

2013 Position Development Conference on Bone Densitometry

Indications of DXA in Women Younger Than 65 yr and Men Younger Than 70 yr: The 2013 Official Positions

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Abstract

Dual-energy X-ray absorptiometry (DXA) is the method of choice to assess fracture risk for women 65 yr and older and men 70 yr and older. The 2007 International Society for Clinical Densitometry Official Positions had developed guidelines for assessing bone density in younger women during and after the menopausal transition and in men 50–69 yr and the 2008 National Osteoporosis Foundation (NOF) guidelines recommended testing in postmenopausal women younger than 65 yr and men 50–69 yr only in the presence of clinical risk factors. The purpose of the 2013 DXA Task Force was to reassess the NOF guidelines for ordering DXA in postmenopausal women younger than 65 yr and men 50–69 yr. The Task Force reviewed the literature published since the 2007 Position Development Conference and 2008 NOF, reviewing clinical decision rules such as the Osteoporosis Screening Tool and FRAX and sought to keep recommendations simple to remember and implement. Based on this assessment, the NOF guidelines were endorsed; DXA was recommended in those postmenopausal women younger than 65 yr and men 50–69 yr only in the presence of clinical risk factors for low bone mass, such as low body weight, prior fracture, high-risk medication use, or a disease or condition associated with bone loss.

Key Words: Dual-energy X-ray absorptiometry; guideline; male osteoporosis; osteoporosis; osteoporosis risk factors.

Introduction

The risk for low bone mass and osteoporotic fracture is increased among women 65 yr and older and in men 70 yr and older, so that screening bone density in these patients has been generally supported (1,2). The previous Position Development Conference in 2007 had recommended bone density testing in men younger than 70 yr and in perimenopausal women only if they have clinical risk factors such as low body weight,

prior fracture, or high-risk medication use, in an effort to identify younger patients at high risk for low bone mass and osteoporotic fracture (3). The National Osteoporosis Foundation guidelines, in 2008 and then reaffirmed in 2013, recommended bone density testing in postmenopausal women and men aged 50–69 yr based on risk factor profile (1). At the 2013 Position Development Conference, the dual-energy X-ray absorptiometry (DXA) Task Force was asked to review the NOF guidelines regarding bone density testing in postmenopausal women younger than 65 yr and men 50–69 yr. This article will describe the methodology of the Task Force, questions posed to the Task Force, the Statement addressing those questions that were voted as appropriate without disagreement by the 2013 International Society for Clinical Densitometry (ISCD)

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Position Development Conference (PDC) Expert Panel and approved by ISCD Board of Directors, and explain the rationale behind the statement.

Methodology

The methods used to develop and grade the Official Position Statement for DXA presented in this document are presented in the Executive Summary of the 2013 PDC regarding bone densitometry that is also in this issue. In brief, the Position Statement presented here was rated as appropriate without disagreement by the Expert Panel of the 2013 ISCD PDC. This position was also rated by the Expert Panel on *quality of evidence, strength of recommendation, and applicability*. Quality of evidence is rated as Good, Fair, or Poor, where Good is evidence that includes results from well-designed, well-conducted studies in representative populations; Fair is evidence sufficient to determine effects on outcomes, but the strength of the evidence is limited by the number, quality, or consistency of the individual studies; Poor is evidence that is insufficient to assess the effects on outcomes because of limited number or power of studies, important flaws in their design or conduct, gaps in the chain of evidence, or information. Strength of the recommendation is rated as A, B, or C, where A is a strong recommendation supported by the evidence; B is a recommendation supported by the evidence; and C is a weak recommendation supported primarily by expert opinion. Applicability is rated as Worldwide or Local; Local statements may vary in their applicability according to local requirements.

Question

Should we retain current NOF guidelines that state that in postmenopausal women younger than 65 yr a bone density test is indicated if they have an additional risk factor for low bone mineral density (BMD)?

Recommended Position Statement

Bone densitometry is indicated for

- All women aged 65 yr and older
- Women younger than 65 yr if they have a risk factor for low bone mass, such as
 - low body weight,
 - prior fracture,
 - high-risk medication use, and
 - disease or condition associated with bone loss.

The task force recommended retaining the current approach of recommending BMD in postmenopausal women <65 yr if they have an additional risk factor for low BMD.

Quality of evidence: Good.

Strength of recommendation: B.

Application of recommendation: L.

In arriving at recommendations, the task force considered the evidence and also sought to keep recommendations simple to remember and implement.

