بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

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Advances in the Understanding of Osteoarthritis

ESSAY

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المستجد في معرفة مرض
الالتهاب العظمي المفصلي

رسالة توطئة للحصول علي درجة
الماجستير في الروماتيزم والتأهيل

مقدمة من الطبيب

محمود هادي نصي

بكالوريوس طب وجراحة عامة

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ABSTRACT

Osteoarthritis (OA) is the most common joint disorder worldwide It is a chronic degenerative disorder characterized by cartilage loss. OA prevalence is high, and it is a major cause of disability. Numerous factors have been associated with an increased risk for the development of OA; these include systemic factors such as genetics, age and gender as well as local mechanical factors such as joint injury , joint deformity and muscle weakness .Therapies for OA have been directed mostly toward the alleviation of signs and symptoms of the disease, predominantly manifested by pain. Evaluating therapeutic efficacy has largely focused on improvement in pain and joint function.

Management of OA, the most common form of arthritis, involves a combination of nonpharmacological, pharmacological, and surgical options in advanced cases. As the populations of developed nations age over the next few decades, the need for better understanding of osteoarthritis and for improved therapeutic alternatives will continue to grow.

Key Words : osteoarthritis , etiopathogenesis , non-pharmacological options , DMOADs .

CONTENTS

LIST OF ABBREVIATIONS

Abbreviation	Meaning
ACCP	Anticyclic citrullinated peptide.
ACR	American College of Rheumatology.
ACT	Autologous chondrocytes transplantation.
ACU	Avocado/Soybean unsaponifiables.
ADAPT	Diet and activity promotion trial.
AGG	Aggrecan.
ALK5	Activin-like kinase 5.
AQE	Aquatic exercise.
AS	Ankylosing spondylitis.
ATP	Adenosine triphosphate.
AUSCAN	Australian/Canadian osteoarthritis hand index.
BLOKS	Boston leeds osteoarthritis score.
BMD	Bone mineral density.
BMI	Body mass index.
BML	Bone marrow lesion.
BMP	Bone morphogenetic protein.
BT	Balneotherapy.
CMC	Carpometacarpal .
COMP	Cartilage oligomeric matrix protein.
COX-2	Cyclooxygenase -2.
CPPD	Calcium pyrophosphate dehydrate.
CR	Conventional radiography.
CRP	C-Reactive protein.
CS	Chondroitin sulfate.
CT	Computed tomography.
CTX-II	C-terminal cross linked telopeptide typeII collagen.
DESS	Coronal double echo steady state .
DIP	Distal interphalangeal .
DISH	Diffuse idiopathic skeletal hyperostosis.
DJD	Degenerative joint disease.
DMOADs	Disease modifying osteoarthritis drugs.
DMSO	Dimethylsulfoxide.
E2	Estrogen.
ECM	Extra cellular matrix.
ECM	Extracellular matrix.
EOA	Erosive osteoarthritis.
ERT	Estrogen replacement therapy.
EULAR	European league against rheumatism.

Abbreviation	Meaning
FAOS	The Foot and Ankle outcome score.
FasL	Fast ligand.
FIHOA	Functional index for hand osteoarthritis.
FOS	Facet osteoarthritis sign.
FSE	Fast spin echo.
GAGPS	Glycosaminoglycan polysulfuric acid.
GI	Gastrointestinal.
GLU	Glucosamine.
HA	Hyaluronic acid.
HLA	Human leukocyte antigen.
HMG-COA	Hydroxymethylglutaryl-Co enzyme.
HOOS	Hip disability and Osteoarthritis Outcome Score.
HRQOL	Health-related Quality of life.
ICE	Interleukin-1 converting enzyme.
IDEA	Intensive diet and exercise for Arthritis.
IGF-1	Insulin-like growth factor-I.
IL-1	Interleukin-1.
IL-1Ra	IL-1 receptor antagonist.
ILsR	Interleukin-1 soluble receptor.
iNOS	Inducible nitric oxide synthase.
JCA	Juvenile chronic polyarthritis.
JSN	Joint space narrowing.
JSW	Joint space width.
KOOS	Knee osteoarthritis outcome Score.
LBE	Land-based exercise.
MCP	Metacarpophalangeal.
MCP-1	Monocyte chemoattractant protein-1.
MED	Multiple epiphyseal dysplasia.
MMP	Matrix metalloproteinase.
MRI	Magnetic resonance imaging.
MSM	Methylsulfonyl methane.
MSCs	Mesenchymal stem cells.
MTP	Metatarsophalangeal.
NFκB	Nuclear factor-κB .
NGF	Nerve growth factor.
NHANES	National health and nutrition examination survey.
NHP	Nottingham health profile.
NHS	National health service.
NO	Nitric oxide.
NPDS	Pain and disability scale.

