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CLINICAL

An integrated approach to assess and manage Early knee Osteoarthritis –Need of the hour

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ABSTRACT

Osteoarthritis (OA) is the most common form of arthritis characterized by the destruction of articular cartilage and subchondral bone with synovial changes. The knee is the most affected joint and diagnosis of knee OA generally depends on clinical and radiographic changes, which occur fairly late during disease progression leading to poor sensitivity for monitoring disease progression.1 As per the new concept, OA knee has been considered as mechanobiological derangement of joint rather than degenerative disease related to age. There were no methods devised or put forward to identify early OA knee with the aim of arresting this derangement in its early stage.2 Therefore there is a need to pursue a goal of early identification and delay in the progression of knee osteoarthritis by an effective assessment and management of knee OA.

KEYWORDS

Early knee OA, assessment,management

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Definition of Early knee OA Currently, the definition of knee osteoarthritis utilizes a combination of clinical symptoms and radiographic criteria. Despite its high prevalence, knee OA is still a puzzle. Out of several definitions proposed in for diagnosis of knee OA, the most accepted one is the definition based on the

American College of Rheumatology (ACR) criteria for knee OA published by Altman et al. 1986. According to this diagnostic criteria, subjects is considered as having knee OA if they present with: knee pain, age above 50, stiffness less than 30 minutes and crepitus, combined with structural changes, i.e., osteophytes and joint space narrowing (KL grade II on standardized radiographs).22 According to new definition, early OA of the knee is defined based on clinical and imaging findings, and should meet three criteria (I) knee pain, (II) KL grade 0, I or II (osteophytes only) using plain radiographs, and (III) cartilage lesion confirmed by arthroscopy and/or OA-related MRI findings such as degenerations of cartilage and meniscus, and/or subchondral bone marrow lesions (BMLs).9 Classification and diagnosis of early knee oa There are more evidence suggesting that knee OA is a disease of the whole joint. Along with cartilage, synovium, bone and bone marrow, menisci, ligaments, muscles and neural tissues also seem to be involved in the disease process.10

Currently, the definition of knee osteoarthritis utilizes a combination of clinical symptoms and radiographic criteria.Most of the epidemiologic studies, has proved that this definition is unable to answer number of questions and it appears to be incomplete. Radiographs fail to capture early changes in knee OA due to measurement errors while most radiographic grading scales are incapable of complete assessment of the joint. There is a direct correlation between joint space narrowing and cartilage volume but there is uncertainty in severity of the degree. There are changes in the cartilage volume and tibial

bone surface area found in early radiographic osteoarthritis in both males and females as mentioned by G. Jones M.D et al .11

Recently, upcoming techniques of imaging, especially magnetic resonance imaging (MRI), have helped identify a large number

of changes pertaining to the joint tissue even at very early stages. A majority of the studies so far have used structural

changes as the basis for stratifying patients who belong to the early stages of osteoarthritis of the knee. However, this subset

of patients show a mix of clinical features and also several structural changes that are seen on MRI. Luyten et al. have

developed a classification for early knee OA: Table 2. Classification criteria for early knee osteoarthritis 1. Knee pain At least

two episodes of pain for > 10 days in the last year 2. Standard radiographs Kellgren and Lawrence grade 0 or 1or 2

(osteophytes only) 3. At least one of Arthroscopy ICRS grade I-IV in at least two compartments or grade II-IV in one

compartment with surrounding softening and swelling

MRI At least two: ≥BLOKS grade 2 for size cartilage loss ≥BLOKS grade

2 for percentage full-thickness cartilage loss ≥ Signs of meniscal degeneration ≥BLOKS grade 2 for the size of bone marrow

lesions ICRS = International Cartilage Repair Society; BLOKS- Boston Leeds Osteoarthritis knee score Classification of

osteoarthritis of the knee is based on plain X-ray. Most importantly, it is the joint space narrowing (JSN) which is considered to

define the presence as well as the severity of knee osteoarthritis. The Kellgren and Lawrence grading system has been

developed to grade the diagnosis of knee OA. Felson 2011Hinman 2006, Kellgren 1957,. 31, 32, 33, Plain radiography:

Identification of changes in the bone-specific to early knee OA is not always possible as the sensitivity of radiography is low.

