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DIAGNOSIS AND TREATMENT OF OSTEOARTHRITIS (LITERATURE REVIEW)

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ABSTRACT

Osteoarthritis rapidly progressive hip arthropathic pain and damage. These disease factors include genetics, female sex, advancing age, and obesity. Pharmacological treatment should begin to diagnose this disease. Exercise is also a useful treatment for moderate osteoarthritis. In comparing non-pharmacological and pharmacological therapy. In 80 patients diagnostic osteoarthritis temporomandibular joint. Only patients with symptoms of one temporomandibular joint. (TMJ). The investigation of lidocaine, morphine and diclofenac morphine reduces the pain in 3 days.

Keywords: Osteoarthritis, pain, Joint inflammation

INTRODUCTION

Osteoarthritis is a chronic disease of cartilage and subchondral bone. (Taruc-Uy and Lynch, 2013) It is the leading cause of chronic disability at older ages due to knee and hip involvement. (Sarzi-Puttini et al., 2005)It is characterized by fibrosis, osteophyte development, and articular cellular damage. (Rychel, 2010) It leads to joint symptoms and signs with loss of honesty of articular cartilage in combination with changes in bone and joint margins. (Taruc-Uy and Lynch, 2013)Many risk factors are commonly associated with disease, including obesity, inflammation, trauma, genetics, and other factors. Osteoarthritis is subdivided into primary and secondary forms, with the primary occurring intact joint without an inciting agent. The secondary form is caused by causal inclining factors, such as trauma. (Taruc-Uy and Lynch, 2013) Osteoarthritis most frequently affects the hands, spine, knees, and hips. Then involve elbows and shoulders. This disease develops by the combination of biochemical cellular and mechanical processes. (Taruc-Uy and Lynch, 2013) It starts to break down by proteolytic of the cartilage matrix. (Taruc-Uy and Lynch, 2013) Loss of these molecules is associated with increased cleavage of type 2 collagen by collagenase and small degradation of small proteoglycans. (Taruc-Uy and Lynch, 2013) Damaged cartilage also causes new thin extensions or outgrowths. The extracellular matrix (ECM) exceeds synthesis leading to decrease in the amount of cartilage matrix. More than 13% of Americans aged 55 to 64 years, and more than 17% of Americans aged 65 to 74 years have related to knee osteoarthritis. (Taruc-Uy and Lynch, 2013)

Sign and Symptoms

Osteoarthritis is sometimes associated with acute or subcutaneous inflammation. Muscle spasm and contracture, capsular contracture and mechanical block due to loose bodies. Articular gelling, a temporary stiffness lasting for several flexion-extension cycles is common in elderly patients, especially in lowering

joints. a crackling or grating sound as the joint is moved, may be due to cartilage loss and joint surface irregularly. (Rychel, 2010)(Sarzi-Puttini et al., 2005) The joint enlargement is caused by secondary synovitis, an increase in synovial fluid, or marginal proliferative changes in cartilage or bone. The next stage is associated with deformity due to cartilage loss of subchondral bone and the formation of bone cysts.

Table 1: Signs and Symptoms of Osteoarthritis (Sinusas, 2012)

Sign and Symptoms	
Joint stiffness	This symptoms effect in early morning. (4) Symptoms can be last from 10 minutes to 30 minutes. (4)
Muscle weakness	Soft tissue leads to be overstressed the joint (4)
Bony crepitation	Cartilage surface damage become rough (4)
Finger joint with knobby growth (4)	
Swollen joint (3)	

Table 2: Risk factors of Osteoarthritis (Rychel, 2010)

Risk factors	
Age	50% people ≥ 55years 85% people≥75 years (3)
Gender	After 40 years in women and 50 years in men (3)
Ethnicity	
Genetics	The chromosome 2q and chromosome 11q in metabolism bone and cartilage. (3) first change metabolism of bone and cartilage.
Hormonal status and density	Estrogen deficiency may affect in osteoarthritis (3) Osteoporosis against onset of osteoarthritis as studies. (7)
Diet	Overweight people have high prevalence of knee osteoarthritis. (3) Women weight loss average 11lbs decreased risk knee osteoarthritis by 50%
Sports	Football players are high risk of osteoarthritis. (3)

DIAGNOSIS

There are many types of diagnosis in osteoarthritis such as Laboratory tests Radiography, Computed tomography (CT), Magnetic resonance imaging (MRI), Ultrasonography, Histopathology, Biochemical markers of cartilage and bone metabolism, X-ray, and Immunological tests.

