

Sarcopenia and Osteoporosis, Risk with Impact for the Individual and Society – Critical Review

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REVIEW

Abstract

Objectives. This publication is a review of published scientific articles on the consequences of osteoporosis accompanied by sarcopenia.

Material and method. Electronic databases, including MEDLINE (via PubMed), SCOPUS and Web of Science, were researched between January 2009 and December 2019. Population-based studies reporting the prevalence of sarcopenia in healthy adult ≥ 60 years of age were selected.

Results. Sarcopenia and osteoporosis affect approximately 40% of people over the age of 65 and over 50% of people over the age of 80. It has been shown that these two pathologies affect both males and females but with a tendency towards females.

Conclusions. Bone fragility and decreased muscle mass are mainly responsible for the severity of fractures and the difficult post-fracture recovery characteristic of the elderly.

Keywords: osteoporosis, sarcopenia, fracture, elderly

I. INTRODUCTION

One of the most dangerous trends of the contemporary era is the increase in the frequency, and intensity, of the consequences of osteoporosis accompanied by sarcopenia. Osteoporosis, the "porous bone," was until recently considered a normal condition in the elderly. Osteoporosis is currently considered a disease, characterized by a reduction in bone mineral density, associated with the compromise of the trabecular bone structure, which predisposes the bone to fracture following a trauma of low intensity or even in its absence. Sarcopenia is defined as a functional decline, fragility, falls and disability of muscle mass as you age. Together with osteoporosis is one of the major problems due to the high rate of risk factors occurring with age.

Sarcopenia is common in people over the age of 62-66, being one of the main geriatric syndromes. The appearance of sarcopenia is multifactorial and can be correlated with the decline of hormones, muscle fibers, chronic inflammatory / degenerative status, inadequate diet, sedentary lifestyle, genetic package. The main types of risk and their impact on the patient are: falls leading to osteoporotic fractures; long periods of hospital stay [1].

After the age of 45 there is a decrease in muscle mass and tone. This can be accentuated over the years [2]. According to the American Center for Disease Control and Prevention, sarcopenia is recognized as one of the five major risk factors for disability, morbidity and mortality in people over 65 years of age. Specialist studies have shown a close relationship between decreased bone mineral density and sarcopenia, leading to decreased quality of life, functional capacity and consequently increased mortality among geriatric patients [3].

Aim and objectives

Through this theme, the authors offer a modest contribution in the process of awareness of the risks to which people with osteoporosis accompanied by sarcopenia may be exposed.

II. MATERIAL AND METHODS

Electronic databases, including MEDLINE (via PubMed), SCOPUS and Web of Science, were researched between January 2009 and December 2019. Population-based studies reporting the prevalence of sarcopenia in healthy adult ≥ 60 years of age were selected. The definitions of the European Working Group on Sarcopenia in the Elderly (EWGSOP), the International Working Group on Sarcopenia (IWGS) and the Asian Working Group on Sarcopenia (AWGS) were used. According to these consensual definitions, sarcopenia was

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defined as a decrease in muscle mass (height-related appendicular muscle mass), muscle strength (hand force), or physical performance (normal gait).

III. RESULTS AND DISCUSSION

It has been shown that sarcopenia and osteoporosis affect approximately 40% of people over the age of 65 and over 50% of people over the age of 80 [3]. These two pathologies affect both males and females but with a tendency towards females.

Bone fragility and decreased muscle mass are mainly responsible for the severity of fractures and the difficult post-fracture recovery characteristic of the elderly [4,5].

According to research, the number of cases of osteoporosis and sarcopenia has increased threefold in the last 30 years [6,7]. Both sarcopenia and osteoporosis are extreme manifestations of natural biological imbalances, translated by fractures, falls, which have a direct influence on the life of each person, family and society.

Reducing the effects of these biological imbalances involves the interdisciplinary study of sarcopenia and osteoporosis, vulnerability, risk and especially the development of extensive information and education of the population.

Vulnerability highlights the degree of human exposure and the quality of individual life, family and social life of different types of risk. The vulnerability is different, depending on the equipment and the degree of preparation of the population. The most vulnerable people to the action of sarcopenia-osteoporosis are the poor countries and social groups that do not have sufficient material, nutritional, informational means to defend themselves from extreme situations, risk factors. Geriatric people with a history of illness, with prolonged immobilization, with various deficiencies of vitamins and nutrients [8].

Regarding the problem of osteoporosis, women are more disadvantaged than men because they lose about 50% of the spongy part and 35% of the cortical part, while men lose 35% and 20% respectively [9]. This disadvantage is due to the links between bone density and hormonal activity. Women are more exposed than men, especially after menopause. Osteoporosis is asymptomatic if it is not complicated by a fracture (by vertebral or fist compression, hip, rib, pelvis, humerus). Osteoporosis can also occur from causes such as chronic treatment with corticosteroids, diabetes, malabsorption syndromes, calcium deficient diet, chronic kidney disease, sedentary lifestyle, constipation, alcoholism, rheumatoid arthritis, hyperthyroidism, early menopause, etc. [10]. Osteoporosis also has a hereditary component. Obesity can be a risk factor [11]. A lifestyle that involves proper nutrition and exercise is helpful in preventing osteoporosis.

The reduction of bone density occurs especially after 40 years, intensifying in women during menopause [11,12]. Clinical trials have shown the onset of osteoporosis in women who have not entered menopause. This triggers an alarm signal for clinicians and individuals, which identifies height reduction, back pain, hip pain, and spinal kyphosis. A

particular risk for the individual suffering from osteoporosis is fracture. Fractures of the radiocarpal joint, hip or vertebral body are common in patients with osteoporosis.

Vertebral compression fractures occur at minimal effort (sneezing, bending, rotating, lifting a light object), more commonly in the middle and lower thoracic or upper lumbar region. Back pain begins acutely with irradiation on the side and front, and then gradually reduces in a few weeks. In those with more fractures, the deformity of the spine appears (dorsal kyphosis + cervical lordosis), a chronic back pain accentuated in the legs and loss of height. Sometimes this change can occur slowly and asymptotically.

Hip fractures occur after a fall [13], especially those on one side or even before the fall. Complications of these fractures have a mortality rate of 15-20% in the elderly and lead to severe physical disability with the need for long-term home care.

IV. CONCLUSIONS

Once osteoporosis is installed, it is not possible to restore bone mass. However, early intervention can prevent osteoporosis and late therapy can stop the progression of the disease. If a secondary cause is present, the specific treatment aims to remove the cause.

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