However, when changes in the joint are seen on X-ray, further imaging studies are not required. Magnetic resonance imaging

(MRI) – Recently, upcoming techniques of imaging, especially magnetic resonance imaging (MRI), have helped identify a large

number of changes pertaining to the joint tissue even at very early stages. Armaghan Mahmoudian in 2017 stated that

introducing MRI as an investigation to define and stratify patients as early OA of the knee should be avoided. Although MRI cannot be recommended as the first line investigation for diagnosis. 46 Clinical profile of early knee OA The knee joint plays an important role in bending and straightening activity to facilitate movement. However the knee joint also helps to twist and rotate the body. The knee relies on a number of structures to perform all of these actions and to support the entire body. It

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According to Neogi, the early phases of the disease, pain is related to activity and becomes more constant over time.12 It is important to study knee OA in the early stages of the disease. Quadriceps weakness had also seen predominantly in patients with early knee OA. Knee osteoarthritis accounts for more trouble with climbing stairs and walking than any other disease. The investigation of postural balance and proprioceptive accuracy in patients with early knee OA showed no significant differences in this group compared to healthy controls. It was suggested that impaired proprioceptive deficits are most likely a consequence of structural degeneration, rather than a risk factor in the pathogenesis of knee OA.26 Thus focusing on an

urge for additional studies to further refine the structural, clinical and functional profile of the subjects with early knee OA and to assess how this profile changes over time.13 The need for defining clinical profile in early knee osteoarthritis will help in the identification of high-risk patients of knee osteoarthritis. This is an essential step towards the initiation of early therapeutic interventions. (Marta Favero in 2014)14 The knowledge of knee OA is mostly based on data from heterogeneous patient populations, but to understand the knee OA trajectory, it is important to study knee OA in the early stages of the disease.

Thus focusing on an urge for additional studies to further refine the structural, clinical and functional profile of the subjects with early knee OA and to assess how this profile changes over time.27 Identification of Risk factors associated with early knee osteoarthritis The understanding of the risk factors associated with the incidence and progression of knee OA is needed for the development of the prevention strategy. The information on the underlying causes is limited despite the growing number of knee OA cases. Better knowledge to quantify risk factors in the incidence and progression of OA is required through larger epidemiological studies looking at joint mal-alignment, exercise, injury, body mass index, diet, and surgery. As shown by

Felson in 1993, stiffness of the ligament and strength and activation of the musculature reduce with aging.58The female gender is one of the risk factors of knee OA due to thinner cartilage. According to Richette, hormonal changes in the post- menopausal phase of women cause changes that are similar to those of aging. This could be the explanation for a higher prevalence of osteoarthritis of the knee in older women.64 There have been a few genes that have been touted as risk factors for the incidence and progression of osteoarthritis of the knee. Genes such as GDF5 are known to be associated with knee OA risk. This could pave the future treatment pathways (Valdes).68 History of comorbid conditions such as cancer, diabetes mellitus, and cardiovascular diseases are also major risk factors. If coupled with a walking disability, the risk is compounded. Occupational hazards for knee OA are due to repetitious activities and overuse of the joints. The fatigue of the muscles protecting the joints increases the risk of osteoarthritis in those joints. As shown by Felson in 1993, stiffness of the ligament and strength and activation of the musculature reduce with aging.15 The availability of better precision tools for the diagnosis and staging of injury to the joint, as well as identification of early degeneration will go a long way in the identification and early treatment knee osteoarthritis. This will, in turn, prevent or postpone the progression to full-blown OA.16 This is necessary

also from an economic point of view since we must reduce costs performing expensive imaging and MRI only in very high-risk subjects. There are some obstacles in managing patients with early knee OA. Early knee OA is also strongly associated with some modifiable risk factors such as obesity and mechanical overload as well as injury to the joint. Constance R Chu et al in

2012 have shown that it is important to detect pre-osteoarthritic changes before the irreversible changes set in. . In order to detect patients at an asymptomatic early OA and pre-radiographic stage, we need to identify them among subjects who are at

increased risk for OA. A range of etiologic risk factors is known such as age, sex, trauma, overuse and genetics, joint mal- alignment and obesity. These risk factors can contribute to the process of injury in different compartments of the joint. Better knowledge to quantify risk factors in the incidence and progression of OA is required through larger epidemiological studies looking at joint mal-alignment, exercise, injury, body mass index, diet and surgery. This is necessary also from an economic

point of view since we must reduce costs performing expensive imaging and MRI only in very high-risk subjects (Alberto Migliore et al 2014).70 Management of early knee OA Pain from knee osteoarthritis creates a significant burden for symptomatic patients, who are often forced to change their lifestyle because of their symptoms. According to O Bruyere,

2006, there are several non-operative approaches that can reduce the symptoms of OA such as activity modification, weight loss, and non-steroidal anti-inflammatory drugs, physical therapy, shoe inserts, and

knee bracing.20 There is hardly any treatment available for early OA. Operative and invasive methods could decelerate the progression of the disease. It may also aim at restoring anatomy and eliminate mechanical causes. Cartilage defects could be remedied by the use of grafting. According to T. C. B. Pollard, the development of disease-modifying drugs has been disappointing.92 The management of a patient of OA of the knee needs to pivot around the patient's requirements. The treatment approach should be centered on controlling the weight subjected to the joint. This can be achieved through modifying the activity level and weight-bearing coupled with a muscle strengthening protocol. Medication plays a significant role and includes the use of acetaminophen and NSAIDs.17 Vitamin D supplementation to correct depleted levels in the body is known to affect positively against the development and deterioration of knee OA.18