The task force considered that any criterion used to select postmenopausal women younger than 65 yr for densitometry

selectively should capture >90% of the women with osteoporosis, that is, a sensitivity of 90%. The current approach of doing a BMD in postmenopausal women younger than 65 yr with an additional risk factor for fracture is referred henceforth as the NOF criteria. Its strong advantage is that it is the simplest to remember and implement, and providers are mostly well acquainted with this approach. It has a sensitivity of 96.2% (and specificity of 17.8%) in detecting a femoral neck T-score ≤ -2.5 , when used with a limited set of risk factors (age ≥ 65 yr, weight < 57.6 kg, personal history of fracture, minimal trauma fracture ≥ 40 yr, family history of fracture, and current cigarette smoking). Cadarette et al (4) had compared the performance of the NOF criteria with other clinical decision rules: Simple Calculated Osteoporosis Risk Estimation (SCORE) using ethnicity, rheumatoid arthritis, history of minimal trauma fracture, age, estrogen therapy, and weight; Osteoporosis Risk Assessment Instrument (ORAI) using age, weight, and estrogen therapy; and ABONE (Age, Body Size, No Estrogen) using age, weight, and estrogen; and body weight <70 kg alone. The SCORE had the best area under the receiver-operating curve (AUROC) in detecting osteoporosis (0.80), with the ORAI (0.79) and weight criterion alone (0.79) not far behind. The sensitivities of the NOF, SCORE, and ORAI were comparable ranging from 96.2% to 99.6%, with the ABONE and weight criterion alone inadequate for our needs (83.3% and 87.0%, respectively) (4). Similarly, Mauck et al (5) found similar sensitivities and AUROC of NOF, SCORE, and ORAI when applied to Rochester, MN, women aged 45–64 yr. D'Amelio et al (6), applying these rules to a cohort of Italian women, found the AUROC of NOF to be superior to Osteoporosis Screening Tool (OST), ORAI, and weight alone.

Since the last PDC, the United States Preventative Services Task Force (USPSTF), however, has weighed in on this topic, and its position deserves consideration (2). The USPSTF recommendations to do a pre-BMD FRAX and do BMD in patients with a 10-yr major osteoporotic fracture risk of >9.3% (the major osteoporotic fracture [MOF] risk of a 65-yr-old woman) has to its credit the fact that many providers are familiar with FRAX and how to use the tool. However, this approach has little else to recommend it. First, it is quite a burden to the PCP and might well further discourage PCP from ordering BMDs. Because too few patients get their BMD tested (7), this is a big drawback. Second, the fact that 65-yr-old women without other risk factors have a pre-BMD MOF risk of 9.3% is not a valid reason to do a BMD in a 55-yr-old woman with risk of 9.3%. The real question is whether there is a pre-BMD MOF risk that makes the likelihood < 10% that a BMD will find osteoporosis or tip the patient over to require treatment because of MOF risk of >20%.

The task force found relevant publications (8–10) that suggested that USPSTF criteria will miss about 20% of patients who require treatment and that the pre-BMD MOF risk that would capture 90% of patients requiring treatment would be 4%–5%, which would qualify all women >53 yr. So, the USPSTF guidelines are cumbersome and insufficiently sensitive and specific. Last, FRAX is a tool that was

optimized to predict fracture risk, not low BMD, so it is not surprising that it does not perform well when trying to select patients with low BMD.

The task force, therefore, concluded that we should retain the current recommendations for BMD in women younger than 65 yr and point out the fallacy of the USPSTF approach. Because there are good data that these NOF criteria identify most patients with osteoporosis, the quality of evidence was judged by the expert panel to be Good. Because there are no studies demonstrating that pursuing this approach results in fewer fractures, the strength of the recommendation is given a B rather than an A. Because not all countries have the capacity to do screening bone densitometry, this recommendation is thought to be local rather than worldwide in applicability.

Question

Should we retain current NOF guidelines for which patients among men aged 50–69 yr, is a bone density test indicated?

- If not, what are the indications for a bone density test for men younger than 70 yr?

Recommended Position Statement

Bone densitometry is indicated for

- All men aged 70 yr and older
- Men younger than 70 yr if they have a risk factor for low bone mass, such as
 - low body weight,
 - prior fracture,
 - high-risk medication use, and
 - disease or condition associated with bone loss.

Regarding men, the task force concluded that we should retain the current position to screen BMD for men ≥ 70 yr or sooner if they have a risk factor. The task force thought that men whose likelihood of osteoporosis was $< 10\%$ could reasonably forego BMD, and the above criteria satisfy this requirement.

Quality of evidence: Fair.

Strength of recommendation: B.

Application of recommendation: L.

