Research Progress of Male Osteoporotic Fracture

Xiaohui Bai¹  Hongzhuo Li*²

1. Graduate Office of Changzhi Medical College, Changzhi, Shanxi, 046000, China
2. Department of Orthopaedics, Peace Hospital Affiliated to Changzhi Medical College, Changzhi, Shanxi, 046000, China

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ABSTRACT
The diagnosis and recognition of male osteoporosis is still insufficient. The male patients with low-energy fracture were less evaluated and treated for osteoporosis. The risk of osteoporotic fracture in elderly men may be between 13% and 25%. With the extension of men’s life, the risk of fracture increases, which makes the management of men with fracture risk challenging. A consensus is emerging on targeted treatment guidelines for male osteoporosis, especially for elderly patients with high fracture risk. This paper aims to seek evidence through literature review, and put forward the most effective clinical strategies and schemes for the diagnosis and treatment of senile osteoporosis, so as to provide some theoretical guidance for clinical practice.

1. Introduction
The evaluation and treatment of male osteoporosis face more obstacles. A few men receive osteoporosis evaluation or treatment after fracture (¹) or after glucocorticoid treatment (²). Nevertheless, there is sufficient information to enable clinicians to identify men at risk of fracture and to treat them appropriately. The new research helps to determine which men should be tested for bone mineral density (BMD) by dual energy X-ray absorptiometry (DXA), and a large number of studies support the hypothesis that current osteoporosis drugs can reduce the risk of fracture in men.

2. Epidemiology
There are different ways to define osteoporosis. The classic method is defined by the occurrence of low-energy fractures. According to this definition, men aged 50 have a 13%-25% chance of developing osteoporotic fractures (³). Especially after the age of 80, the risk of fracture is greater. The second method is to use the standard deviation that the BMD defined by the World Health Organization (WHO) is 2.5 or much lower than

*Corresponding Author:
Hongzhuo Li,
Graduate Office of Changzhi Medical College, Changzhi, Shanxi, 046000, China;
Email: 496976698@qq.com

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the average value of normal young people. Recently, the World Health Organization and the International Society for Clinical Densitometry (ISCD) concluded that the fracture risk of women and men occurred at about the same absolute bone mineral density.

Other risk factors included decreased femoral neck BMD, age, previous fractures, history of hip fractures in parents, smoking, alcohol consumption, rheumatoid arthritis, exposure to glucocorticoids, and secondary osteoporosis.

3. Pathophysiology

Osteoporosis is asymptomatic before fracture. Even after fracture, older men are less likely to be evaluated for osteoporosis. Testosterone in men gradually decreases with age, bone mass is slowly lost, transverse bone trabeculae is reduced, bone absorption is more than bone formation, and it is often difficult to repair the damage. The transverse progressive reduction, the longitudinal bone trabecula also gradually narrowed from wide, resulting in the decrease of bone mineral density. Lower external force can cause fracture, especially in the spine.

4. Risk Factors

There is a significant relationship between the risk factors of primary osteoporosis and the etiology of secondary osteoporosis. Age is the main risk factor. Most osteoporotic fractures occur in 80 years old men. The age-related parallel is the decrease of serum testosterone, which affects bone mineral density and reduces muscle quality. Smoking is considered an important risk factor.

There are many conditions that can lead to osteoporosis, such as long-term use of corticosteroids (at least 5 mg per day within 3 months), drinking history, fracture history, rheumatoid arthritis, cop, epilepsy or Parkinson’s disease, and stroke.

