

Research progress on pathogenic factors of knee osteoarthritis

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Abstract: Knee osteoarthritis is a musculoskeletal disease that seriously affects the quality of life of patients. The disease has a high prevalence and high disability rate. Especially with the gradual acceleration of the aging of the world, knee osteoarthritis has become a dangerous human disease. One of the most serious diseases of health. However, the pathogenesis of knee osteoarthritis is still unclear, and there is no relevant effective treatment. Therefore, minimizing the occurrence of this disease has become the key to treatment. Based on this, this article reviews the pathogenic factors of knee osteoarthritis.

1. Introduction

Osteoarthritis (OA) is considered to be a disease characterized by the loss of hyaline articular cartilage. In recent years, OA has been relabeled as a complete organ disease, a disease characterized by structural changes throughout the joint, as pathological abnormalities also occur in the periarticular muscles, ligaments, synovium, neurosensory system, and finally bone, and it is also a disorder defined by patient self-reported outcomes such as pain, stiffness, and disability. Knee osteoarthritis (KOA) is a growing geriatric problem in the industrialized world, leading to pain, functional limitations, disability, and reduced quality of life, as well as reduced productivity and increased healthcare costs [1]. Studies have shown that OA is currently the fourth most common disabling disease worldwide [2], and nearly 80% of people aged 55 and older have symptomatic osteoarthritis. As Asia's population ages and lives longer, this means that among other chronic diseases, more and more people are suffering from osteoarthritis. At present, the number of OA patients in my country has reached 40 million, accounting for about 3% of the total adult population [3]. The pathophysiological underpinnings of KOA are multifaceted, including intra-articular inflammation and collagen degradation, impaired muscle function, reduced proprioceptive sensitivity, and psychological features of chronic pain [4].

Pain is a common symptom in bone and joint disease, more common than stiffness or disability. OA of the knee affects approximately 20% of adults and is increasing dramatically in many countries, mainly related to age and obesity, leading to an increasing number of people suffering from OA pain and causing significant disability and associated medical costs burden [5]. According to the U.S. Healthcare Expenditure Panel, insurers and individuals spend more than \$185 billion a year on OA, with an additional \$10 billion in lost work due to OA. In my country, due to regional differences, the economic burden cannot be directly compared. However, combined with the consumption level of

local residents, it can be clearly reflected that the consumption cost of KOA is huge.

KOA treatment requires long-term and effective treatment of the symptoms and joint structural changes that lead to disability, but the effectiveness of osteoarthritis treatment in many literature reviews usually emphasizes short-term pain control, and less consideration is given to late efficacy and symptoms. At present, there is no effective long-term treatment. The latest clinical guidelines propose preventive treatment, which is currently the most effective way to reduce the incidence of the disease. The related pathogenic factors affecting this disease will now be reviewed in order to bring some help to KOA patients.

2. Age

The incidence of knee osteoarthritis increases with age, and there is a lot of evidence that the incidence of knee osteoarthritis increases with increasing age [6]. The possible reason is that with increasing age, cartilage degeneration and muscle strength decline, the more obvious, the chance of repeated joint wear and tear increases, the probability of injury increases, the cartilage bears more pressure, and the articular subchondral bone bears more stress after damage [6, 7]. With increasing age, various risk factors for KOA accumulate and accelerate knee joint degeneration.

3. Sex

The current epidemiological survey shows that the incidence of KOA in my country is more common in women than in men. Some studies have found that premature removal of the ovaries and uterus results in earlier onset of KOA and a higher incidence than normal women. After the age of 50, women are more prone to KOA, which may be related to the difference in estrogen and lifestyle habits between men and women.

4. Obese

After the reform and opening up, living standards have risen significantly, population aging and obesity are more common than decades ago, and body mass index (BMI) has a significant correlation with the incidence of KOA. Excessive body weight will increase the weight-bearing joint burden of patients. Wang Bin et al [8] believe that weight loss can reduce the symptoms and development rate of knee joint KOA, which may be related to cartilage after weight loss. Weight reduction.

