

osteoporosis update



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feature

From fracture to osteoporosis

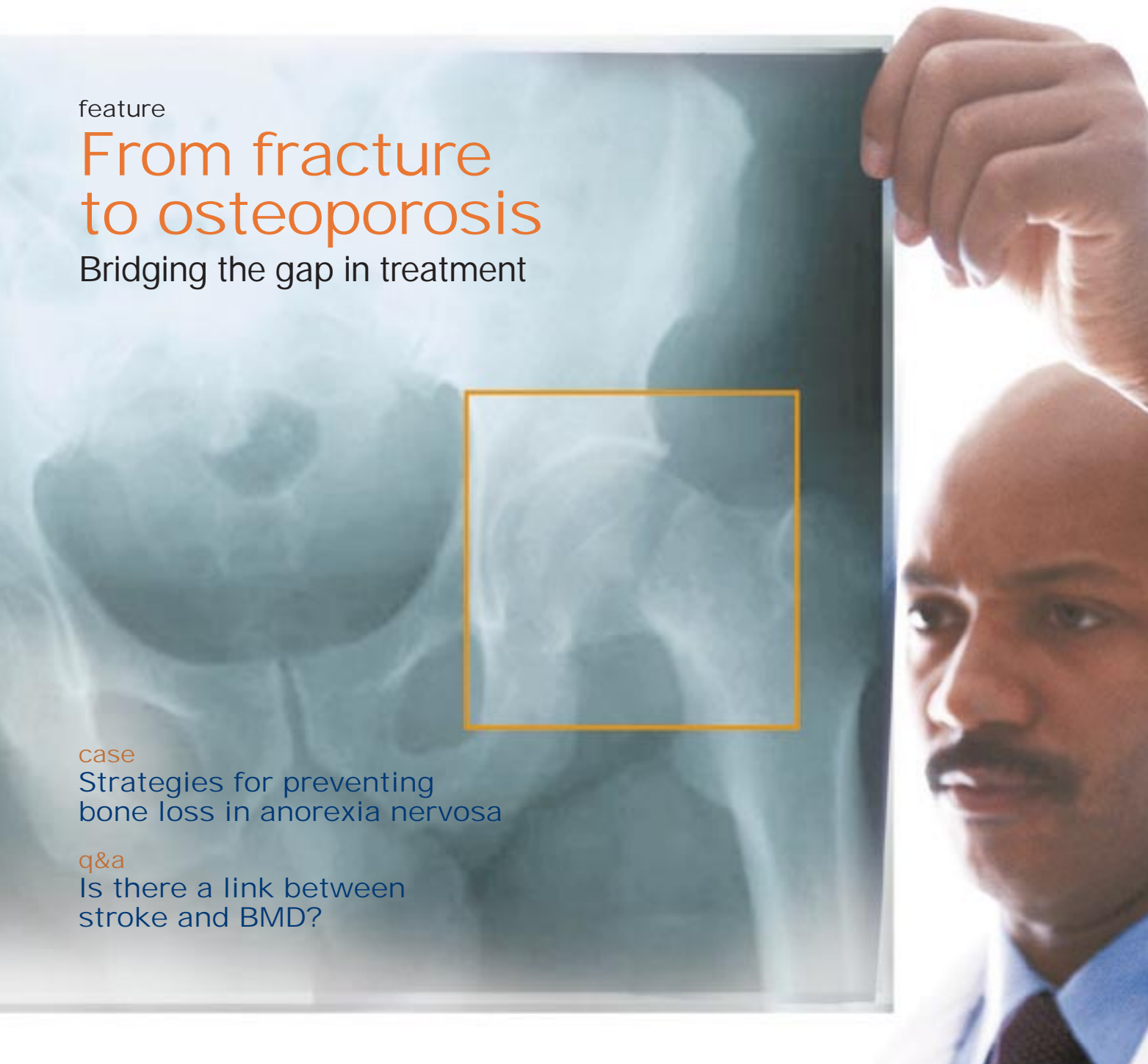
Bridging the gap in treatment

case

Strategies for preventing
bone loss in anorexia nervosa

q&a

Is there a link between
stroke and BMD?