The criterion of screening BMD at 70 yr for men was recently reaffirmed in the Endocrine Society practice

guideline (11) and it seems for good reason. This approach of screening men > 70 yr was found to be cost effective by Schousboe et al (12), and the prevalence of osteoporosis by BMD seems to be $< 10\%$ until 70 yr in men (13,14). There are some studies that suggest that the prevalence of osteoporosis in men does not rise $> 10\%$ until 75 yr (15,16), but these studies define T-scores in men according to a female reference peak bone mass, so that using a male reference peak bone mass would likely push the time to osteoporosis a bit earlier.

The American College of Physicians (ACP) recommended DXA testing for men at increased risk for osteoporosis and candidates for drug therapy (17). These risk factors included age > 70 yr, low body weight, weight loss, physical inactivity, corticosteroid use, androgen deprivation therapy, and prior fragility fracture. They also recommended assessment for osteoporosis risk factors in older men but fail to give a specific age range for this assessment, instead stating that it is “reasonable” to do this before 65 yr. The USPSTF did not find sufficient available evidence of the benefits of osteoporosis screening for men with some uncertainty about the balance of benefits and harms with screening (2).

The task force suggested that we affirm our own position to screen men at 70 yr, similar to positions endorsed by the Endocrine Society, NOF, and ACP.

In terms of which men < 70 yr should be screened, it seems pretty clear that men with additional risk factors have a higher risk of osteoporosis (11,18) and should be screened, although we could find nothing analogous to the article by Cadarette et al (4,19) mentioned earlier, which gives the comparative sensitivity, specificity, positive predictive value, and negative predictive value for different methods of identifying younger men.

There are a few articles that identify OST as an effective tool in men (20–24). The OST is the simplest of the tools using only age and weight ([weight in kilograms – age in years] $\times 0.2$, truncated to an integer) and has a high negative predictive value (25). An OST chart has been developed that simplifies its use (19). Table 1 summarizes some of the published data on OST use in men.

The difficulty with OST is that the validation was conducted with men specifically referred for BMD who are at clearly higher risk for osteoporosis. It is also unclear what threshold

Table 1
OST Characteristics at Detecting T-Score ≤ -2.5 in Men

Reference	Population	Cutoff	Sensitivity (%)	Specificity (%)
Adler et al (23)	Pulmonary and rheumatology clinics	3	93	66
Li-Yu et al (21)	Filipino men referred for BMD	–1	91	66
Kung et al (22)	South Chinese men recruited from the community	–1	73	68
Ghazi et al (24)	Moroccan men referred for BMD	2	88	58
Lynn et al (20)	Osteoporosis fractures in men (MrOS) caucasians	2	88	36
	Chinese	–1	91	36

Abbr: OST, Osteoporosis Screening Tool.

to set for consideration of BMD testing given the wide range of cutoffs, which appear to be driven by population ethnicity.

The task force was reluctant to add in another formula for people to remember, and so the final decision was to retain the current recommendations to screen men <70 yr if they have a risk factor for low BMD or fracture.

Because there are limited data comparing utility of different screening tools among men, the quality of evidence was judged by the Expert Panel to be Fair. Because there are no studies demonstrating that pursuing this approach results in fewer fractures, the strength of the recommendation is given a B rather than an A. Because not all countries have the capacity to do screening bone densitometry, this recommendation is thought to be local rather than worldwide in applicability.

Limitations

For women, the article by Cadarette et al (4,19) gives us good data comparing the strengths and weaknesses of the different tools to predict low BMD, but we have much less data about the comparative utility of these tools in men.

Our position about not using FRAX to determine which women should get a BMD before 65 yr puts us at odds with the USPSTF, which is an undesirable position. However, the data and good clinical judgment support the position we accepted.

Questions for Future Research

Current guidelines about the cost-effectiveness of screening for osteoporosis and treating it are based on certain assumptions about the cost of the DXA and treatment. Because the cost of treatment and reimbursement for DXA have fallen over the past few years, the question is whether cost-benefit analyses based on the new costs will justify moving thresholds for screening and intervention to an earlier age.

Current guidelines suggest treating patients with osteoporosis, or those with osteopenia at high risk of fracture, but do not recommend treating menopausal women with osteopenia with low fracture risk. The question arises whether antiresorptive treatment should be directed at osteopenic women as soon as they start losing BMD around the time of menopause to prevent osteoporosis. This treatment paradigm was inconceivable at one time, but now that we have inexpensive generic antiresorptives with good safety records, and we know that a 5-yr course often gives 10 or more years of protection, it is possible that this treatment paradigm may become accepted. If this occurs, screening at menopause for low-risk patients might become an option because osteoporosis is uncommon at menopause, but osteopenia is common.

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