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REVIEW ARTICLE ON- AN OVERVIEW AND MANAGEMENT OF OSTEOPOROSIS

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ABSTRACT:

The most prevalent chronic metabolic bone disease, osteoporosis is characterised by increasing bone fragility and is linked to several events, including menopause and ageing. Although it affects people of all ages, genders, and ethnicities, it is more prevalent in Caucasians (white people), the elderly, and females. Osteoporosis is spreading over the world at an alarming rate because to an ageing population and increased life expectancies. According to estimates, osteoporosis affects more than 200 million people worldwide at the moment. The International Osteoporosis Foundation has released statistics showing that 1 in 3 women over 50 and 1 in 5 men may have an osteoporotic fracture during their lifetimes. Every fracture is an indication of an upcoming one. until there are clinical signs of osteoporosis.

Key words: osteoporosis, bone fragility, menopause, metabolic bone disease

INTRODUCTION:

Osteoporosis is a disease that is characterized by decrease in bone mass, damage of bone tissue, and disruption of bone microarchitecture: it can lead to compromised bone strength and an increase in the risk of fractures (1).

Osteoporosis is one of the most common bone disease in humans, representing a major public health problem. It is more common in Caucasians, women, and elder people.Complication of osteoporosis is fracture as the complication of hypertension is stroke. Osteoporosis affects a large number of, of both sexes and all races, and its prevalence will increase as the population ages. It is a silent ailment until fractures occur, which causes important secondary health issues and even death(2).

It was estimated that the number of patients worldwide with osteoporotic hip fractures is more than 200 million (3). Osteoporosis is also an important health issue in Turkey, because the number of elder people is high. The incidence rate for hip fracture increases spontaneously with age in all countries as well as in Turkey, which is evident in the FRACTURE study (7). It was estimated that around the age of 50 years, the probability of having a hip fracture in the remaining lifetime was 3.5% in men and 14.6% in women (7).

Bone loss occurs when the rate of resorption exceeds the rate of production because bone tissue is perpetually lost through resorption and repaired through formation. From birth to adulthood, the bone mass develops and assumes its ultimate shape. At puberty, the bone mass reaches its peak, or peak bone mass (PBM), at which point bone mass loss begins. Genetics, health during development, nutrition, endocrine status, gender, and physical exercise all play a significant role in determining PBM. Bone remodelling is used to fix microfractures and stop them from becoming macrofractures, which aids in maintaining a healthy skeleton. Bone remodelling entails removing older bone and replacing it with new bone. An imbalance between resorption and production rates results from menopause and sophisticated ageing (resorption rises above formation).

An increased risk of fractures brought on by osteoporosis is attributed to certain causes. In addition to specific risk factors including the use of glucocorticoids (which diminish bone formation and bone loss), lower bone quality, and disruption of microarchitectural integrity, these include general risk factors related to ageing and sex steroid deficiency. When weaker bone is overloaded, as frequently happens during falls or certain daily tasks(8), fractures occur.

Clinical evaluation:

The public has misidentified osteoporosis as a condition that only affects women, but it also affects men. Young men can develop osteoporosis, which is typically not recognised until a fracture sends the patient to a doctor. However, postponed treatments typically fail. Without **excluding** the secondary causes, the diagnosis of osteoporosis is never taken as primary osteoporosis. A thorough history and physical examination of the patient always offer some hints regarding the possibility of the presence of another illness; specific laboratory tests may be required to rule out additional underlying conditions.

Clinical findings and complications:

The clinical consequences of osteoporosis that are relevant are fractures and their complications. Osteoporosis is a quiet illness that only manifests as a fracture for the patient. In an adult older than 50 years old with or without trauma, a recent fracture at any major skeletal site, such as a vertebra (spine), proximal femur (hip), distal forearm (wrist), or shoulder, should raise the suspicion that osteoporosis requires immediate further evaluation, including diagnosis and treatment.

Clinical risk factors used for the assessment of fracture probability (10)

Age

gender

Low body mass index (≤19 kg/m^2)

Previous fragility fracture, particularly of the hip, wrist and spine including morphometric vertebral fracture

Secondary causes of osteoporosis including:

Parental history of hip fracture

Current steroid treatment (any dose, by mouth for three months or more)

Current smoking Alcohol intake of three or more units daily

Rheumatoid arthritis

Untreated hypogonadism in men and women

Prolonged immobility

Organ transplantation

Type I diabetes

Hyperthyroidism

Diagnosis of osteoporosis:

Bone quality (20%) and BMD (70%) can be used to quantify bone strength. BMD is simple to assess, however bone quality is not yet quantifiable in clinical settings. Osteoporosis is diagnosed through the measurement of BMD, the occurrence of a hip or vertebral fragility fracture, or in the absence of substantial trauma (such as a car accident or a fall from a high place).

Bone mineral density can be easily tested to determine bone density, however aside from the biochemical indicators of bone tissue, the level of degeneration of the bone tissue cannot be determined in clinical settings (27). Bone strength and fracture risk are intimately connected, and as BMD declines, the risk of fracture rises exponentially, measurements using dual energy X-ray absorptiometry (DXA).

Approach to a patient with osteoporosis:

To determine a patient's fracture risk, a thorough history and physical examination, BMD testing, vertebral imaging to detect vertebral fractures (where necessary), and the WHO-defined 10-year estimated fracture probability test are all used (30).