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Closing the care gap between fracture and diagnosis

I am always impressed by the ability of primary care practitioners to absorb and apply new information across the wide scope of clinical practice. They must monitor dozens of new therapeutic areas and decide which of the thousands of clinical guidelines are relevant to their practices. Despite these challenges, Canadian physicians are very successful in comparison to the rest of the world at incorporating the newest concepts in osteoporosis. Canada has one of the highest rates of osteoporosis diagnosis using dual energy x-ray activation (DXA). Even more significantly, Canada is among the top few countries when it comes to treating diagnosed patients with evidence-based therapies (as outlined in the recent guidelines of the Osteoporosis Society of Canada).

All this doesn't mean that we can be complacent. As underscored by the articles in this issue of *Osteoporosis Update*, one of the ongoing gaps in clinical care is our failure to identify people who have sustained fractures as being at risk of osteoporosis. The majority of those who have suffered low-trauma fractures have reduced bone mass and should be treated with osteoporosis drugs. In fact, the anti-resorptive drugs appear to be most effective in precisely this population — people with previous fractures.

The ideal situation would be to have a system in place at each fracture clinic and each orthopedic ward to initiate the osteoporosis diagnostic process. This is unlikely to happen on a widespread

basis unless additional resources are allocated by hospitals, health authorities and governments. Most orthopedic surgeons I have talked to are well aware of the importance of this disease and would gladly refer all their fracture patients to an osteoporosis centre, but they will not assume osteoporosis care. I think this is reasonable, as the responsibility for medical care of these patients lies elsewhere. If orthopedic surgeons order bone densitometry or biochemical testing, they become ethically and legally

responsible for ensuring that the results are followed up and that appropriate therapy is started. Therefore, a direct pipeline from fracture clinic to osteoporosis intervention will only take place if every fracture facility is linked to an osteoporosis centre staffed by physicians who will take over patient care. Due to manpower and financial issues, I don't see this happening outside of a few large centres.

Instead, I believe that our greatest potential to make an impact on this care gap is to emphasize the importance of fracture history with primary care physicians. Doctors need to regard our low-trauma fracture patients as presumed cases of osteoporosis and proceed accordingly. While Canadian physicians do well in the field of osteoporosis, we can do even better by recognizing the importance of fracture history.



Kerry Siminoski, MD, FRCPC, is Associate Professor in the Departments of Radiology and Medicine at the University of Alberta, in Edmonton.

A handwritten signature in black ink, appearing to read 'Kerry Siminoski', written in a cursive style.

Management options for osteoporosis in a patient with anorexia nervosa



“My patient is a young woman in her 20s who has been suffering from anorexia nervosa for several years. She is amenorrheic and testing has shown that she has low BMD in the osteopenia range. To what extent do other factors besides estrogen deficiency (i.e. lean body mass and body mass index) determine the extent of bone loss in people with this disorder? While she is undergoing psychiatric treatment, what is the best therapy to prevent further bone loss and the development of osteoporosis in my patient?” — a GP in Drummondville, QC

Dr. Gillian Hawker comments:

Anorexia nervosa (AN) typically affects females during adolescence — a period of rapid bone growth. Teenage girls effectively triple their bone mass during this time, reaching the majority of their peak bone mass (their lifetime “bone bank”) within three years of the onset of menstruation. Anything that affects bone development during this important period of growth has tremendous potential to impact their attainment of optimal peak bone mass.

AN is associated with malnutrition, low body weight, sex hormone deficiency, hypercortisolism and changes in levels of nutritionally-dependent hormones such as leptin and IGF-1, factors which we would expect to have a marked effect on peak bone mass. Indeed, prior studies in small samples of young women severely affected by AN have consistently documented bone mineral density (BMD) deficits. Predictors of lower BMD in AN have invariably included a variety of measures of the length and severity of illness, such as duration of

amenorrhea, lower body weight or body mass index, decreased estrogen levels, insufficient calcium or caloric intake, level of exercise and earlier age of onset. Recovery from AN, defined as a return to normal body mass and of menses, appears to be associated with at least partial, if not complete, regaining of BMD. The key factor responsible for improved density appears to be weight gain; without this, correction of hormonal deficiencies has been unsuccessful in reestablishing normal BMD. Specifically, the use of oral contraceptives to increase estrogen levels and restore menstruation in young women with AN has not resulted in a positive effect on BMD in the absence of a return to normal body weight.

These observations have been difficult to interpret due to the fact that most young women with AN are both underweight *and* amenorrheic. Although virtually all studies of BMD in AN have found significant positive correlations between measures of body mass (e.g. body weight, lean and fat mass, body mass index) and BMD, most have failed to adjust for systematic differences in body mass observed between individuals with AN and healthy age-matched controls. Thus, the independent contributions of estrogen deficiency, decreased body mass, exercise and other factors to

the development of reduced BMD in AN remain unclear. Additionally, most of the studies have been in severely affected young women who are hospitalized in, or attending, tertiary care eating disorder units, and they may not be generalizable to less serious cases.