Magnetic Resonance Imaging (MRI)

Magnetic resonance imaging (MRI) was obtained with fast spin echo T2-weighted fat-suppressed, fast spin echo T1- weighted short inversion recovery sequences. (Sarzi-Puttini et al., 2005) MRI found chondral thinning, subchondral osseous changes, and osteophytes. (1) Direct visualization of articular cartilage and other joint tissue. (meniscus, tendon, muscle or effusion). (Taruc-Uy and Lynch, 2013) Osteoarthritis presents as high signal intensity lesions on T2- T2-weighted images or low signal intensity lesions on T1- weighted images in a superior, weighted bearing portion of the femoral head. (Rychel, 2010) There are three characteristic lesions observed on MRI.

The early stage presents as well-defined serpentine high signal intensity lesion on the T2 weighted sequence which represents bone marrow edema. (Sarzi-Puttini et al., 2005). The intermediate stage has poorly defined serpentine lesions with large area of diffuse high density. (Taruc-Uy and Lynch, 2013). The later stage present a more diffuse area of edema with foci of necrosis. The visible area of high signal intensity surrounding foci of low signal intensity on T2 weighted sequences. (Sarzi-Puttini et al., 2005)

Immunological Test

In immunological test such as antinuclear antibodies and rheumatoid factors, should not ordered unless evidence of joint inflammation.(Taruc-Uy and Lynch, 2013) Although osteoarthritis is an accepted degenerative disease, autoimmune processes are believed to be diseases in pathogenesis. (Abeles and Abeles, 2013) Microarray analysis of the expression of genes associated with the WNT pathway also suggests the possible involvement pathway in altered bone remodeling in osteoarthritis. (Power et al., 2010) Antibody against chondrocyte membrane. In an antinuclear antibody (ANA) in primary osteoarthritis of the knee (OAK). (Abeles and Abeles, 2013) Cellular immune response to cartilage-related components such as YKL- 39 cartilage intermediate layer protein and osteopontin.

The first pooled deoxyribonucleic acid (DNA) genome-wide associated study on

Osteoarthritis showed C allele of signal nucleotide polymorphism (SNP) rs4140564 minor allele frequency (MAF) 75kb upstream of prostaglandin-endoperoxide synthase 2 gene (PTGS2), associated with prevalent of knee Osteoarthritis in women. (Kerkhof et al., 2010) Antinuclear antibody is one of the most commonly performed screening test in the detection of autoimmune disease. ANA is found in a wide range of autoimmune diseases including connective tissue diseases like rheumatoid arthritis and non-rheumatoid arthritis such as primary biliary cirrhosis. (Abeles and Abeles, 2013)The protein protect SOST gene in an inhibitor canonical signaling and is expressed in osteocyte. (Kerkhof et al., 2010)

TREATMENT

Mainly 2 types of treatment for osteoarthritis. Such as Pharmacological and Non-Pharmacological treatments.

Pharmacological Treatments

Topical capsaicin cream is considered for adjunctive treatment of joint pain. (Taruc-Uy and Lynch, 2013) These desensitize neurons by reducing substances a pain neurotransmitters. The early patients recommended first-line treatment for hand osteoarthritis. (Taruc-Uy and Lynch, 2013) Corticosteroids work by anti-inflammatory and antinociceptive action. Acetaminophen and nonsteroidal anti-inflammatory drugs (NSAIDs) are treatments of osteoarthritis and cyclooxygenase-2 (COX-2) inhibitors may be used if the former is not well tolerated. (Taruc-Uy and Lynch, 2013) Paracetamol is recommended as the first-line drug for pain relief in osteoarthritis. (Taruc-Uy and Lynch, 2013)

Non Pharmacological Treatment

Aerobic and strengthening exercise equally effectively term of pain and function. In alternative treatment include herbs, diet, homeopathy, mind – body intervention, manual healing, electromagnetic therapy, and acupuncture. (Power et al., 2010) Physiotherapy help to increase local blood circulation and reduce inflammatory reaction. (Chinese Orthopaedic Association, 2010) Balneotherapy also known as spa therapy or mineral bath is also used treat osteoarthritis. (Taruc-Uy and Lynch, 2013)

METHODOLOGY

Study 1(Immunological test)

