Characteristics and Clinical and Research Progress of Osteoporotic Fractures

Hui Li

The Second Affilated Hospital of Qiqihaer Medical University, Qiqihaer, Heilongjaing, 161000, China

Keywords: Characteristics, Clinical and research progress, Osteoporotic fractures

Abstract: Osteoporotic fractures are the most serious consequence of osteoporosis, and the prevalence of osteoporotic fractures is closely related to factors such as age, gender, and race. The characteristics of osteoporotic fractures are: poor bone quality, slow fracture healing time, and a higher incidence of re-fractures. Osteoporotic fracture treatment includes surgical treatment of fractures and anti-osteoporosis treatment. Anti-osteoporosis treatment, on the one hand, can increase bone mass and improve bone quality, on the other hand, it has important clinical significance to reduce the risk of re-fracture; surgical treatment of fractures should be based on simple, safe and effective principles. Due to poor bone quality, the internal fixator and implant fixation is poor after fracture, and it is easy to loosen. Therefore, it is necessary to find an internal plant that is closer to the bone stiffness and bone elastic modulus, and R & D can improve bone mass faster and effectively Preparations with bone quality to improve the treatment of osteoporotic fractures. In the treatment of osteoporotic fractures, surgical treatment of fractures and anti-osteoporosis treatment should be equally important in order to achieve a more ideal treatment effect of osteoporotic fractures.

1. Introduction

Osteoporotic fractures are the most serious consequence of osteoporosis. The fractures caused by osteoporosis are fragile fractures. Fractures caused by minor injuries in daily life activities due to decreased bone strength generally refer to fractures caused by slight violence that occurs when the human body falls when walking on a flat ground. This type of fracture is a complete fracture and has a higher prevalence among the elderly. Common fracture sites are the thoracolumbar spine, proximal humerus, and distal radius. Due to the poor bone quality, the internal fixation and implant fixation are poor after fracture, easy to loosen, the bone healing process after fracture is slow, and osteoporosis itself increases the risk of re-fracture. Osteoporotic fractures seriously threaten the physical and mental health of the elderly and reduce the quality of life in life, especially hip fractures and multiple vertebral fractures, the disability rate and mortality are significantly increased. In the surgical treatment of osteoporotic fractures of the elderly, active treatment of osteoporosis should not be ignored.

2. Characteristics of Osteoporotic Fractures

Osteoporotic fractures have many and complicated sites. Common fracture sites include the distal radius, proximal humerus, hip joint, and thoracolumbar segment of the spine. Due to the low bone mass, poor bone quality, and low energy damage at the fracture site Comminuted fractures can occur afterwards. Intra-articular fractures often have severe fractures of the articular surface, often accompanied by ligament and soft tissue damage, which makes treatment difficult. The pathogenesis of osteoporotic fractures is mainly affected by age, genetics, endocrine, nutrition and other factors, and its characteristics are different from other skeletal diseases. OF patients are mostly post-menopausal female patients. Due to their advanced age, patients are often accompanied by a variety of complications, such as cardio-cerebrovascular diseases, diabetes, respiratory diseases, renal disease and other basic organ diseases. At the same time, the patient's immune function is low, and the body's compensatory ability is poor. When OF patients undergo surgical treatment, they are prone to high lethality and high disability. The latest primary osteoporosis diagnosis and treatment

  DOI: 10.25236/isbsbh.2020.018

guidelines indicate that the initial stage of healing of OF is the same as that of general fractures, but after 8 weeks, osteoclasts in patients with osteoporotic fractures are still very active, collagen fiber formation is lacking, bone Absorption is strong, mineralization is reduced, the formation of new bone and the maturity of the callus are delayed, and the tissue composition, microstructure and bone mass of the cartilage callus are abnormally changed, so the healing time is slower than normal, and delayed fracture healing is prone to occur. Not even healing. In addition, in the bed-resting period, the lack of exercise leads to the accelerated reduction of bone mass. The principle is equivalent to the loss of useless bone, which makes osteoporosis more serious. Qiu Guixing and others reported that 20% of hip fracture patients re-fracture within 1a, which may be due to the slow growth rate of bone in the cartilage, the large amount of cartilage callus, the apoptosis of chondrocytes and the bone callus during the intramembrane osteogenesis The speed of reconstruction has led to a lower than normal quality and mechanical strength of the callus, resulting in a significantly increased risk of re-bone fractures.

3. Clinical Manifestations of Osteoporotic Fractures

The prevalence of fractures in osteoporosis patients accounts for about 20%, which is often the first symptom of some patients with osteoporosis, or the cause of the first diagnosis. Once a fracture occurs, the pain, deformity and dysfunction of the fracture site will appear. Some elderly people have poor sensitivity to pain, and patients with embedded femoral neck fractures can even walk, which is likely to cause missed diagnosis and misdiagnosis, and should be paid attention to.

Shortened height, wedge-shaped vertebral body or compression fracture of multiple vertebral bodies, resulting in shorter height or kyphosis deformity. Vertebral wedge deformation and compression fractures can often occur due to the gravity of their torso, and there may not be explicit traumatic violence.