Based on the evidence to date, the focus for prevention of further bone loss in AN should be first and foremost on supporting the psychiatrist in encouraging weight gain. At the same time, ensuring that your patient’s diet is replete with calcium and vitamin D is also important. Currently, there is no evidence for the use of pharmacologic bone-active agents in the management of AN-associated low BMD. However, based on their efficacy in other types of osteoporosis, some specialists will consider bisphosphonate treatment in AN if bone density is very low and/or low-trauma fractures have been sustained, even in the absence of evidence. That said, since there is no published data to date on the safety of these drugs in pregnancy, effective contraception is warranted if bisphosphonates are prescribed in young women.

Since restriction of physical activity is an integral component of the psychiatric management of AN, the usual efforts to increase participation in high impact activities (e.g. jumping, skipping, running, sports) are not appropriate in this case. At the same time, we are not sure whether or not there is a role for resistance exercise (e.g. weight training); this question is being investigated. And finally, as noted above, therapy with an oral contraceptive agent is not indicated in this patient. 🌿

References are available on request

Dr. Gillian Hawker is Director of the Clinical Epidemiology and Health Care Research Program at the University of Toronto and of the Osteoporosis Research Program at Sunnybrook and Women’s College Health Sciences Centre.

Focus on fractures

More follow-up is needed to identify osteoporosis and improve patient outcome



Low-trauma fractures, especially in women over 40 and men over 50 years of age, can be devastating. They often result in deformity, chronic pain, and loss of mobility and independence that sometimes require admission into nursing homes or long-term care facilities. Their profound impact on quality of life has not yet been fully calculated. One-year mortality rates following hip fracture in the elderly (over age 70) are relatively high, and the risk of subsequent severe, disabling hip or vertebral fractures is increased for all.

In spite of statistics on the personal and healthcare costs associated with fractures (Table 1, page 7), primary care physicians often miss the opportunity to diagnose osteoporosis, initiate treatment and educate patients. More attention needs to be given to primary prevention and, in cases where fragility fractures have already occurred, better follow-up for the underlying cause.

FROM FRACTURE TO OSTEOPOROSIS TREATMENT: GLARING GAPS

In spite of the warning signs that fractures present, several studies indicate that assessment and therapy for osteoporosis remain inadequate. The reasons for this problem include issues related to both patient and physician attitudes and awareness and the need for a more integrated, multidisciplinary approach to management involving various levels of healthcare professionals (e.g. specialists, general practitioners, pharmacists, etc.).

Patient awareness

In one study using a stage-of-change model to evaluate post-menopausal women who had sustained a hip fracture, 62% of patients were unaware that their fracture might be caused by osteoporosis or had never considered pharmacologic treatment for it. Denial is another important inhibiting factor: it is often easier for patients to rationalize a break as a “traumatic” one-time event than to confront a diagnosis of osteoporosis and the prospect of undergoing primary care interventions for the condition.

Physician barriers

A Queen’s University study involving patients who presented with fragility fractures reported that less than 20% underwent investigation and adequate treatment for osteoporosis at one-year follow-up. Another Canadian study at McMaster University that monitored 527 hip fracture patients revealed that none of these were treated for the condition. Within one year, 10% of patients went on to experience another fracture and 5% had a second hip fracture. The mortality rate after one year was 25%.

These studies clearly point to the need for better management in order to reduce the rates of illness and death associated with the condition. Solutions to remedy this state of affairs include changing physician attitudes and improving communication between family doctors and the orthopedic surgeons treating fractures. Fracture clinics provide an ideal setting for finding and treating osteoporosis (see Sidebar, page 8). In a 2002 written survey, both groups agreed that primary care physicians were responsible for post-fracture attention to osteoporosis, but family doctors expressed concern about

cost and potential adverse effects of medication — despite the fact that therapies for avoiding future fractures are considered safe and effective. There also exists a significant role for pharmacists, both in recognizing and identifying osteoporosis risks and in educating patients and physicians about the various pharmacologic and nonpharmacologic options available.