Using specific antibody staining, determined the osteocyte of sclerostin within osteons of femoral neck cortex, in the bone removed from undergo surgery fir hip osteoarthritis and femoral neck failure. (Power et al., 2010) 8µm thickness were taken from bone biopsy of hand osteoarthritis patients (70 years), (79 years) 11 patients (6 female and 6 male) patient in case control sectioning was oriented at right angle neck longitudinal axis. Then incubated in 0.3% hydrogen peroxide in methanol to quench endogenous peroxidase activity. Next washed PBS and blocked normal serum and incubated overnight in humid chamber at 4'C in mouse monoclonal sclerostin antibody IgG clone H7 at dilution 1:1500. The primary monoclonal antibodies were obtained from R&D system used at the concentration of 0.5 and 10µg/ml. washed two times and incubate in biotinylated anti mucosal secondary anti serum for 30 minutes. Immunoperoxidase activity was visualized for 1 minutes.

Study 2 (MRI)

The majority of early osteoarthritis patient have MRI evidence of synovitis: this was present in 93% series of 12 patients, most involving radiocarpal joint at wrist. (Gwilym et al., 2009).

Thickening oat wrist in 11 of 15 early patient it was localized to distal radioulnar joint in nine with radiocarpal joint in seven. MRI done in two ways. Firstly, the volume synovial membrane has used as surrogate measure. Synovial membrane within the joint allowing to calculated. These studies were performed at the knee in patients with established disease. In second method found that inflamed synovium brightly after injection of DTPA.

A typical S-shaped curve increasing signal intensity observes the injection of contrast medium. These may spuriously when baseline signal intensity is low. We identified 164 patients diagnosed with moderate to severe osteoarthritis who were referred for total knee replacement over a year.

Study 3 (Non-pharmacological drugs)

In this paper author referred 80 patients diagnosed with osteoarthritis of the temporomandibular. We include patients with symptoms of TMJ. There were 19 males and 61 females in the group with a median age of 52.8 years. The patients were randomly divided in this study, with the first patient diagnosed with osteoarthritis always rest therapy group second splint therapy third arthrocentesis group fourth arthrocentesis and splint therapy group(MacHon, Hirjak and Lukas, 2011). Patients were monitored at 2 weeks after therapy was initiated and then 1,2 and 3 months after the beginning of therapy. The patient suggested to be assessed at between 0 and 1 on the scale and the mouth could be opened more than 35mm. In rest therapy, the patient took non-steroid anti-inflammatory for period of 2 weeks (ibuprofen 400mg3× daily), and semi-solid food was recommended (MacHon, Hirjak and Lukas, 2011). In splint therapy, they were 2mm wide and prepared using vacuum techniques. During the first 10 days following beginning therapy took steroid anti-inflammatory (ibuprofen 400mg 3×) after experiencing pain. In arthrocentesis, this procedure took place under local anesthesia, and upper jaw space was injected with 120ml of irritation solution. After a single dose of antibiotic (amoxicillin 2g peroral 1 h before the operation). After Arthrocentesis therapy, this was a combination of both methods.

Study 4 (Pharmacological Test)

In this placebo control trial, obese women 45-64 years of unilateral radiography in osteoarthritis were randomly associated with receiving 30 months of treatment with 100mg doxycycline or placebo twice a day. Tibiofemoral was measured and the radiographic examination baseline was 16 months and 30 months.

RESULTS / DISCUSSION

Study 1 (Immunological Test)

Sclerostin-positive cells stained brown and sclerostin-negative cell stained blue color (Power et al., 2010). Alkaline phosphate (ALP) allow mapping of location forming MBUS. Described Pole and colleagues. These were done by ALP stained with those from the adjected immunostained section. Distribution sclerostin sclerostin-negative and sclerostin positive osteocyte densities at osteon level different between induvial but only part by diagnostic category osteoarthritis patient higher density sclerostin control induvial patient (Power et al., 2010).

In BMUS studies there was borderline tendency for Osteoarthritis patient have large osteon area and canal area than control induvial. These tests called Wilcoxon test. The referred patient with positive Anti-nuclear antibody and to tertiary care specialist is common practice has met with some disparagement, misdiagnoses can have emotional insurability patient a serious negative impact on health care resource delay in poor clinical outcome such as organ

damage or failure. 39 patients who were treated with corticosteroid dosage as high as 60 mg/serum dilution of 1/160 approximately 27% of patient referred because of positive antibody test AARD. In another 50 patients did not fulfill sufficient criteria classification in using diagnostic profile none of patient thrombocytopenia (MacHon, Hirjak and Lukas, 2011).