Pain Osteoporosis patients with bone pain are about 42%. Once a fracture occurs, it often causes pain or aggravation of pain. Pain is the main symptom of fresh fractures.

4. Treatment of Osteoporotic Fractures

4.1 The Medical Treatment of Osteoporotic Fractures.

OF is the first treatment of osteoporosis after the occurrence of OF. The medical treatment of osteoporosis is divided into three categories according to its different mechanisms of action, namely inhibiting bone resorption and promoting bone Formation and promotion of bone mineralization drugs.

Drugs that inhibit bone resorption: The principle of bisphosphonates is 1) regulate the release of cytokines from osteoblasts, inhibit osteoclasts and promote osteoblast differentiation, proliferation and activation; 2) reduce osteoclast bone resorption and accelerate Osteoclast apoptosis and can inhibit osteoclast formation. As a bone resorption inhibitor, bisphosphonates have been used in recent years to treat osteoporosis, inhibit bone resorption, and promote the healing of osteoporotic fractures. Bisphosphonate can also inhibit bone loss after fracture and strengthen bone integration and retention around the implant. Evidence-based medical research has shown that it can increase the bone density of the lumbar spine and hips and reduce the risk of fractures of the vertebral body and hips. In addition, calcitonin can also inhibit the biological activity of osteoclasts, resist bone resorption, reduce the number of osteoclasts, increase bone density, quickly inhibit bone loss, and can significantly relieve bone pain, especially for osteoporosis with pain symptoms Patients. Another study has shown that calcitonin can increase bone strength and density, and reduce the occurrence of brittle fractures after osteoporosis. The reassessment of the long-term safety of calcitonin in the United States and the European Union shows that the use of calcitonin nasal spray for more than 6 months can increase the risk of malignant tumors. At present, calcitonin nasal spray is only used for drug options that are ineffective in the treatment of osteoporosis patients.

Estrogen has the effect of inhibiting bone turnover and preventing bone loss, and is an effective

drug for preventing postmenopausal osteoporosis. Zhang Qiongjie's animal experiments show that estrogen (estradiol benzoate) can promote fracture healing of osteoporotic bone tissue, including promoting bone formation and enhancing the biomechanical properties of callus. However, other experimental studies have confirmed that estrogen (17d. Ethinyl estradiol) only slightly inhibits bone turnover and has little effect on fracture repair. In addition, estrogen supplementation increases the risk of thrombosis, and patients with thrombotic diseases are prohibited. The International Menopause Association believes that the risks of estrogen replacement therapy and breast cancer are still uncertain, but breast cancer is still listed as a contraindication for hormone replacement therapy.

Bone formation-promoting drugs: Parathyroid hormone is low-dose recombinant PTH1-34, which is currently a representative drug for bone formation. It can effectively treat severe postmenopausal female osteoporosis, increase bone density, and reduce the risk of fracture. At present, PTH is used in patients with severe osteoporosis, and the treatment time must be within 2a. Blood calcium levels should be monitored during medication to prevent hypercalcemia. Bone sclerosis protein antibodies secreted by bone cells can also induce bone formation, increase bone mass and bone strength, promote fracture repair, and improve bone defects. Osteosclerosis antibody is mainly used in the second stage of treatment for low bone mass and fracture healing.

Bone mineralization drugs: Active vitamin D can inhibit osteoporosis and promote osteoporotic fracture healing by coordinating the dynamic balance of bone formation and bone resorption. Active vitamin D3 can also enhance muscle strength and neuromuscular coordination to avoid falls Reduce the incidence of related fractures.

4.2 Related Physical Therapy for Osteoporotic Fractures

In the late stage of OF treatment, it is necessary to cooperate with drug therapy and physical therapy to achieve the desired therapeutic effect. Among them, the drug treatment has the characteristics of exact treatment effect, but the drug treatment has the problems of long treatment period, poor patient compliance, high cost and adverse drug reactions. In addition, due to the destruction of the bone mass balance and a large amount of bone loss during the bed-resting period, OF must use the corresponding physical methods to assist the treatment during the treatment process to better help patients relieve symptoms. Physical therapy mainly includes exercise therapy, vibration therapy and extracorporeal shock wave therapy. Exercise therapy is a type of physical therapy that guides patients to perform various forms of active and passive movements, and then promotes the rehabilitation of patients. The main mechanisms of exercise therapy for osteoporosis include promoting bone formation, inhibiting bone dissolution, increasing absorption of calcium, phosphorus, manganese and other elements, improving the utilization of various elements, promoting blood circulation and sex hormones The secretion of the bone eventually strengthens the toughness of the bone and achieves the purpose of preventing osteoporosis. Vibration therapy is the use of mechanical stimulation in the form of vibration in the growth area of skeletal bone cells, so that bone cells grow rapidly and increase bone mass, so as to achieve the effect of treating osteoporosis. VerbovolAF and other studies have found that about 6 months of whole-body vibration training can increase the strength of lower limb muscles and hip bone density in postmenopausal women with osteoporosis. In addition, the experiment showed that the post-menopausal women (47-64 years old) were intervened with whole-body vibration with a frequency of 30 Hz, 20 min / d, and a total of 12 months. The results showed that the vibration group and the non-vibration group Compared with the vibration group, the bone density of the femoral neck increased by 2.13%, and the bone density of the spine increased by 1.5%. Extracorporeal shock wave is a kind of high-energy, high-pressure wave. Its main function is to repair soft tissues and heal fractures, promote tissue regeneration and bone formation of callus. Zhang Kun et al. Performed extracorporeal shock wave treatment on part of the bone tissue of the rabbit osteoporosis and found that the strength and quality of the bone tissue after treatment had improved significantly in a short time.