Abbreviation	Meaning
OA	Osteoarthritis.
OARSI	Osteoarthritis research society international.
OASFs	Osteoarthritis synovial fibroblasts.
OI	Ocular inflamation.
PEMF	Pulsed electromagnetic fields.
PFP	Passion fruit peel.
PGE-2	Prostaglandin E-2.
PIP	Proximal interphalangeal.
PMNs	Polymorphonuclear leukocyte
RA	Rheumatoid arthritis.
RAGE	Receptor for advanced glycation end products.
RF	Rheumatoid factor.
ROS	Reactive oxygen species.
SAMe	S-adenosyl methionine.
SF	Synovial fluid.
SFs	Synovial fibroblasts.
sHLA	Soluble isoforms HLA.
SLCs	Synovial lining cells.
SNP	Single nucleotide polymorphism.
SOD	Superoxide dismutase.
SPGR	Spoiled gradient-recalled echo.
TENS	Transcutaneous electrical nerve stimulation.
TGF-β	Transforming growth factor-β.
THA	Total hip arthroplasty.
TIMP	Tissue inhibitor of matrix metalloproteinase.
TKA	Knee-joint arthroplasty.
TMJ	Temporomandibular joint.
TNF	Tumor necrosis factor.
TNF-Sr	Tumor necrosis factor soluble receptor.
VAS	Visual analoge scale.
VIL-10	Viral interleukin -10.
WOMAC	Western ontario and McMaster universities.
WORMS	Whole-organ magnetic resonance imaging score.

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Introduction and Aim of the work

Osteoarthritis (OA) is the most common articular disease worldwide; its high prevalence entails significant costs to society .Direct costs of osteoarthritis include clinician visits, medications, and surgical intervention,indirect cost is the time lost from work. As the populations of developed nations age over the next few decades, the need for better understanding of osteoarthritis and for improved therapeutic alternatives will continue to grow (***Lozada,2009).***

It is becoming increasingly apparent that the subchondral bone, periosteum, periarticular ligaments, periarticular muscle , synovium, and joint capsule are all richly innervated and are the likely source of nociception in osteoarthritis .In addition, it is apparent that local tissue alterations in the bone and meniscus and alignment of the lower extremity are important in terms of disease genesis ***(Hunter ,2009).***

New diagnostic recommendations for knee osteoarthritis,have been published, one on risk factors :female sex, aging, overweight, joint injury, malalignment, joint laxity, occupational and recreational use, family history, and Heberden's nodes (bone overgrowth at the distal finger joints), and one on clinical diagnosis that focused on 3 symptoms: pain on use, short-lived morning stiffness, and functional limitation, and 3 signs : crepitus, restricted movement, and bony enlargement.The third recommendation called for plain radiography of the knees, with a weight bearing, semi-flexed view, plus a lateral and skyline view (***Zhang,2009).***

A group of patients show fast progression of the disease process leading to disability and ultimately joint replacement.Apart from symptom relief, no treatments have been identified that could eradicate the disease process .Therefore, there has been increasing attention devoted to the understanding of the mechanisms that are driving the disease process.The biology of the cartilage-subchondral bone unit has been highlighted as a key in osteoarthritis, and pathways that involve both cartilage and bone formation and turnover have become prime targets for modulation,and thus therapeutic intervention(***Luyten et al.,2008).***

Therefore the aim of this work is to demonstrate the advances in etiopathogenesis , clinical assessment and management of osteoarthritis.

Epidemiology and Etiopathogenesis

EPIDEMIOLOGY

Osteoarthritis is derived from the Greek word "osteo" meaning of the bone, "arthro" meaning joint , and "itis" meaning inflammation, although the "itis" of osteoarthritis is somewhat of a misnomer as inflammation is not a conspicuous feature.

By the age of 65, more than 80% of the population have radiographic changes consistent with osteoarthritis in at least one site (hands, feet, spine, knees, or hips), 40% complain of arthritic symptoms, and 10% report limitation in activity due to arthritis. Women, after the perimenopausal period, are more likely to develop osteoarthritis of the knees, hips, and hands than are men ***(Issa and Sharma, 2006).***

The prevalence of OA (the frequency of the disease in the population at a given time), varies according to the definition of OA, the specific joints under study, and the characteristics of the study population. The prevalence of radiographic and symptomatic knee, hand, and hip OA has been estimated. The age-standardized prevalence of radiographic knee OA in adults over the age of 45 years was 19.2% among the participants in the Framingham Study (the prevalence of radiographic and symptomatic knee Osteoarthritis of independently living elderly in the early 1980s at which time they had been observed for over 35 years and many risk factors for Osteoarthritis had been ascertained. This study suggested that knee osteoarthritis increases in prevalence throughout the elderly years, more so in women than in men. Also, studies of risk factors have shown that obesity precedes and increases the risk of knee