Study 2 Magnetic resonance imaging (MRI)

It provides a window through which processes can observed. Recording systems have been developed for MRI radiological systems of sharp and that can be used to measure inflammation and damage. (Sarzi-Puttini et al., 2005) MRI is an emerging important imaging technique context of early inflammatory arthritis and promises to be a useful addition to the new diagnosis (MacHon, Hirjak, and Lukas, 2011). In 164 Patients who met the study criteria, 19 patients were excluded because no provider was listed. In 145 patients 19 patients presented with MRI. 126 patients presented without MRI. A total of 45% of patients were referred. (Sinusas, 2012) Only 3% of patients who were providers presented with MRI compared to 16% referred from nonacademic providers ordering MRI population was 6.65%. The MRI diagnosis of evolution pathological orthopedic condition is well recognized. The incidence of MRI osteoarthritis referred academic arthroplasty surgeon. No patient referred with knee osteoarthritis was felt require an MRI for diagnosis (Sinusas, 2012). In this study 19 presented with an MRI scan. 164 patients identifying met the study criteria, and 19 patients were excluded because no referring provider was listed. There were 94% of patients referred from a 6% referred from a non-physician 24 % referred from academic provider and 16% from non academic provider. Out of a patients who were referred from a non-physician provider, 44% presented with MRI (Arthritis Rheum.)

Study 3 (Non-pharmacological Test)

RT analgesics rest therapy in 20 patients (5 males and 15 females) median age of 54.1. Duration disorder 64 weeks.

	% patient without problem	% patient with problem
14 days past commencement of treatment	20	
1-month past commencement of treatment	30	
2 months past commencement of treatment	30	
3 months past commencement of treatment	20	

Splint in 20 patients (six males and 14 females) median age 50.4 and duration of disorder – 20.7 weeks

	% patient without problem	% patient with problem
14 days past commencement of treatment	20	
1-month past commencement of treatment	30	
2 months past commencement of treatment	50	
3 months commencement of treatment	60	

Arthrocentesis 20 patients (4 males and 16 females) age limited 54

Duration of disorder 36.6 weeks

	% patient without problem	% patient with problem
14 days past commencement of treatment	55	
1month past commencement of treatment	75	10
2 months past commencement of treatment	75	10
3 months past commencement of treatment	70	5

In the 14 days after the procedure

P = 0.180

P = 0.030

P = 0.036

P = 0.009

These results reflect older patients are less likely they improve (12).

Osteoarthritis mostly arises as a result of mechanical overloading of joints. The next part of the joint is affected the cartilage collagen fragmentation occurs with deformation and degradation of the joint surface (MacHon, Hirjak and Lukas, 2011). These study shows a best method of treatment involve the use splint together

with arthrocentesis. (MacHon, Hirjak and Lukas, 2011)(Ferreira-Gomes et al., 2012)

In study 1 and study 2: the immunological test advantages are simple test procedures, no need to large instruments, there any rays are not using. The disadvantage is not possible to react with enzymes and antibodies, analysis time takes too much, and sometimes it is not enough to analyze antibodies. In MRI scanning advantages they don't expose radiation They show soft tissue structures such as cartilage and organs. The disadvantages are these produce not clear images. (Kraus et al., 2011)

Study 4 (Pharmacological Test)

71% of randomly completed trails. 85% of subjects completed at 30 months. After 16 months doxycycline group was 40% less placebo group after 30 months it was 33% less.

CONCLUSION

Doxycycline has shown a rate of knee-established osteoarthritis in patients. Placebo-controlled double-blind trials tetracycline, antibodies, doxycycline, knee osteoarthritis. These show arthrocentesis with the use splint useful first-stage treatment for osteoarthritis. These studies showed this drug reduces less active total gelatinase and collagen extract of osteoarthritis cartilage. There are non-pharmacological is a best that other than pharmacological tests because drugs have side effects such as headaches, rashes, and stomach problems. An MRI is better than an immunological test. MRI is a new diagnosis in latest the health industry. It is also a very quick diagnostic method. (Ferreira-Gomes et al., 2012). In the MRI study, 13% of patients with radiographically obvious knee osteoarthritis obtained an MRI before referral for total knee replacement.

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