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Ajay Chandanwale,Rahul Puranik,Sushant Ghumare

Abstract Osteoarthritis (OA) is the most common form of arthritis characterized by the destruction of articular cartilage and subchondral bone with synovial changes. The knee is the most affected joint and diagnosis of knee OA generally depends on clinical and radiographic changes, which occur fairly late during disease progression leading to poor sensitivity for monitoring disease progression.1 As per the new concept, OA knee has been considered as mechanobiological derangement of joint rather than degenerative disease related to age. There were no methods devised or put forward to identify early OA knee with the aim of arresting this derangement in its early stage.2

Therefore there is a need to pursue a goal of early identification and delay in the progression of knee osteoarthritis by an effective assessment and management of knee OA. Introduction Osteoarthritis (OA) is a long-standing disease with progressive loss of articular cartilage due to a variety of genetic and environmental risk factors and pathophysiologic processes..3 Knee osteoarthritis is the most common chronic degenerative disease of the joint. Early Knee OA is primarily affecting articular cartilage and involves the entire joint, including the subchondral bone, synovial membrane, menisci, and periarticular structures. is a dynamic mechanobiological derangement of articular cartilage leading to pain and disability of knee. Although there is not yet an effective cure for OA, sensitive and cost-effective diagnostic methods for OA at an early stage are important for proper treatment with lifestyle changes, physical therapy, and medication. The prevalence of knee OA ranges from 22% to 39% in India, which is expected to double by the year 2030. 4 The proportion of people affected by knee OA is likely to increase day by day due to the aging of the population and marked rise in an obese or overweight population.5The diagnosis of OA is based on clinical and radiographic changes which occur fairly late during disease process having poor sensitivity for monitoring disease progression.6 This review focuses on the diagnosis of early OA knee so that an integrated approach of clinical assessment and clinical management will be developed in a systematic manner for early identification and effective intervention. An integrated approach of assessment which includes clinical, radiological and biochemical assessments along with management by pharmacological, physiotherapy and lifestyle modification may provide clear guidelines to clinicians to manage early OA Knee. Osteoarthritis (OA) is the most common joint disease where the knee joint is affected due to degeneration. As per the global burden of diseases report, knee OA was is the leading cause of disability. The number of knee replacements is increasing. Therefore, preventing progression to severe joint damage will be effective public health strategy to rise in incidence. The understanding of the factors associated with the incidence and progression of knee OA is needed for the development of the prevention strategy. The information on the underlying causes is limited despite the growing number of knee OA cases. The knowledge of the factors involved in the onset and progression of the disease is important for better prevention and improvement in the management of OA

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techniques to alleviate pain and increase their functioning.102 Conclusion To conclude, the systematic monitoring of clinical symptoms, baseline imaging results are needed which may give patients and clinicians valuable insight into the effectiveness of the management plan. Through this integrated approach to manage early knee Osteoarthritis clinicians can serve in a critical, central role in the care process. The nonsurgical attempts to alter the course of early knee OA will likely be futile unless the aberrant biomechanical environment at the knee is first addressed. Arguably, this needs concerted research effort to identify novel integrated knee OA approaches which are directed towards modifying chronic knee joint overload as well as addressing focal targets such as chondral defects. Osteoarthritis (OA) is the chronic degenerative

joint disease where the knee joint is commonly affected and thus is the leading cause of disability. The number of knee replacements is increasing. Therefore, grabbing the patients as early on stair climbing and preventing progression to severe joint damage by integrated assessment and management will be the effective public health strategy.

relies on the bones, ligaments, tendons, and cartilage. The patient approaching a physician always complains about knee pain. With today’s high-paced society, the patients are more vulnerable to knee problems. Knee pain is generally caused by, knee injury, degeneration, and arthritis. Also, infection and bone tumors are less common causes. Identification of Early knee osteoarthritis is difficult as compared to moderate or severe knee OA, due to the limited clinical signs and symptoms. The complaints of the individuals of recurrent pain and discomfort of the knee, short periods of stiffness, within between long periods of very little clinical manifestations, usually shape up a clinical picture for the health professional to perform further investigations through radiographs, ultrasound, MRI or arthroscopy. Often, in such cases, the history, coupled with additional clinical examination, as well as no systemic manifestations, points to a more local joint problem with mechanical nature.23

Cryotherapy is an effective method achieved by application of ice packs or ice massage. Again, short term diathermy has its own limitations. In a study on physiotherapy efficacy, physical therapy was found to improve pain as well as the functioning.1

Jill M Binkley in 1999 showed that patients who approach with a symptomatic knee OA, could receive some advantage by including physiotherapy in their treatment. It is imperative that all such patients are counseled appropriately regarding use of optimal exercise

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