

VERTEBRAL FRACTURE ASSESSMENT

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Overview

Vertebral fracture assessment (VFA) refers to bone density scanning of the spine by dual-energy x-ray absorptiometry (DXA) for the purpose of detecting osteoporotic vertebral fractures.

Osteoporosis is a skeletal disorder characterized by compromised bone strength predisposing to an increased risk of fracture. The development of osteoporosis and osteoporotic fractures is multifactorial with bone strength factors, such as bone density and bone quality, and non-skeletal factors, such as falls, playing important roles. Vertebral fractures are the most common osteoporotic fracture and occur earlier in the natural history of osteoporosis than do other fractures, but they are frequently undetected. Clinically, vertebral fracture is suspected in patients with either back pain, vertebral deformities as assessed during a physical examination, or loss of height. Treatment of vertebral fracture focuses on two issues: (1) management of the fracture, addressing both pain relief and rehabilitation, and (2) assessment and treatment of underlying low bone density. Nearly 75% of vertebral fractures are asymptomatic and are clinically undetected. Once patients experience a vertebral fracture, including an asymptomatic vertebral fracture, their risk of sustaining another vertebral fracture increases markedly. Women with vertebral fractures have an approximate fourfold greater risk of subsequent vertebral fractures than those without prior fractures and have an increased risk of hip fracture as well.

Currently, the standard method for diagnosing vertebral fractures is a radiologist's evaluation of lateral spine x-rays. X-rays are assessed using one of a variety of grading systems, the most common being the semi-quantitative method described by Genant (1993). Despite being considered the gold standard in the diagnosis of vertebral fracture, screening for vertebral fractures is not recommended, because even amongst high risk populations, most individuals will not have a vertebral fracture. X-rays are typically reserved for patients with signs and symptoms highly suggestive of vertebral fracture.

In current clinical practice, osteoporosis is diagnosed on the basis of either a low-impact or fragility fracture or BMD which was best assessed by central dual-energy x-ray absorptiometry using World Health Organization (WHO) criteria.

- A low impact fracture is one that occurs after a fall from standing height or less;
- A fragility fracture occurs spontaneously or with no trauma (cough, sneeze, sudden movement).



Currently, dual x-ray absorptiometry (DXA) of the hip (femoral neck or total hip) is the gold standard for the diagnosis of osteopenia or osteoporosis using the WHO definitions.

1994 World Health Organization (WHO) Definitions of Osteopenia and Osteoporosis	
Normal	HIP BMD > 1.0 below the young adult female reference mean (T score above - 1.0)
Osteopenia	Hip BMD between 1.0 and 2.5 SDs below the young adult female reference mean (T score between - 1.0 and - 2.5)
Osteoporosis	Hip BMD >= 2.5 SDs below the young adult female reference mean (T score at or below - 2.5)
Severe osteoporosis or established osteoporosis	Hip BMD >= 2.5 SDs below the young adult female reference mean in the presence of 1 or more fragility fractures

Kanis JA et al. The Diagnosis of Osteoporosis. *J Bone Miner Res.* 1994 Aug;9(8):1137-41.

Pharmacological treatment of low bone density is an integral part of fracture management. The most commonly prescribed agents are alendronate and risedronate. These agents prevent bone resorption and increase bone density. Studies show that the incidence of vertebral fractures decreases by approximately 60% after one year of treatment. There is little controversy over whether individuals who present with a personal history fracture or with osteoporosis should be treated with antiresorptive agents. Among patients with osteopenia, however, there is less agreement because of the current lack of objective criteria for identifying patients at high risk of fracture likely to benefit from treatment while limiting the risks that accompany treatment.

Bone density measurement can predict risk of fracture but cannot identify all individuals who will have a fracture. A major problem with bone density measurement is that these tests alone are not optimal for the detection of individuals at high risk of fracture (and who would benefit from treatment). Over most reasonable assumptions, the tests have high specificity but low sensitivity. In other words, the risk of fracture is very high when osteoporosis is present, but by no means negligible when BMD is above - 2.5. A large number of low-impact and fragility fractures occur in individuals with BMD T-scores in the range of -1.0 to - 2.5, and therefore the finding of an occult vertebral fracture in these individuals would be of particular importance for a treatment decision.

It has been proposed that vertebral fracture assessment by DXA could be performed at the time of routine bone density testing in men and post-menopausal women with osteopenia to screen for vertebral fractures which would not otherwise be detected and which would influence clinical management. Conclusions about the utility of the test, given its diagnostic characteristics, must then be placed in context of the clinical use of the test in making treatment decisions.



Some evidence exists regarding the diagnostic performance of VFA. The most significant limitation of VFA in screening for vertebral fracture is the poor image quality of the upper thoracic vertebrae. For this reason, VFA is usually limited to T7-L4, however the overwhelming majority of the osteoporotic fractures occur at these levels. In a 2004 review article, Lenchik and colleagues conclude that “some degree of caution is warranted when using lateral DXA images for assessment of vertebral fractures for the following reasons: many fractures seen on DXA should be confirmed with standard radiographs to exclude the possibility of a pathologic fracture, and patients with indeterminate DXA images (common in the upper thoracic region) should be referred for radiography.”

Vertebral fractures affect a minority of the population and intervention thresholds based on BMD alone lack sensitivity. Osteoporosis is a multifactorial disease and it has been shown that a more effective approach is to improve the gradient of risk (sensitivity) by combining BMD with clinical risk factors. Some clinical risk factors have long been considered indications for treatment themselves. In particular, use of systemic corticosteroids is associated with excessive bone loss and fracture risk. This suggests that BMD measurement alone doesn't capture all of the risk because other changes in bone occur. Architectural changes, for example, may render bone more susceptible to fracture even at comparable levels of bone density. Prospective studies have identified several other factors, including low body mass index (BMI), rheumatoid arthritis, secondary osteoporosis, cigarette smoking, and alcohol use, which contribute independently to fracture risk. Compared with other risk factors, the patients' age showed particularly strongly in predicting vertebral fractures and indicated that reliance on BMD T-score for assessing risk without considering the age of the patient is unwise. Currently, osteopenia is treated selectively by targeting those individuals with clinical risk factors that are associated with increased fracture risk. There is no scientific evidence that demonstrates that patient outcomes are improved by diagnosing asymptomatic vertebral fractures in patients with osteopenia over basing treatment decisions for osteopenic patients on BMD and clinical risk factors.

Definitions

Bone mineral density (BMD) – is measurement of the amount of calcium in bone. BMD measurement is a clinical tool used to diagnose osteoporosis or osteopenia, predict future fracture risk, and monitor changes in bone density over time.

Osteoporosis – a disease characterized by low bone mass and microarchitectural deterioration of bone tissue leading to enhanced bone fragility and a consequent increase in fracture risk. (World Health Organization, 1994)

Policy

Screening for vertebral fractures using dual-energy x-ray absorptiometry (DXA) as an adjunct to bone mineral density measurement is considered experimental or investigational.



Evaluating vertebral fractures or signs and/or symptoms suggestive of vertebral fractures using dual-energy x-ray absorptiometry (DXA) is considered experimental or investigational.

Codes

Effective March 1, 2010, claims for vertebral fracture assessment will be denied vendor liable.

Codes	Number	Description
CPT	77082	Dual-energy X-ray absorptiometry (DXA), bone density study, 1 or more sites; vertebral fracture assessment

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Products to Which This Policy Applies

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- ⊕ Major Medical
- ⊕ MassHealth
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Committee review dates:

Technology Assessment Subcommittee: 09/22/2009

Technology Assessment Committee: 09/30/2009

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