5. Genetic factors

Some studies believe that genetic factors have a 40% influence on the occurrence of KOA [9], and the HLA-1, HLA-B8 single gene mutation and human type II collagen genetic defect related to early knee osteoarthritis have a certain influence, resulting in Early-onset osteoarthritis [10]. Interestingly, late-onset osteoarthritis usually affects multiple etiologies, due to a variety of common DNA variants and other factors [11].

6. Races

The incidence of KOA varies significantly in race, with the highest incidence in blacks, lower in whites, and the lowest in yellows [12].

7. Bone metabolism

Some data suggest that osteoporosis and osteoarthritis have a significant correlation, and many scholars believe that there is a negative correlation [13], which may be related to the thinning and number of trabecular bone, but the pressure on the knee joint has not decreased, resulting in weight-bearing pain., but there is no definite evidence to prove that osteoporosis is the main cause of KOA. In bone metabolism, the reduction of osteoblast activity is generally manifested as a decrease in bone formation markers in bone metabolism, while the activity of osteoclasts generally manifests as an increase in bone resorption markers. In bone metabolism markers, bone resorption and bone formation are unbalanced. It reflects abnormal bone metabolism and causes bone disease [14].

8. Fundamentals and other factors

The occurrence of this disease is also related to daily exercise, occupation, trauma, living habits, living environment and so on. At present, the exercise of the knee joint has increased significantly in the major guidelines, which may be related to the increase in the weight-bearing of the knee joint cartilage and bone due to the weakness of the extensor muscles. Some scholars believe that people who work in agriculture or construction, often repeatedly squatting and lifting heavy objects, have a significant correlation with KOA, and some high-intensity sports (such as football, badminton, weightlifting and long-distance running) will increase the risk of KOA [15]. The injury of the knee joint is mainly due to damage to the articular cartilage, the cartilage surface is stripped, the nourishing blood supply is destroyed, the production of synovial fluid is reduced, and the risk of KOA is significantly increased. Osteoarthritis of the knee can result from a variety of mechanical pathways following joint injury, and such development may differ from older or obese individuals. Knee osteoarthritis can be considered as a complex condition rather than a single disease. A summary of 4 studies in Australia showed that more than half of older adults with arthritis had high blood pressure, followed by cardiovascular disease (20%), dyslipidemia (19%), diabetes (14%) and including depression Mental health disorders, including psychosis (12%). A large study in 2017 showed that the use of non-steroidal anti-inflammatory drugs (NSAIDs) is not the main cause of cardiovascular disease and may be related to fat metabolism and innate immune system factors [16].

Currently, there are neither viable preventive intervention strategies nor effective medical remedies for the treatment of knee osteoarthritis. Pain is the leading cause of medical treatment in patients with knee osteoarthritis, this secondary chronic pain is almost 100 percent, and clinicians consider osteoarthritis-related pain to be a nociceptive pain condition. The primary treatment goal is therefore pain control, but pain is individual-specific, the pathophysiology of joint pain has received little attention for many years, and many important research questions remain unanswered [17], on the other hand, from the patient's perspective, OA pain, like many other pain conditions, is associated with many misconceptions and false beliefs about its causes and effective treatments. In fact, getting patients to describe their OA pain has great difficulty, they may think no one wants to hear it, or they may feel the need to maintain their self- and social image. While some live by self-imposed individualism, others view OA as a complex, ever-changing, illogical disease associated with aging, such that some patients progress from progressive cartilage damage to surgical reconstruction. Therefore, it is very necessary to reconstruct the patient's cognition of the disease and delay the joint disease. In the clinical environment, how to assess the disease early and find effective methods to determine that the patient can benefit from the intervention to maintain the knee osteoarthritis The function and quality of life of patients with inflammatory disease is one of the national priorities identified by the Institute of Medicine. This disease poses a serious burden on families and society.

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