Commentary

The patient with a fragility fracture: an evolving role for the orthopaedic surgeon

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Summary

Osteoporosis can now be diagnosed readily, and treatments that increase bone mineral density and decrease fracture risk, even after fragility fracture has occurred, are now available. Clinical guidelines for management of osteoporosis unanimously recognize that fracture risk is highest among those who have already sustained a fracture, and encourage prompt evaluation and treatment of these individuals. Despite these guidelines, most women who experience fragility fractures remain untreated (for osteoporosis) by any of the physicians involved in their care. Barriers to diagnosis and treatment have been identified, including uncertainty about the responsibility for such management. The orthopaedic surgeon has a unique opportunity to initiate definitive osteoporosis evaluation and treatment in patients who present with fractures, and recent guidelines support the evolution of the role of the orthopaedist in this direction.

Introduction

Prior to the availability of bone mineral density (BMD) measurements and effective treatments, fragility fractures were the usual means by which osteoporosis was diagnosed, and the condition was regarded as an inevitable and immutable consequence of ageing. Thanks to advances in the past decade, this perception has changed. Osteoporosis is now recognized as a disease, and much of its pathogenesis has been elucidated. Subclinical disease can be detected readily, through BMD testing. Scientific and clinical interest in the disease, as measured by Medline citations, has more than doubled, from fewer than 800 in 1990 to more than 1900 in 2001. Effective therapeutic interventions to improve BMD and to reduce the risk of fracture have been validated in clinical trials and are now available.⁴,⁵,¹³,¹⁶

The publication in 1994 of the World Health Organization (WHO) BMD-based operational definitions of osteoporosis and osteopenia marked an important conceptual advance in our approach to managing osteoporosis, because they formalized the principle that patients with increased fracture risk can not only be identified before fractures have occurred, but that treatment should be initiated in those at highest risk.⁴² Subsequently, clinical guidelines for osteoporosis management have been published by a number of organizations.⁸,²⁰,³⁰,³¹,⁴⁰,⁴¹ These guidelines unanimously recognize that people who have already suffered a fragility fracture

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QJM vol. 97 no. 2 © Association of Physicians 2004; all rights reserved.
are at highest risk of subsequent fractures, and advocate evaluation and treatment. Prior fracture is associated with at least a doubling of risk for subsequent fracture, regardless of the site of the prior fracture, and the association between prior vertebral fracture and subsequent vertebral fracture is even stronger.\textsuperscript{25} Epidemiological studies and clinical trials have consistently reported that patients with one or more pre-existing vertebral fractures have approximately 4–5 times greater risk for subsequent vertebral fracture, and that the risk increases progressively with the number of existing vertebral fractures.\textsuperscript{5,13} Risk of new vertebral fracture is particularly high during the first year after the occurrence of a vertebral fracture: 19\% of women with a new vertebral fracture sustained an additional fracture within the next year.\textsuperscript{26}

Despite increased awareness of osteoporosis and clear evidence of the predictive importance of fracture history, fracture patients typically do not receive evaluation or treatment for osteoporosis. Studies consistently report low levels of recognition, evaluation, or treatment in persons with low-impact fractures, even in areas with national health insurance or large managed care organizations. In Canada, Hajcsar et al. found that fewer than 20\% of men and women who were treated for fragility fractures and followed up in fracture clinics had evaluations or received adequate treatment for osteoporosis.\textsuperscript{15} Moreover, 40\% of these patients had sustained at least one other fracture during the preceding 10 years. Elsewhere in Canada, Khan and colleagues reported that only 50\% of patients who presented with fragility fractures of the wrist were followed up for osteoporosis even as long as 3 years after the fracture.\textsuperscript{24} Parenthetically, the authors noted that 39\% of these patients had previous fractures and that 14\% had already sustained yet another fracture. Kanterewicz and Yanez reported that, within a year after wrist fracture, only 26\% of women were receiving antiresorptive therapy.\textsuperscript{22} In a study conducted in Israel, review of hospital records and pharmacy databases in 1998 and 1999 revealed that fewer than 30\% of emergency department patients and 40\% of hospitalized patients received any osteoporosis treatment during the 6 months after fracture.\textsuperscript{25} Similarly, in Australia, only 25\% of women had either evaluation or initiation of treatment during the 6–9 months after fracture of the wrist, humerus, or hip.\textsuperscript{43} Reports from the Netherlands\textsuperscript{37} and the UK\textsuperscript{27} corroborate these findings. Studies in the US have also reported low rates of evaluation and treatment among postmenopausal women who sustained fractures of the distal forearm. In Olmstead County, Minnesota, only 18\% of women received any intervention during the 12 months following the fracture.\textsuperscript{9} Freedman et al. reviewed a claims database including more than 3 million patients in 30 states, and reported that only 24\% had either diagnostic evaluation or osteoporosis treatment during the next 6 months.\textsuperscript{14}