5. Clinical Manifestations

Osteoporotic fractures are mostly fractures caused by low energy, such as slight falls. For severe osteoporosis, sometimes twisting the body, opening windows and holding objects may cause fractures. (1) General manifestations of fracture: pain, tenderness, swelling and dysfunction. However, patients with osteoporotic fractures may have no pain or only slight pain, or present with increased original pain. (2) The specific manifestation of fracture: deformity, bone rubbing sensation (sound) and abnormal activity may occur. However, there are also patients with osteoporotic fractures who lack the above-mentioned typical manifestations. (3) Performance of osteoporosis: whether the height has been reduced by more than 5 cm, scoliosis or hunchback deformity, etc. because osteoporotic fractures often occur in the spine, hip and wrist, according to the different parts of the fracture, there are the following specific manifestations: first, spinal fractures often occur at the junction of the thoracic and lumbar vertebrae. In patients with osteoporosis, some minor activities such as holding objects, carrying water, and even coughing may occur here. The second is hip fracture, that is, proximal femoral fracture, including femoral neck and intertrochanteric fracture. Patients with intertrochanteric fracture of femur may suffer from hip pain and be unable to move. If the fracture displacement is obvious, the lateral edge of the affected limb and foot can touch the bed surface. However, the external rotation deformity of lower limbs in patients with femoral neck fracture is relatively mild, and the degree of pain is also less than that of intertrochanteric fracture. In some patients with embedded fracture ends, they can even walk to the hospital for treatment. Third, wrist fracture, usually distal radius fracture. When people want to fall, they will stretch out their palms reflexively to touch the ground to support and protect their bodies. At this time, the body’s gravity will concentrate on the radius at the distal end of the forearm and fracture will occur.

6. Diagnose

All patients with low-energy spine or hip fractures should undergo imaging examination. CT bone mineral density measurement indicates that elderly men with a spine or hip bone mineral density score of -2.5 and a higher risk of FraX fracture within 10 years can be regarded as having osteoporosis. For all patients, some basic blood tests can be performed, which may be helpful for diagnosis and necessary for determining the safety of treatment. For example, blood calcium may provide evidence of hyperparathyroidism, alkaline phosphatase may be used as a marker of increased bone turnover, and serum 25 hydroxyvitamin D may indicate osteomalacia; whole blood count (CBC) is usually a routine laboratory test. 75% of patients with multiple myeloma have low hemoglobin or hematocrit levels. Multiple myeloma may have vertebral fractures similar to osteoporosis.

7. Treatment

7.1 Conservative Treatment

Bisphosphonates are usually the first choice for the treatment of osteoporosis. Orwoll and his colleagues...
first reported the study of a modern osteoporosis drug in 2000 [9]. Alendronate has been shown to increase bone mineral density and decrease markers of bone turnover in elderly men with DXA or osteopenia and a history of osteoporotic fractures. Men taking alendronate for 2 years also had fewer morphometric vertebral fractures than those taking placebo. Boonen and colleagues found that zoledronic acid reduced the fracture rate of osteoporosis men by 67% compared with placebo [9]. Most of the most worrying side effects occurred in women taking alendronate, namely osteonecrosis of the jaw (ONJ) [10] and atypical femoral fracture (AFF) [11]. Other drugs, such as the bisphosphonate substitute denosumab [12], teriparatide [13], strontium ranelate, are still controversial in terms of their effectiveness and long-term follow-up efficacy. It is also recommended that all patients with osteoporosis take adequate vitamin D. The diet should provide 1000 to 1200 mg of elemental calcium per day [14]. It is considered very important to reduce the risk of falls through exercise and family safety.

7.2 Surgical Treatment

Mazanec, D.J. et al. have shown that in most cases, surgery can greatly reduce the incidence of the aforementioned adverse events in the treatment of KD [15]. Hip fractures, especially femoral neck fractures, should be treated as early as possible regardless of the type, and total hip or femoral head replacement should be selected according to age and joint function needs. PVP and PKP have been widely used in vertebral compression fractures, which have the advantages of short operation time, low hospitalization cost, less radiation exposure, less bone cement consumption, etc. [16]. The fracture of distal radius and proximal humerus tend to be treated surgically before fracture, which is conducive to early joint exercise, the recovery of joint function, and the reduction of joint adhesion, stiffness and other complications.

In conclusion, male osteoporosis is still not fully recognized and diagnosed, so the treatment is insufficient. There may be more complications in fracture due to older age. At present, it is not clear whether the older the age, the more complications, is the reason for the higher mortality after hip fracture in men. Among elderly men, 25 to 35 percent of them die within one year after hip fracture, about twice as many as women. Although the incidence of fractures in men is lower than that in women, the consequences of hip fractures are greater. Identifying and treating male patients at risk of fracture will reduce the number of fractures, deaths, and likely medical costs.

References

[12] Langdahl, B., Teglbjaerg, C.S., Ho, P.R., et al., 2015. A 24-month study evaluating the efficacy and safety of denosumab for the treatment of men with low
bone mineral density: results from the ADAMO trial. Journal of Clinical Endocrinology & Metabolism. 100, 1335-1342.


