

## ■ ANNOTATION

# Orthopaedic surgeons and fragility fractures

A SURVEY BY THE BONE AND JOINT DECADE AND THE INTERNATIONAL OSTEOPOROSIS FOUNDATION

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Osteoporosis is a "progressive skeletal disease characterized by low bone mass and micro-architectural deterioration, with a consequent increase in bone fragility and susceptibility to fracture".<sup>1</sup> The clinical relevance of osteoporosis is the resulting fractures that occur in the weakened bone – the so-called fragility fractures. Although managing the initial fractures, orthopaedic surgeons are missing a major opportunity to prevent future fractures by not providing appropriate care themselves and by instigating appropriate protocols of care to be provided by their colleagues.

Clinical trials have demonstrated that medical treatment given to patients with fragility fractures can reduce the risk of future such injuries by up to 50%.<sup>2-4</sup> In a 1998 editorial, 'Fracture care is not enough', Tosi and Lane<sup>5</sup> in the American volume of the *Journal of Bone and Joint Surgery* stated "We must thrive to prevent fractures rather than treating them once they occur". In a recent review in the British volume it was stated that "with such a large and diverse list of risk factors to recall when reviewing a patient with a simple insufficiency fracture in a busy clinic, it is easy to dismiss the underlying cause and simply 'treat the fracture'".<sup>6</sup> The reasons for such neglect are related to the availability of time and resources. There has also been a lack of simple algorithms and protocols for treating the disease. Recent articles suggest that orthopaedic surgeons are still neglecting to identify, evaluate and treat patients with osteoporosis who are admitted with low-energy fractures.<sup>7-17</sup>

### Why we have to change this now?

#### Fractures related to osteoporosis are common.

Every second woman and every third man over the age of 50 will eventually suffer from an osteoporosis-related fracture. The lifetime risk for an osteoporotic fracture of the hip, spine or wrist has been reported to be 40% for Caucasian women in Europe.<sup>18-20</sup> The risk for a hip fracture is between 11% and 18% in women, which is equal to the combined risk for breast, uterine, and ovarian cancers.<sup>21</sup> Vertebral frac-

tures are between two and three times more prevalent than those in the hip but only one-third are ever diagnosed.<sup>22</sup> In the US alone, 1.5 million fractures, including 250 000 of the hip, 250 000 of the distal radius and 700 000 of the vertebrae occur each year secondary to osteoporosis.<sup>23</sup> In the UK over 300 000 osteoporotic fractures are sustained each year.<sup>24</sup> In Germany 130 000 fractures of the hip were operated on in 1999.<sup>25</sup> The European Parliament Osteoporosis Interest Group found that 480 000 fractures of the hip had occurred in the European Union in 1999.<sup>26</sup>

**The number of hip fractures is expected to increase dramatically.** The number of individuals over 65 years of age is expected to almost double by the year 2040 and as the population ages, the number of hip fractures is predicted to rise dramatically.<sup>25</sup> In 1990, the estimated total number of these injuries in persons over the age of 50 was 1.7 million worldwide.<sup>27</sup> Assuming that there are no changes in the age- and sex-specific incidence, the number of such fractures is estimated to reach 6.3 million worldwide by 2050 and in Europe the number will double in 50 years and exceed 970 000.<sup>27</sup> This increase can be explained primarily by the aging of the population, and it is based on the assumption that no major changes will occur in the health of elderly people or in the prevention of these fractures. As the cost of treating these patients will also rise, a three- to eight-fold increase of the overall expenditure by the year 2030 can be expected.<sup>28</sup> The projected total costs are expected to be US \$131.5 billion worldwide by 2050.<sup>29</sup>

#### Osteoporotic fractures are associated with an increase in morbidity and mortality.

The negative impact on quality of life after a hip or vertebral fracture is a major concern. Up to a third of patients who sustain fracture of the hip will die as a result,<sup>30</sup> 4% die during their initial hospitalisation<sup>31</sup> and 10% to 24% within the first year.<sup>32,33</sup> In addition to mortality, these fractures are associated with substantial morbidity and loss of function. Half of these patients do not regain their previous level of

mobility. They may become severely handicapped, unable to walk unaided or climb stairs and 25% will require long-term residential care.<sup>34</sup> Many patients lose their ability to live independently and often depend on other family members for support. The annual cost of treating patients with fractures of the hip in the US is between \$10.3 and \$15.2 billion.<sup>35</sup> The annual cost in the UK now exceeds £800 million.<sup>36</sup> The costs to patients, family members and society occurring because of lifestyle changes and lost productivity are not known.

**A fragility fracture is the strongest indicator of risk of future fracture.** Patients who have had a fracture at any site have approximately twice the risk of sustaining a future fracture compared with individuals who have never experienced such an injury as an adult.<sup>37,38</sup> Patients with a low-energy fracture of the wrist, hip, proximal humerus or ankle have nearly a fourfold greater risk for future fractures than individuals who have not.<sup>38</sup> Up to 50% of patients with a vertebral fracture will experience additional vertebral fractures within three years, many within the first year.<sup>39,40</sup> A patient with a vertebral fracture has nearly a fivefold increased risk of a future similar injury and double the risk of hip and other non-vertebral fractures.<sup>37,41</sup>

Patients who have sustained a fracture of the distal radius have nearly twice the relative risk of a future hip fracture,<sup>35,42</sup> and have both site-specific and generalised decreased bone-mineral density when compared with young adults and age-matched controls.<sup>43,44</sup> Fractures of the distal radius start to occur approximately 15 years earlier than those in the hip and warn of a high risk of these latter fractures. Fractures of the distal radius are therefore good indicators for investigation of osteoporosis. In a cohort of 22 494 low-energy fractures, the relative risk of a fracture of the hip following a fracture of the wrist, proximal humeral, ankle or hip was 3.22, 5.76, 1.30 and 9.79, respectively.<sup>38</sup> A contralateral hip fracture may occur in as many as 10.6% of patients with a fracture at the hip.<sup>45</sup>

