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USE OF VITAMIN D IN THE TREATMENT OF OSTEOPOROSIS

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ABSTRACT

Vitamin D is an essential prohormone synthesized in the skin by exposure to ultraviolet B (UVB) rays from sunlight, and its food sources are scarce. After being produced or ingested, vitamin D undergoes chemical transformations until it is converted into its active form, calcitriol, which is essential for calcium homeostasis and intestinal absorption of this mineral. In addition, it plays an important role in peripheral muscles and balance, and can influence the prevention of falls. Vitamin D deficiency is common in patients with osteoporosis and can be diagnosed by serum 25-hydroxyvitamin D dosage.

Keywords: Vitamin D. Calcium absorption. Osteoporosis. Vitamin D deficiency. Vitamin D supplementation. Bone metabolism. 25-hydroxyvitamin D (25(OH)D).

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INTRODUCTION

Vitamin D plays a key role in regulating calcium and phosphorus metabolism, contributing to the maintenance of bone health. Its main source is skin synthesis from sun exposure, as the presence of this vitamin in natural foods is limited. In the body, vitamin D undergoes two hydroxylations: first in the liver, forming 25-hydroxyvitamin D [25(OH)D], and then in the kidneys, resulting in the active form, calcitriol. This active version is essential for intestinal calcium absorption and the maintenance of mineral homeostasis.

Studies indicate that low serum levels of vitamin D are associated with a higher incidence of fractures and falls, especially in the elderly and patients with osteoporosis. Vitamin D deficiency is diagnosed when serum 25(OH)D levels are below 20 ng/mL, while values between 20 and 29 ng/mL are considered insufficient for at-risk populations. Vitamin D supplementation has been shown to be effective in preventing fractures and strengthening peripheral muscles, contributing to reducing the risk of falls. This study seeks to analyze the benefits of vitamin D on bone and muscle health, as well as its implications for the prevention of diseases associated with its deficiency.

METHODOLOGY

To carry out this study, a literature review was conducted based on the analysis of scientific articles indexed in the SciELO, PubMed and Google Scholar databases. Descriptors such as "Vitamin D", "osteoporosis", "calcium absorption", "fall in the elderly" and "bone metabolism" were used. Published articles that address the relationship between vitamin D and bone health were selected.

RESULTS

The studies analyzed demonstrated that vitamin D deficiency is strongly associated with increased incidence of osteoporosis, sarcopenia, and falls in the elderly. Adequate concentrations of 25(OH)D (above 30 ng/mL) promote better calcium absorption and reduce the risk of fractures. A meta-analysis of studies conducted in postmenopausal women revealed that supplementation with daily doses above 800 IU of vitamin D resulted in a significant reduction in the risk of femoral neck fractures and nonvertebral fractures. In addition, adequate supplementation contributed to muscle strengthening, improving balance and reducing the risk of falls.

In patients with postmenopausal osteoporosis, assessment of serum 25(OH)D levels is recommended prior to initiation of treatment. In cases of severe deficiency, an initial replacement of 50,000 IU per week for eight weeks is suggested, followed by a maintenance dose of 1000-2000 IU daily. These values are recommended by the Endocrine

Society and the Brazilian Society of Endocrinology and Metabolism. However, very high doses are not recommended because of the risk of hypercalcemia and toxicity.

CONCLUSION

Vitamin D is essential for calcium homeostasis and bone health, and it also plays a key role in peripheral muscles and body balance. Its deficiency is associated with an increased risk of fractures and falls, especially in vulnerable populations such as the elderly and patients with osteoporosis. Adequate vitamin D supplementation has been shown to be effective in preventing these conditions, as long as it is carried out within the recommended guidelines.

Therefore, it is essential for healthcare professionals to regularly assess serum vitamin D levels and adopt individualized replacement strategies to ensure bone health is maintained and falls prevented. Future studies should continue to investigate the effects of different doses of supplementation and their relationship with other clinical conditions.

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