Specific issues for men

People continue to think of osteoporosis as a disease affecting only postmenopausal and elderly women. In one study of seniors, about half of the men who answered the questionnaire were not aware that they could have the condition. Another survey showed that primary care physicians were more likely to treat female fracture patients for osteoporosis than males. In spite of recurring fractures, statistics point to a startling neglect in diagnosis and treatment of osteoporosis in men (see Table 2, page 8). Fewer men than women receive post-fracture antiresorptive treatment — as opposed to simply calcium and vitamin D supplementation — or longer-term follow-up with BMD measurements. This is of particular concern since the incidence of fractures in men is relatively high, and their impact is greater than in women. The mortality rate following hip fracture is up to two-times higher in men than in women.

APPROACHES TO POST-FRACTURE MANAGEMENT

Fractures are a complication, rather than an inevitable result, of osteoporosis. The OSC *2002 clinical practice guidelines* identified the following four key risk factors for fracture:

- age
- low BMD
- prior fragility fracture after age 40
- family history of osteoporotic fracture (especially maternal hip fracture)

Other major and minor risk factors that can help physicians decide who should be assessed and treated for osteoporosis include: prolonged glucocorticoid use (over three months), medical conditions such as primary hyperparathyroidism, malabsorption syndrome, osteopenia, hypogonadism in men and early menopause in women (before age 45), propensity to fall, rheumatoid arthritis, history of hyperparathyroidism, chronic anticonvulsant or heparin therapy, low calcium intake, tobacco or excessive alcohol or caffeine use, low body weight or weight loss > 10% of weight at age 25. After a first fracture, physicians should recommend bone mineral density testing and discuss pharmacologic treatment options with their high-risk patients, and take steps to reduce the risk of further fractures (this rises dramatically after a first fracture).

Besides pharmacologic treatment, specific exercise programs target osteoporosis patients. Their goal is to improve

table 1 The startling statistics associated with fragility fractures


Healthcare costs in Canada	<ul style="list-style-type: none"> • \$1.3 billion annually (1993) • Four-fold increase in hip-fracture incidence expected by 2035
Risk of death within one year of hip fracture	<ul style="list-style-type: none"> • 17% in women, 32% in men
Post-fracture ramifications for patients	<ul style="list-style-type: none"> • 50% lose independence • 33% never return to pre-fracture health • 24% community-living patients remain institutionalized more than one year after hip fracture • Over 1/3 of fracture survivors require more than 6 months rehabilitation prior to discharge home • Health-related quality of life is significantly lower following hip and pelvic fractures
Of fragility-fracture patients in Ontario fracture clinics	<ul style="list-style-type: none"> • < 20% received a diagnosis of osteoporosis, 80% of those went on to receive treatment • < 20% of undiagnosed patients were advised to take calcium or vitamin D supplements
Effect of osteoporosis treatment on high-risk patients	<ul style="list-style-type: none"> • 50% reduction of severe hip fracture • 70-90% reduced risk of multiple spine fracture and severe spine curvature

coordination and enhance muscle strength in order to avoid preventable falls. There are some advantages to group over at-home exercise programs: peer support, social interaction and the presence of an instructor can help maintain involvement in the program, whereas interest is likely to wane more quickly when activities are performed alone at home. Lifestyle modifications may also be necessary to help make individuals' daily routines and living spaces more amenable to fall prevention.

FOLLOW-UP AND COMMUNICATION

The onus lies with clinicians to follow up reports of fracture with serious efforts to diagnose osteoporosis and initiate care, in men as well as in women. To that end, efforts are being undertaken to ensure open communication between family doctors and the orthopedic surgeons treating fractures.

Good management depends on improving patient and physician education and changing attitudes. A survey of elderly people revealed that physicians rank only fifth as a source of information about osteoporosis (following media, friends, etc.). It is important that primary care physicians inform fracture patients about osteoporosis and their treatment options.

To complement medical intervention, endeavours should be made to reduce falls through lifestyle adjustments and community-based or at-home exercise regimens. Overall aims should look at implementing a more integrated approach to falls, fracture and osteoporosis prevention, diagnosis and management in the hospital and community setting, and to improving resources for home services and follow-up on safety assessments (e.g. to prevent danger of falls). The ultimate goal of post-fracture management is to reduce the incidence of subsequent fractures, as well as to improve quality of life for patients. 

References are available on request

Teaming up with orthopedic surgeons: a "Lucky Break" for patients

Following a recent fracture with minimal trauma, it may seem obvious that anyone over age 50 should be discussing their risk of osteoporosis with their family doctor.