4.3 Surgical Treatment of Osteoporotic Fractures

In order to reduce bed-complications, OF patients should take surgical intervention as soon as possible without surgical contraindications, choose according to the patient's own repair ability and the tolerability of the operation, and choose the surgical treatment method with less trauma and faster recovery. As the cortex of the OF-damaged area becomes thinner, the working distance of the screw becomes shorter, and the bite force of the screw to the bone decreases, it is difficult to achieve fixation of the broken end. Therefore, a relatively stable fixation mode should also be adopted for OF internal fixation. The International Association of Internal Fixation Research (AO) 's recommendations for the treatment of osteoporotic fractures: the use of relatively stable fixation techniques, such as bridging techniques; the use of angularly stable internal plants; the use of intramedullary fixation techniques; and the use of controlled bone compression Technology; using bone strengthening technology; using artificial joint replacement.

In recent years, hip replacement surgery has been gradually developed in China. At the same time, the incidence of periprosthetic fractures has gradually increased. Periprosthetic Femoral Fracture (PFF) is one of the serious complications after artificial joint replacement. Foreign reports have reported that the incidence of peri-prosthetic fractures is about 4.1%, and the incidence of peri-prosthetic fractures in hip replacement revision cases is about 6%. Among all the revision reasons, after prosthesis loosening and infection, Ranked third. PFF treatment is more difficult, but osteoporotic PFF is more difficult to treat because of the decrease in bone strength around the prosthesis. Claus et al. Reported 9 cases of major trochanter fractures related to wear and tear, and found that there was no inevitable connection between the degree of osteolytic injury and the risk of fracture. It is recommended to give conservative treatment and anti-bone for minor displacement and mild to moderate osteolysis Osteoporosis treatment. Vancouver type B fractures are the most common type. Xu Xiaoping’s report shows that for most B1 fractures, they should be accurately reduced and given internal fixation treatment. For the treatment of B2 and B3 types, a wide range of coated biotype extended handles are used. The revision surgery of the prosthesis, type C often occurs in the distal femur, and corresponding open reduction and internal fixation should be performed. Regardless of the type of PFF, the importance of anti-osteoporosis treatment is emphasized during surgical treatment. Postoperative internal plant loosening and bone quality degradation lead to difficulty in internal fixation. Postoperative loosening is a common cause of OF operation failure. Xiao Feng and other studies pointed out that: open reduction and calcaneal plate internal fixation combined with calcium phosphate artificial bone for the treatment of calcaneal fractures can better reduce the articular surface and maintain the height, which can reduce postoperative complications. Therefore, improving the stability of endogenous plants has become a key to the treatment of OF. In recent years, studies have shown that OF should strengthen the support, such as calcium phosphate or calcium sulfate support to improve the stability of the internal fixation. In view of this, the research and development of internal fixation strengthening technology has been promoted.

5. Conclusion

As China enters an aging society, osteoporotic fractures will continue to increase, and strengthening the importance of osteoporotic fractures has important social significance. In clinical diagnosis and treatment, on the one hand, we must pay attention to the treatment of fractures, and more importantly, we should pay attention to the diagnosis and treatment of osteoporosis itself, strengthen intervention on the cause of fractures, and avoid the occurrence of re-fractures. In recent years, Chinese medical workers have continued to deepen their research on osteoporotic fractures, and relevant literature reports have been continuously updated. Most patients with osteoporotic fractures have been treated and recovered.

References

[1] Ding Yue. Consensus of anti-osteoporosis treatment and management experts in patients with osteoporotic fractures [J]. Chinese Journal of Osteoporosis and Bone Mineral Diseases, vol.3, no.8, pp. 192-193, 2015.

[2] Shan Fengling, Lu Hankui. Application progress of serum calcitonin in clinical diagnosis and treatment of medullary thyroid carcinoma [J]. Medical Review, vol. 2, no.23, pp. 240-243, 2017

[3] He Qiao, Li Beilei. Characteristics and nursing of osteoporotic fracture [J]. Electronic Journal of Clinical Medical Literature, vol.11, no.2, pp. 4837-4840, 2015.

[4] Liu Limin. Joint interpretation of “Guidelines for the diagnosis and treatment of osteoporotic fractures” and “Guidelines for the diagnosis and treatment of primary osteoporosis” [J]. Beijing Medicine, vol. 2, no.39, pp. 180-182, 2017.

[5] Huang Gongyi. Characteristics and clinical and research progress of osteoporotic fractures [J]. Basic Medicine and Clinical Medicine, vol.10, no.7, pp. 1088-1092, 2016.