

Analysis of Related Factors in Patients with Parkinson's Disease and Osteoporosis

Qiu Fucheng

Department of Neurology
The First Hospital of Hebei Medical University
Shijiazhuang, Hebei, China, 050031

Kong Xiangzeng*

Department of Neurology
The First Hospital of Hebei Medical University
Shijiazhuang, Hebei, China, 050031

Abstract: To explore the related risk factors of elderly Parkinson's disease with osteoporosis. A total of 10776 patients with Parkinson's disease were selected. According to the results of bone density examination, 293 cases were divided into the osteoporosis group and 714 cases in the non-osteoporosis group. The correlation between the occurrence of Parkinson's disease with osteoporosis and human factors, vascular risk factors and serum bone metabolism characteristics was analyzed. Patients with Parkinson's disease should be treated in time, exercise moderately, strengthen nutrition, and supplement vitamin D to reduce the occurrence of the osteoporosis.

Keywords: Related Factors; Parkinson's Disease; Osteoporosis

1. INTRODUCTION

Parkinson's disease, also known as Parkinson's paralysis, is a neurodegenerative disease that is more common in the elderly 60 years old. With the aging of the population, the incidence of this disease is increasing year by year. Its main clinical manifestations are bradykinesia, muscle rigidity, and postural disturbance, accompanied by resting tremor. Therefore, patients with Parkinson's disease are prone to falls and fractures, which is one of the main causes of poor quality of life, disability, and death in the elderly. This phenomenon is not only related to slow movement and rigid posture, but also related to the occurrence of osteoporosis in patients. Osteoporosis is a common disease in the elderly, and it is a systemic metabolic bone disease mainly characterized by susceptibility to fractures. Studies have shown that patients with Parkinson's disease are more likely to suffer from osteoporosis H1.

This study analyzes the risk factors of elderly patients with Parkinson's disease and osteoporosis and provides a basis for clinical early intervention. Although fractures are closely related to postural balance disorders in patients, decreased bone mineral density in Parkinson's patients is highly correlated with fractures. After comparing the femoral neck fracture rate between 52 Parkinson's patients and 5943 sex- and age-matched controls, it was found that the fracture and fall rates of Parkinson's patients were significantly higher. Even after adjusting the factors of fractures caused by falls in Parkinson's patients, the fracture rate was still higher than that of the control group. All patients were tested for bone mineral density by dual-energy X-ray bone densitometry, and the detection sites were bilateral radius, femoral neck, and lumbar spine average value.

To analyze the correlation between the occurrence of Parkinson's disease with osteoporosis and human factors and vascular risk factors. 5ml of fasting venous blood was drawn from the two groups of patients in the morning, and the bone metabolism markers parathyroid hormone, osteocalcin, serum calcitonin, and vitamin D were detected. The correlation between the occurrence of Parkinson's disease and osteoporosis and serum markers of bone metabolism. Parkinson's patients

not only have decreased bone mineral density, but also the decreased bone mineral density is related to the H—Y (Hoehn—Yahr) classification of Parkinson's disease. The higher the grade, the more obvious the decreased bone mineral density, and it is related to the severity of the disease.

In addition, the same study found that 59% of female patients and 19% of male patients had osteopenia. Among 105 Parkinson's patients, 63% of women and 20% of men had osteoporosis. Osteopenia was present in 41% of men and 28% of women, indicating that the course of the disease was associated with a decrease in bone mineral density, whereas the severity of the disease was not.

2. THE PROPOSED METHODOLOGY

2.1 People with Parkinson's disease are highly associated with osteoporosis.

The reduction of bone mineral density itself is an important independent risk factor for femoral neck fractures in patients with Parkinson's disease, and it is related to the H—Y classification and course of the disease. Patients with different H—Y classifications of Parkinson's disease will need vitamin D. The level gradually decreased, and the incidence of osteoporosis gradually increased (20.3% vs 24.7% vs 51.9% vs 33.5% vs 35.2%). Vitamin D levels in different H—Y grading osteoporosis groups were significantly lower than those in non-osteoporosis groups ($P < 0.01$).

Calcitonin levels in H-Y3, H-Y4 and H-Y5 osteoporosis groups were significantly higher than those in non-osteoporosis groups, and osteocalcin levels were significantly lower than those in non-osteoporosis groups ($P < 0.05$, Table 2). The patient's reduced outdoor activities lead to insufficient sunlight exposure, and insufficient sunlight exposure will cause calcium metabolism disorders. A two-year study proved that Parkinson's patients who received 13 light irradiation for more than 15 minutes a day, their bone mineral density increased by 3.8% after two years, and their 25-OHD also increased significantly, while the bone mineral density of patients in the control group decreased by 2.6%. 25-OHD also significantly reduced H_j.