This is not the reality, at least in Ontario, according to Dr. Earl Bogoch, orthopedic surgeon and member of the Osteoporosis Society of Canada (OSC)'s Scientific Advisory Council, who is leading an awareness program supported by the Ontario Orthopaedic Association (OOA) in Ontario fracture clinics. Older patients who have experienced a fractured are often unaware that they may have osteoporosis. "These are the people who are at the greatest risk of a future severe, disabling hip or vertebral fracture," said Dr. Bogoch. "They should receive testing and treatment for osteoporosis."

A recent partnership between the OSC and the OOA will try to remedy this situation. "Three hundred orthopedic surgeons see all the fractures in the 72 fracture clinics in Ontario," says Dr. Bogoch. "The fracture clinic should provide the ideal opportunity to identify and treat osteoporosis patients."

The purpose of the "Lucky Break" project is to raise awareness about osteoporosis among patients, fracture-clinic nurses and doctors. By encouraging appropriate investigation and treatment for the disease, the initiative strives to prevent further fractures. The OOA will provide information to its members, as well as communicate with Ontario fracture clinics, the Canadian Society of Orthopaedic Technologists and the family practice section of the Ontario Medical Association. Public inquiries are directed to the OSC website (www.osteoporosis.ca) and toll-free line (1 800 463-6842).

table 2 Fractures and osteoporosis treatment in men as compared to women

	Men	Women
Occurrence of hip and spinal fractures (approx.)	1/3 of hip fractures; 1/3-1/2 of spinal fractures	2/3 of fractures
12-month mortality with hip fracture	32%	17%
Osteoporosis treatment after hospital discharge; at 5-year follow-up	4.5%; 27%	27%; 71%
Of those treated (above), % receiving calcium and vitamin D only (as opposed to antiresorptive treatments)	67%	32%
BMD performed by 5-year follow-up	11%	27%

A message about the importance of recognizing vertebral fractures

Bill D. Leslie, MD, FRCPC, Departments of Medicine and Radiology, St. Boniface General Hospital, Winnipeg; Chair, Manitoba Bone Density Program Committee.

Osteoporosis is a serious public health concern and radiologists have a significant role to play in identifying patients who could benefit from further evaluation and treatment. Although bone mineral density (BMD) measurement is pivotal in the diagnosis of osteoporosis and fracture risk assessment, conventional x-rays are still an important tool. Individuals who have suffered a spontaneous or minimal-trauma vertebral fracture should be considered to have the condition even without BMD in the “osteoporosis” range (T score ≤ -2.5). The recently published *2002 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada* state that “Better recognition and measurement of vertebral deformities presents a major opportunity for increased early recognition of osteoporosis.”

Vertebral fractures occur more often and earlier than other types of osteoporotic fractures, including of the hip. While most are not diagnosed clinically, this does not mean that they are unimportant. Both symptomatic and asymptomatic vertebral fractures are associated with increased morbidity and mortality. The presence of a vertebral fracture increases the risk of a second one at least four-fold. Among women who have had a recent osteoporotic vertebral fracture, 20% will sustain a new fracture within the next 12 months. Pharmacologic therapy can cut this rate in half after as little as six months, and reduce the risk of multiple vertebral fractures by 90%. Vertebral fractures are also indicators of increased risk of fragility fractures at other sites, such as the hip. Clinical trials

show that it is the individual with a vertebral fracture who has the most to gain from osteoporosis treatment.

Since the majority of vertebral fractures do not come to clinical attention, accurate radiographic diagnosis and reporting is essential. Significant kyphosis, measured height loss > 2 cm in one year or historical height loss > 4 cm should trigger a thoraco-lumbar spine x-ray to identify and confirm their presence, even if there is no accompanying history of back pain.

Vertebral fractures seen on chest or spine radiographs are frequently neglected from the radiologist's dictated report

The simplest and most widely used criterion for diagnosis of a vertebral fracture is derived from measurements of the vertical height of a vertebral body at its anterior margin, centre (or mid-position) and posterior margin, as assessed on lateral spine radiographs. If any of these measurements differ from each other or from the same measurements in the supra- or sub-adjacent vertebrae by 20% or more, the vertebra is considered to have a fracture deformity as long as congenital, developmental, degenerative or other causes are excluded. Although it is also possible to grade the severity of fracture (mild 20-25%, moderate 25-40%, severe $> 40\%$), the most essential radiographic distinction is between normal, or nonfracture, and definite vertebral fracture. In comparing



spine x-rays in the same patient, a change in vertebral height of 15% or more is evidence of an intercurrent compression fracture and should prompt reassessment of the treatment. More than one new or progressive vertebral fracture is unusual with currently approved medications; this demands a full review of the patient's therapeutic regimen and adherence. In this situation it would also be prudent to screen for secondary factors, such as hyperparathyroidism, osteomalacia or myeloma.