To identify the necessity for BMD testing and/or vertebral imaging, all postmenopausal women and men aged 50 and older should be assessed for osteoporosis risk. In general, the risk of fracture increases with the number of risk factors. Because there are no warning indications before a fracture, many people are not diagnosed with osteoporosis in time to get effective medication during the early stages of this disease. However, osteoporosis is preventable and treatable.

Pharmacologic therapy:

Before beginning treatment, all osteoporotic patients should be screened for secondary causes of their condition and subjected to BMD assessments using central DXA, including vertebral imaging investigations when appropriate. If treatment monitoring is intended, BTM levels should also be acquired.

Who should be considered for treatment?

The following postmenopausal symptoms in men and women 50 years of age and older should be taken into consideration for treatment:

• - A hip or vertebral fracture (clinically evident or detected on vertebral imaging), since it has been demonstrated that patients with hip and spine fractures, regardless of T score, have decreased fracture risk with pharmacologic therapy.

When the T-score is less than 2.5 at the femoral neck, complete hip, or lumbar spine, fractures are determined.Low bone mass (T-score between 1.0 and 2.5 at the lumbar spine or femoral neck) and a 10-year likelihood of a hip fracture of less than three percent or a significant osteoporosis-related fracture of more than twenty percent.Most studies on the anti-fracture effects of Food and Drug Administration (FDA)-approved medications have involved postmenopausal women with osteoporosis.

Pharmacologic agents for treatment of osteoporosis:

Following are the major objectives of treatment for patients with osteoporosis:

- To treat the symptoms of fractures and skeletal deformities;
- To prevent fractures by strengthening bones and lowering the risk of damage;
- To preserve proper bodily function

The majority of current treatments for osteoporosis and fracture prevention aim to reduce bone resorption and are referred to as antiresorptive drugs. They are raloxifene, a selective oestrogen receptor modulator (SERM), oestrogen, bisphosphonates (BPs) such alendronate, risedronate, ibandronate, and zoledronic acid, a human monoclonal antibody against RANKL called denosumab, and strontium ranelate (SR).Only alendronate, risedronate, zoledronic acid, and SR have been demonstrated to reduce both vertebral and hip fractures, despite the fact that other antiresorptive drugs increase bone mass.

Universal recommendations for all patients

Any osteoporosis prevention or treatment programme should include a number of interventions, including an adequate intake of calcium and vitamin D, as well as lifelong, regular weight-bearing and muscle-strengthening exercises, the cessation of tobacco use and excessive alcohol consumption, and the treatment of fall risk factors (33).

A sufficient external supply of calcium is required to keep serum calcium levels constant; otherwise, low serum calcium levels encourage bone resorption to raise calcium levels to normal. The older population is more susceptible to calcium insufficiency since their needs for calcium rise. The Institute of Medicine (IOM) advises a daily calcium intake of 1200 mg for women over 50 and men over 70, and 1000 mg for men between 50 and 70. Calcium absorption, bone health, muscle function, and balance all depend on vitamin D. Adults should take 800 IU of vitamin D per day after the age of 70, according to the IOM (34–36). The main dietary sources of V-D are saltwater fish, liver, milk, juices, and cereals that have been fortified with the vitamin. V-D2 (ergocalciferol) or V-D3 (cholecalciferol) supplements may be used.

Many older patients are at a high risk for V-D deficiency. These patients include those with malabsorption issues (such as celiac disease) or other intestinal diseases (such as inflammatory bowel disease, gastric bypass surgery), gastric acidity, pernicious anaemia, proton pump inhibitors, chronic renal or liver insufficiency, patients on medications that increase the breakdown of V-D (such as some anticonvulsive drugs), or patients taking glucocorticoids.

Alcohol :

Alcohol should not be consumed in excess because it is bad for bones. The causes are multifaceted and include a propensity for falls, a lack of calcium, and chronic liver illness, all of which contribute to a propensity for V-D deficit. One drink is defined as 120 mL of wine, 30 mL of spirits or 260 mL of beer, and should not exceed 7 drinks per week for those who are at risk for osteoporosis (23).

Caffeine:

Patients should be advised to reduce their caffeine intake to less than 1 to 2 servings (8 to 12 ounces in each serving) of caffeinated drinks in a day. Some articles showed that there is a relationship between caffeine consumption and fracture risk (37).

Exercise :

Throughout life, it is recommended to maintain a regular weight-bearing exercise routine (for instance, walking for 30–40 minutes per session) as well as performing back and posture exercises for a short period of time most days of the week. Peak bone mass is larger in active children and young adults than in inactive ones (38).

These exercises reduce the incidence of falls in elderly individuals by enhancing balance, strengthening muscles, and slowing bone loss brought on by inactivity (39). Pushing, tugging, side-bending, lifting, and bending actions compress the spine and can result in fractures, so patients should refrain from doing these

activities.

Prevention of falls :

The majority of osteoporotic fractures are precipitated by falls, thus precautions should be taken in the home, especially for patients who are weak and receiving drugs that may impair mental awareness and increase the risk of a stroke (40).

CONCLUSION:

Until it is compounded by fractures that become widespread, osteoporosis is a common and silent condition. Over the course of their remaining lives, it is predicted that 20% of men and 50% of women over 50 would experience an osteoporosis-related fracture. These fractures result in long-term impairment, decreased quality of life, and an increase in mortality; they also place a significant financial strain on medical services and human resources on both the patient and the country. Before fractures happen, osteoporosis can be identified and treated effectively. Therefore, primary healthcare practitioners should be required to focus on the prevention, identification, and treatment of osteoporosis.

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