Therefore, Parkinson's patients should exercise properly and ensure enough "sunbathing" time, to delay the progress of osteoporosis, prevent the occurrence of fractures, and improve the quality of life. Parkinson's patients often have mild to moderate malnutrition, which is related to dysphagia and gastric emptying disorders caused by the disease. The lack of nutrition leads to lower BMI of patients. And insufficient intake of vitamin D and calcium. The reduction of bone mineral density is correlated with BMI, the lower the BMI, the higher the incidence of fracture. The important role of 25-OHD in bone metabolism is self-evident. Vitamin D deficiency itself is a high-risk factor for fractures, and vitamin D deficiency is extremely common in Parkinson's patients. There are studies to confirm. 55% of Parkinson's patients are deficient in vitamin D. Parkinson's disease patients generally suffer from osteoporosis due to slow movement, bone loss and insufficient intake of vitamin D and calcium. Of the 996 patients with Parkinson's disease in this study, 282 were osteoporotic, accounting for 28.3%. This study found that the age, female, and body mass index of the osteoporosis group were significantly higher than those of the non-osteoporosis group, and the bone density was significantly lower than that of the non-osteoporosis group, and the difference was statistically significant.

At the same time, the intake of calcium in patients with Parkinson's is far from enough. For the prevention of fractures, the International Osteoporosis Institute recommends at least 1200 mg of calcium and 800 IU of vitamin D per day. However, Parkinson's patients have swallowing disorders and constipation problems, and their compliance with long-term calcium and vitamin D intake is extremely poor. Therefore, to prevent osteoporosis in patients with Parkinson's disease, it is necessary to solve the malnutrition problem and improve the swallowing function of patients. Getting enough vitamin D and calcium at the same time is crucial. Bone mineral density was significantly reduced in bone mass examination. This study also found that the severity of Parkinson's disease patients with osteoporosis was correlated with vitamin D, osteocalcin, and calcitonin. Logistic regression analysis showed that age, female, body mass index, and vitamin D were independent risk factors for Parkinson's disease with osteoporosis.

2.2 Causes and countermeasures of osteoporosis in patients with Parkinson's disease.

It is known that taking large doses of levodopa can cause hyperhomocysteinemia in patients, and hyperhomocysteinemia is also related to the reduction of bone mineral density. Therefore, reducing homocysteine may have a certain effect on the prevention of osteoporosis in patients with Parkinson's disease. This study found that age is an independent risk factor for the occurrence of Parkinson's disease with osteoporosis. As the age increases, the bone mass of the human body will gradually decrease, and the secretion of sex hormones will also gradually decrease. The secretion of calcium-regulated hormones will be impaired, which will cause bone metabolism disorders and lead to osteoporosis.

With the further intensification of population aging in my country, studies have shown that the number of osteoporosis patients in my country will increase to nearly 300 million in 2020, accounting for more than half of the world's osteoporosis patients. Therefore, aging is a risk factor for osteoporosis. The average age of onset of Parkinson's disease is 55 years old, more common after 60 years old. Studies have

shown that body mass index is strongly related to the occurrence of osteoporosis. Low body mass and low body mass index are two independent risk factors for postmenopausal osteoporosis. Patients with Parkinson's disease often suffer from mild to moderate malnutrition, which is related to insufficient nutritional intake caused by Parkinson's disease, dysphagia, and drug side effects.

Vitamin D deficiency is common in patients with Parkinson's disease, which is related to slow movement, muscle rigidity, less sunshine when going out, and insufficient intake of vitamin D and calcium. In this study, vitamin D levels in the osteoporosis group were significantly lower than those in the non-osteoporosis group. Vertebral fractures are highly correlated with osteoporosis, with only a quarter of vertebral fractures caused by falls. The vertebral fracture rate of Parkinson's patients is much higher than that of the control group, indicating that Parkinson's patients may have osteoporosis. Numerous studies prove it. Bone mineral density in Parkinson's patients compared with age-matched controls. As stated, osteoporosis is a very common phenomenon in Parkinson's patients, and it is related to the course of the disease, the severity of the disease, body mass index, etc. certain correlation. Parkinson's disease is even an important cause of secondary fractures. However, it is often missed.