NOT AN INEVITABLE PART OF AGING

Unfortunately, experience shows that vertebral fractures seen on chest or spine radiographs are frequently neglected from the radiologist's dictated report. This is particularly likely to occur when the examination is being done for another reason (e.g. chest x-ray to evaluate dyspnea) or when the clinical information supplied is incomplete. The requesting physician can assist the radiologist by clearly indicating on the requisition that the test is being conducted to look for osteoporotic compression fractures. Directly reviewing the spine radiographs with the radiologist can be a valuable experience for both parties. Not only does the physician gain a better appreciation for the severity of the abnormalities and confidence in recognizing them, but it also reminds the radiologist of the importance of not omitting mild compression fractures from the report as “normal aging.”

Our panel of specialists answers your questions

“I’ve seen recent studies showing that stroke patients are at significant risk for osteoporosis and fractures. Why is this, and is there sufficient evidence to indicate osteoporosis assessment and treatment in all patients who suffer a stroke? What therapy would be most beneficial?”
— a GP in Chester, NS

Dr. Richard Crilly responds: The relationship between osteoporosis and stroke is two-fold.

First, it has been reported that both men and women with low bone mineral density (BMD) have increased mortality. One study suggested that, for women, this was especially due to stroke (Browner, 1991; Johansson, 1998). Subsequently, a prospective study (Browner, 1992) showed a 30% increase in stroke for each standard deviation unit reduction in calcaneal bone density. While the relationship is not thought to be causal, the common link remains elusive. (Among the many candidates, estrogen deficiency used to be considered an obvious one). Uncertainty about the association between BMD and stroke mortality has been raised by the results of a large prospective study in the US, which found no relationship for either men or women (Mussolino, 2003). Nonetheless, women who have just suffered an acute stroke have been shown to have lower BMD (Jorgensen, 2001).

The second issue is what happens to bone density after a stroke. Rapid bone loss (within weeks) from the paralyzed limb has been well described and will compound any pre-existing reduction in BMD. Subjects, particularly women, are at greater risk of hip fracture due to both the bone loss and their increased risk for falling.

An added, longer-term complication is that, because of their lack of exposure to the outdoors and sunshine, patients with more severe stroke may become deficient in vitamin D and be at even greater risk for hip fracture (Sato et al, 2001).

The fracture rate after hospitalization for stroke has been found to be very variable, ranging from no difference overall (Melton et al, 2001) to a seven-fold increase (including hip fracture risk) within the first year (Kanis et al, 2001).

Dr. Richard Crilly is Associate Professor of Geriatric Medicine at the University of Western Ontario, in London.

Although one study (Jorgensen et al, 2000) showed that the degree of bone loss — greatest in the first seven months — correlated inversely with the amount of mobility regained, another (Melton et al, 2001) indicates that the individuals at greatest risk of fracture are those with moderate functional disability but who are still mobile (and thus at risk of falling).

The question is what to do about this problem. For now, it is probably premature to think either in terms of stroke risk assessment in those with low BMD or, conversely, routine BMD measurements in people with stroke risk factors or transient ischemic attacks (TIAs).

Stroke patients, particularly women, are at greater risk of hip fracture due to bone loss and increased risk for falling

No guidelines exist as yet for managing patients who have suffered stroke. Providing everyone with about 800 IU/day of vitamin D supplementation, especially older patients, can be justified. For those likely to regain mobility but remain significantly impaired, treatment with a bisphosphonate (and perhaps an intravenous bisphosphonate, given the rapid loss that can occur and the frequent stroke-associated swallowing difficulties) might make most sense. Hip protectors may also be considered. Conclusive evidence for any of these measures, however, as well as their cost-effectiveness, is yet to be obtained. 🌿

References are available on request

The Osteoporosis Society of Canada (OSC) is committed to providing practical, up-to-date information and evidence-based recommendations to support physicians in their daily practices. Your questions and cases will help us tailor future issues to better meet your clinical needs. Please send all correspondence to mackinnon@parkpub.com. The OSC's Scientific Advisory Council will be pleased to address your concerns.