some potential structure modifying effects.[23]

In the patients with excellent results use of analgesic were decreased. Some patients who were known cases of acid peptic deceases were found to have G-I disturbances. It is also noted that Glucosamine and Chondroitin Sulfate has increased level of blood sugar, so regular monitoring of blood sugar levels should be done in diabetic patients. Most common side effects during research are found increased intestinal gas and softened stools.[18] however animal research has shown the possibility that Glucosamine may worsen insulin resistance, a measure cause of diabetes.

At present, OARSI is recommending chondroitin sulfate as a second most treatment for moderate cases of osteoarthritis.[24] Likewise the European League rheumatism support the usefulness of chondroitin sulfate in management of knee osteoarthritis and grants the highest level of evidence.[25] Recently in Vitro study Chondroitin sulfate reduced the IL-1B induced nuclear factor Kb (Nf-kB) translocation in chondrocytes.[36] In addition Chondroitin sulfate has recently shown positive effects in osteoarthritic structural changes occurred in sub choral bone.[26] In several prospective controlled studies Glucosamine and Chondroitin sulfate had decreased pain, improve functional disability, reduced NSAID or acetaminophen consumption and provide good tolerability.[27-28]

CONCLUSION

It is concluded that Glucosamine 1500 mg per day and Chondroitin Sulfate 1200 mg per day has shown effective results in management of osteoarthritis of knee joints of mild to moderate osteoarthritis. Its results are highly effective in mild to moderate osteoarthritis of knee joint along with the combination of analgesics, physiotherapy and intra articular corticosteroid as required however in certain patient with severe osteoarthritis it has not shown significant improvement in quality of life of patient.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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