

Vertebral Fractures Identified by IVA in Postmenopausal Women

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Introduction: Two primary risk factors for osteoporosis are low axial BMD and an existing vertebral fracture. The risk of future fractures is four- to five-fold higher if there is an existing vertebral fracture^{1,2}. Moreover, vertebral fractures are themselves a debilitating effect of osteoporosis. They are associated with significant mortality and morbidity, including back pain, decreased mobility, increased days of bed rest and kyphosis^{3,4}. Fortunately, available treatments for osteoporosis have demonstrated an ability to decrease vertebral fracture incidence by 30-50%^{5,6}.

Recent studies have highlighted how important it is to detect vertebral fractures. Lindsay *et al.*¹ studied the occurrence of fractures during the year following an incident vertebral fracture. Those women with one or more prevalent fractures before the incident fracture had a 22% chance of another fracture during the next year, whereas those without a prevalent fracture at the time of incident fracture had only a 4% chance of another fracture during the next year.

Often, early vertebral fractures do not come to clinical attention. It has been estimated that less than one-third of all vertebral fractures are clinically diagnosed⁷. As a result, patients with a prevalent vertebral fracture classified as “normal” or “osteopenic” by BMD are mis-classified in terms of fracture risk and do not receive medical treatment which is so important for the prevention of future fractures.

This under-recognition of vertebral fractures is due in part to the cost, radiation dose and inconvenience of conventional spine x-rays, especially for asymptomatic patients. This study identified prevalent vertebral fractures using the Instant Vertebral Assessment (IVA) feature of the Hologic Delphi bone densitometer in postmenopausal women who came for BMD measurements to the Osteoporosis Research Unit at PacMed Clinics in Seattle, WA.

Materials & Methods: 158 postmenopausal women (minimum age 50, mean age 61.9 years, SD = 9.3 years) were measured on a Hologic Delphi-W with the IVA option. DXA BMD measurements of the total AP Spine (L1-L4), total hip, and femoral neck were obtained along with AP and lateral spine IVA images. The lateral and AP IVA images consist of rapid (10 s), low dose (7 mR), single-energy, breath-hold scans of the spine, typically T4 through L4.

Patients were classified using the WHO criteria using their lowest BMD T-score: normal (T-score ≥ -1.0), osteopenic (T-score < -1.0 and T-score > -2.5), and osteoporotic (T-score ≤ -2.5).

Fractures were visually identified using Genant’s semi-quantitative method⁸. Classification was as follows:

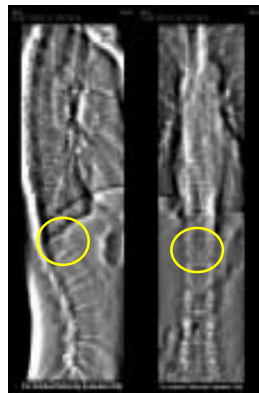
- Mild- approximately 20-25% reduction in anterior, middle, and/or posterior height and a 10-20% reduction in area.
- Moderate- approximately 25-40% reduction in anterior, middle, and/or posterior height and a 20-40% reduction in area.
- Severe- approximately 40% or greater reduction in anterior, middle,



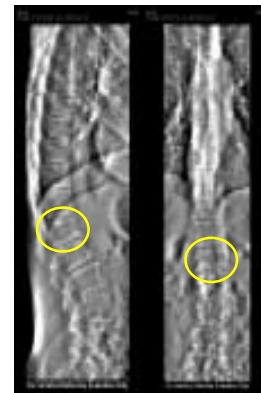
A111 Age 73, Lowest T-score was AP spine = -1.0 Severe fracture T12.



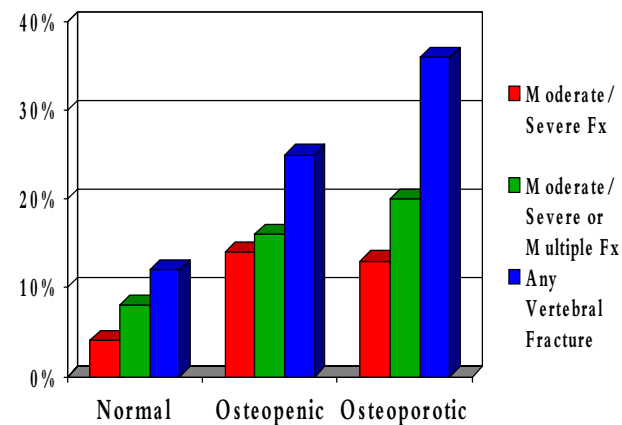
H,N Age 67, Lowest T-score was total hip = -0.7 Severe fracture L2, mild T12.



A206, Age 57, Lowest T-score AP Spine = -2.5, Moderate fracture L1.



A032 Age 70, Lowest T-score Femoral Neck = -2.3, Mild fracture L1.



Results: Using the WHO criteria, 49 patients were normal (age 56.2 ± 4.5 years), 79 were osteopenic (age 63.3 ± 9.7 years) and 30 were osteoporotic (age 67.3 ± 9.4 years). A number of the older women defined as normal or osteopenic may have had elevated BMD measurements as a result of osteoarthritis, osteophytes, etc.

Out of the 158 patients in the study, 37 (23%) of the patients were identified as having one or more vertebral fractures. In the combined normal/osteopenic group, 26 (20%) were identified as having a vertebral fracture. 13 (10%) of these fractures were classified as moderate or severe.

Conclusions: In conclusion, 20% of the patients who were classified as normal or osteopenic by the BMD T-score had a vertebral fracture. The use of the IVA feature on these patients prevented them from being mis-classified by BMD alone as low to moderate risk patients and identified those who could significantly benefit from therapies^{5,6} that reduce fracture risk.

References:

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