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Editorial

Discordance between Hip and Spine Bone Mineral Density: A Point of Care

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Dual energy X-ray absorptiometry (DXA) is the most commonly used and validated method for the determination of bone mineral density (BMD).[1] DXA is usually measured at the central bone (hip and spine) and the BMD is determined by the lowest score at 1 of these 2 sites.[1,2] Discordance is defined as a discrepancy in the BMD measurements at the 2 sites, which can pose clinicians with the predicament on how to incorporate BMD measurement when deciding on the diagnosis and management of postmenopausal osteoporosis. Since its introduction in 2000, the World Health Organization has developed a classification system;[3] minor discordance indicates osteopenia at one site and normal or osteoporotic BMD at another, whereas major discordance indicates normal bone density at 1 site and osteoporosis at another.[4] T-score discordance can occur for a variety of reasons related to physiologic and pathologic patient factors as well as the performance or analysis of DXA itself.

The prevalence of spine-hip T-score differences owing to minor discordance has been reported in 38% to 51% of patients examined with DXA; otherwise, less than 5% of patients examined with DXA show major discordance.[5-9] Discordance was found to be significantly higher in the elderly group, with 2 patterns stratified by age.

In women aged 50 to 60 years with menopause >3 years, lower T-scores are more easily found in the spine than in the hip.[10] The differential bone loss among bones in the body and the proportion of cortical and cancellous bones have played a role in BMD discordance; cancellous bone has a higher rate of bone turnover and is lost earlier than cortical bone, suggesting that the presence of more cancellous bone in the spine might account for earlier loss of bone matrix in early osteopenia and more significant discrepancy in late osteoporosis.[11]

On the other hand, older age (>70 years) has been positively associated with a higher T-score in the spine than in the hip,[10-12] mainly caused by degenerative changes such as vertebral osteophytosis/endplate and facet sclerosis, aortic calcification, syndesmophytes, and vertebral compression deformity.[8,13] An increasing relative proportion of clinical vertebral fracture to hip fracture was seen for increasing spine-hip T-score discordance in women aged 50 to 64 years and women aged ≥65 years.

BMD might not fully capture the osteoporotic fracture risk because many fragility fractures in postmenopausal women occur with osteopenia and not osteoporosis.[14] Also, physicians often need to define populations at high risk for fracture when making treatment decisions for postmenopausal patients with T-scores in the osteopenic range.[14,15] Thus, the fracture risk assessment tool (FRAX) has been developed to evaluate future fracture risk and avoid missing the opportunity to prevent fractures. However, FRAX may underestimate the risk of major osteoporotic fracture when the lumbar spine T-score is much lower (>1 standard deviation discrepancy) than the femoral neck T-score.[8,10] Since only hip BMD is included in the FRAX calculation, other BMD measurement sites are not currently a component of FRAX. As a result, the risk of other osteoporotic fractures, compared to hip fractures, has often been underestimated in clinical practice.[8,10,15]

If patients are left untreated for osteoporosis, their bone density will increase rapidly. Hence, early identification and treatment are key to preventing offset (difference) between the lumbar spine and femoral neck T-scores.[10,16,17] In light of these results, the 2010 Osteoporosis Canada guidelines state that pharmacotherapy may be considered in individuals with a moderate risk for fracture and a lumbar spine T-score much lower than the femoral neck T-score.[18] Other studies suggest that major discordance or discordance of more than -1.5, are associated with an increased risk of fracture; therefore, aggressive osteoporosis treatment should be considered.[5,9,19]

To date, there are limited data regarding the effectiveness of osteoporosis treatments to lower fracture risk in osteopenia patients with discordance. Therefore, further prospective multicenter studies are needed to validate the performance of early interventions in various categories of these patients.

Clinicians and densitometrists should expect more than 40% of women screened for DXA to have T-score discordance between the spine and hip. Counseling patients for osteoporosis by taking into account T-score discordance, can enhance compliance and optimize the management of osteoporosis. Recognition of this issue may also play an additional role in making clinical decisions and minimizing the future risk of osteoporotic fractures.

DECLARATIONS

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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