Although it is known that hip fractures are associated with increased mortality and morbidity, and with increased risk of another fracture,\textsuperscript{28,35,39} similar failure to diagnose and treat osteoporosis has been reported in this setting. In addition to the studies cited above, investigators in New Zealand found that 90\% of hip fracture survivors were neither evaluated nor provided with definitive treatment for osteoporosis.\textsuperscript{38} Kamel et al. found that only 9\% of hip fracture patients admitted to a university-affiliated hospital in New York had been diagnosed previously with osteoporosis, and that only 5\% were treated with calcium, vitamin D, or alendronate at discharge, regardless of whether or not medical consultation had occurred.\textsuperscript{19} In a study of community-dwelling women, Bellantonio et al. reported that treatment levels remained low even as long as 25 months after hip fracture: 40\% were receiving no treatment, 47\% were receiving some treatment, and only 13\% were receiving adequate treatment as recommended in the NOF guidelines.\textsuperscript{2}

Barriers to diagnosis and treatment exist for both physicians and patients. In Switzerland, despite a direct education program for fracture patients that significantly improved their understanding of osteoporosis, only 31\% believed their fractures to be due to osteoporosis.\textsuperscript{27} Primary-care physicians are less likely than endocrinologists or rheumatologists to recognize osteoporosis,\textsuperscript{33} and they cite cost, uncertainty about medication effectiveness and safety, difficulty with keeping abreast of new developments, and lack of guidelines that are useful for family practitioners as barriers to management of osteoporosis.\textsuperscript{18,34,36} In addition, orthopaedic surgeons questioned by Simonelli and colleagues reported that diagnosis and management of osteoporosis were the responsibility of the primary care physician.\textsuperscript{36}

Large segments of the population are at risk for fracture, whether because of osteoporosis, prior fracture, or other combinations of risk factors. In Australia, 1.9 million persons, or one-tenth of the population, have osteoporosis,\textsuperscript{1} the estimated prevalence in Sweden is about 400 000,\textsuperscript{21} and approximately 12\% of the United States population have osteoporosis. \textsuperscript{29} Because of increasing longevity and secular increases in certain fractures, the prevalence of both osteoporosis and fracture is anticipated to increase over the next several decades.

The risk of fractures is highest among those with prior fragility fractures,\textsuperscript{25} and such patients should
receive highest priority for intervention. Ross and colleagues have shown that fracture rates are higher among women with high BMD and one prevalent vertebral fracture, than among women with low BMD and no vertebral fractures. These authors and others have observed that, even after adjustment for BMD, prior vertebral fracture remains a significant predictor of new fractures. Similarly, prior fracture at any site has been shown to predict subsequent fracture risk, independently of BMD. These observations suggest that intervention should be considered in all patients who present with a history of fragility fracture, even if BMD is not available or if osteoporosis is not identified by BMD testing. The recently published recommendations from the Australian Fracture Prevention Summit support this strategy and encourage heightened awareness among orthopaedic surgeons of the importance of secondary prevention of further fractures. The Royal College of Physicians in Great Britain, in its guidelines for the prevention and treatment of osteoporosis, asserted that multiple medical specialists, including orthopaedic surgeons, should participate in the management of the disease. The RCP has recently proposed an algorithm for management of osteoporosis, including the recommendation that any person presenting with an unequivocal fragility fracture should be treated, and that diagnostic investigation should be undertaken in cases that are less clear, with treatment provided if the T-score is −1.0 or lower.

Efforts are underway to address the gap between treatment recommendations and clinical practice. A multidisciplinary, multifaceted fracture intervention program has been implemented in a joint initiative between Northwestern University Feinberg School of Medicine and Northwestern Memorial Hospital that includes education programs for physicians and other health professionals and implementation of assessment and treatment recommendations for patients hospitalized with hip fractures. During the first year, treatment with antiresorptive medication was prescribed for 67% of fracture in-patients found to have low bone mass. Other hospital-based intervention programs have been implemented at the University Hospital National Health Service Trust in Glasgow, at the Mayo Clinic in Rochester, Minnesota, and in the Health East managed care program in Minneapolis, Minnesota; results from these and other programs are anticipated to provide guidance for future successful efforts.

Women at high risk of fracture must be identified and offered definitive therapeutic intervention. For women who have not fractured, BMD testing is the best way to quantify fracture risk. Fragility fracture is a sentinel event in osteoporosis and affords the clinician an immediate opportunity to identify women at the greatest risk. As our population ages, the urgency of treating osteoporosis cannot be overstated. Although progress has been made in the last decade, a large group of undiagnosed and untreated women remains at risk, and identification and management of these women is anticipated to ever-increasingly involve the orthopaedic surgeons who care for patients with fragility fractures.

Acknowledgements

The authors thank Philip D. Ross, PhD, of Merck Research Laboratories, for helpful advice and comments regarding this manuscript.

References