Osteoporosis indirectly led to the occurrence of fractures, further aggravating the condition. Therefore, neurologists must be aware that once a patient is diagnosed with Parkinson's disease, bone mineral density should be routinely tested, especially at the femoral neck. To have a comprehensive understanding of the patient's osteoporosis and assess the risk of future fractures in the patient. And patients need to be encouraged to exercise properly. Engage in more outdoor activities to increase the time of "sunbathing", and pay attention to improving the nutritional status of patients and supplementing enough calcium and vitamin D. At the same time, the family members of the patient should take good care of the patient to minimize the risk of fracture caused by the patient's fall. Multivariate logistic regression analysis of items with statistical significance in univariate analysis showed that age, female, body mass index, vitamin D is an independent risk factor for the occurrence of Parkinson's disease with osteoporosis, bone mineral density, osteocalcin and calcitonin are not associated with the occurrence of Parkinson's disease with osteoporosis.

3. CONCLUSION

The results of this study showed that age, female, body mass index, and vitamin D were independent risk factors for the occurrence of Parkinson's disease with osteoporosis. Therefore, patients with Parkinson's disease should be treated in time, exercise moderately, strengthen nutrition, and supplement vitamin D to reduce the occurrence of osteoporosis. Among them, Parkinson's disease is highly correlated with osteoporosis, and patients with Parkinson's disease are high-risk groups for osteoporosis. The reduction of bone mineral density in patients with Parkinson's is related to age, gender, disease duration, and disease severity. In clinical work, we must pay attention to the monitoring of bone mineral density in patients and guide them to avoid fractures.

4. REFERENCES

- [1] Yan Lini. Related research on osteoporosis in patients with Parkinson's disease [J]. Chinese Medicine Guide, 2012, 10(17): 2.
- [2] Yan Lini. Related research on osteoporosis in patients with Parkinson's disease[J]. Chinese Medicine Guide, 2012(017):010.
- [3] Yang Wenping, Ma Yuping, Lu Xiaowei, et al. Analysis of risk factors for osteoporosis in elderly patients with Parkinson's disease [J]. Chinese Clinical Research, 2022, 35(10): 5.
- [4] Reason. Parkinson's disease can increase the risk of osteoporosis[J]. Chinese Medical Information Herald, 2014(9):1.
- [5] He Juren. Risk factors and countermeasures of contralateral hip refracture after hip fracture surgery over 75 years old [J]. Journal of Hebei Medical University, 2018, 39(2): 4.
- [6] Zhang Bojian, Qiao Haiquan. Progress in surgical research on Gaucher disease [J]. Abdominal Surgery, 2019, 32(2):4.
- [7] W. Rush, S. Venkatraman, S. Gush, et al. Compounds and compositions for the treatment of disorders associated with NLRP activity:
- [8] Ding Xueping. Study on the Incidence and Risk Factors of Dysphagia in Patients with Parkinson's Disease [D]. Zhejiang University, 2016.
- [9] Huang Changfu, Zhou Zhong, Fu Jiayong. A short report. Analysis of the curative effect of DHS and PFN in the treatment of senile osteoporotic intertrochanteric fractures.
- [10] Liang Yuhua. The influence of hyperhomocysteinemia in Qinghai area on Parkinson's disease associated with osteoporosis.
- [11] Xu Jiao, Yu Ganglian, Deng Yueyue, et al. Analysis of related factors in Parkinson's disease patients with osteoporosis [J]. Chinese Journal of Cardiovascular and Cerebrovascular Diseases for the Elderly, 2019, 21(2):4.
- [12] Ma Su. Clinical observation of 25-hydroxyvitamin D level and osteoporosis in patients with Parkinson's disease[D]. Hebei Medical University.
- [13] Qu Bo, Kong Dan, Dai Yongjing. Analysis of Injury Factors and Preventive Measures for Elderly Patients with Hip Fracture [J]. Chinese Journal of Modern Nursing, 2012.
- [14] Editorial Department of "Rehabilitation (Healthy Family)". Myocardial infarction, cerebral thrombosis, osteoporosis, early-onset Parkinson's disease-what geriatric diseases are suffered by young and middle-aged people[J]. 2013.
- [15] Zhang Jibin, Zhang Chaochun. Perioperative treatment of elderly patients with femoral intertrochanteric fracture complicated with Parkinson's disease [C]// Selected papers of the 20th Annual Conference of Rehabilitation of Limbs and Disabilities of China Kangxi Association. 2011.
- [16] Joshua E.Schroeder, Alexander Hughes, Andrew Sama, et al. Surgical treatment of lumbar spine in patients with Parkinson's disease[J]. Orthopedics Dynamics, 2016, 012(001):54-58.
- [17] Jiang Huifen (Hui-Fen Chiang), Wu Peizheng (Pei-Cheng Wu), Lai Dongyuan (Tung-Yuan Lai). A case report of Parkinson's disease treated with traditional Chinese medicine [J]. Taiwan Journal of Clinical Medicine of Traditional Chinese Medicine, 2009, 15(2):122-126.