**The majority of patients with fragility fractures are discharged without adequate evaluation of osteoporosis.** Despite the evidence in support of appropriate management of patients with osteoporosis after they have sustained a fragility fracture, up to 95% are discharged without adequate assessment as to the cause of the fracture and very few are prescribed medication.<sup>7-17</sup>

Gardner et al<sup>10</sup> retrospectively analysed 300 randomly selected patients with fractures of the femoral neck. Only 58 (19.3%) had received a prescription for medication targeting osteopenia at the time of their discharge. However, 40 of these patients (13.3% of the overall group) had been prescribed calcium but only 18 (6.0% of the overall group) had received medication to actively prevent bone resorption and to treat osteoporosis. The remaining 81% of patients were discharged without proper medication and none had a bone density scan while in hospital.<sup>10</sup>

Freedman et al<sup>9</sup> analysed 1164 patients with fractures of the distal radius and found that few had been assessed or

treated for osteoporosis. Only 2.8% had been tested for bone density, and only 22.9% were treated with at least one of the drugs approved for managing established osteoporosis.<sup>9</sup> Torgerson and Dolan<sup>17</sup> found that, following an osteoporotic fracture, the majority of patients were not prescribed any suitable medication. Only 39% of patients with vertebral fractures received antiresorptive medication, and patients with fractures of the hip did not receive any.<sup>17</sup> A survey of 56 Danish departments of orthopaedic surgery showed that only seven (12.5%) referred their patients with a low-energy fracture for a bone density scan and only six (10.7%) gave treatment for those with osteoporosis.<sup>46</sup>

### Multinational survey

The Bone and Joint Decade and the International Osteoporosis Foundation (IOF) initiated a multinational survey of the current care of patients with osteoporotic fractures in a range of countries with different health care systems (UK, Germany, Spain, Italy, France and New Zealand) in order to assess the levels of practice.

In association with the respective societies (BOA, DGOOC, SECOT, SIOT, SOFCOT and NZOT), a working group of national project coordinators was convened and a questionnaire developed, partly based on an American survey in 2000.<sup>47</sup> This questionnaire was then translated into the national language. The national project coordinator determined the optimum method of distributing the survey. Anonymous responses were collected nationally and then analysed centrally.<sup>48</sup>

**Results.** Overall 3422 surgeons responded, representing approximately 25% of all society members. The response rate was highest in New Zealand (70%). Although a higher overall multinational response rate would have allowed a more accurate appraisal, the results provide valuable insights into the current state of practice.

The survey reflects the opinion of surgeons, who each month treat at least 54 000 fragility fractures in their units, and prescribe medication for osteoporosis for 30 000 patients per month.

In all countries, the majority of respondents believed that the orthopaedic surgeon should identify and initiate the evaluation of osteoporosis in patients with fragility fractures. However, only 10% always initiated a bone density test after surgically treating a patient for a fragility fracture. If osteoporosis is suspected, most surgeons in France, the UK and New Zealand (70% to 90%) would refer the patient to an osteoporosis specialist or general practitioner, while more than 80% of those in Germany and Italy initiate investigation and treatment themselves.

More than half of the orthopaedic surgeons surveyed said they had received no or insufficient education in osteoporosis. In Italy and Spain this was lower but a third still felt that they were inadequately informed.

Only 25% of the orthopaedic surgeons in France, the UK and NZ felt well informed about managing osteoporosis, while more than 80% in Germany and Spain were confi-

dent in their knowledge. Most of the surgeons in Germany, Italy and Spain felt competent in prescribing calcium/vitamin D and bisphosphonates, compared to less than 50% of their colleagues in France, the UK and New Zealand. Only 50% of orthopaedic surgeons in Southern Europe knew about the importance of external risk factors for hip fractures such as a cataract, poor lighting, uneven carpets and poor balance. There were also a number of misconceptions about the indications for bone mineral density in the countries (Germany, Spain) where surgeons considered themselves knowledgeable about osteoporosis.

The majority of surgeons from all countries recommended that a baseline bone density test should be performed in a woman aged 50 without risk factors or fracture, indicating a lack of knowledge about the current indications for bone mineral density testing.

Clearly there is a need for further education and improved training. Fortunately, the majority of orthopaedic surgeons in all countries were interested in learning more about the diagnosis and management of osteoporosis-related fractures. The mode of learning which most surgeons preferred was through seminars or journals, followed by CD ROMs and website based information. E-based learning was the most popular in France. There was very little interest (less than 15%) by orthopaedic surgeons in all countries receiving direct information from pharmaceutical representatives.

There is a need for orthopaedic surgeons to be more aware of the concerns of their patients regarding osteoporosis. The National Osteoporosis Society was well-known in only two of the countries (UK and Germany). In the remainder more than half of the surgeons had not heard about their National Osteoporosis Society.

This survey suggests that current practice is inadequate for the diagnosis and treatment of osteoporosis, especially in patients who have sustained a fragility fracture. We are aware that there may be a selection bias in the study since the surgeons who answered have already positively selected themselves, and therefore the lack of knowledge about osteoporosis is probably underestimated.

Patients with fractures create a unique opportunity for treatment since the optimal care of fragility fractures includes fixing the fracture and the evaluation, diagnosis and treatment of its underlying cause.<sup>49</sup> Pharmacological intervention has the potential to reduce the risk of future fracture by half in patients with existing fractures. Other measures such as fall prevention and individually-tailored exercise programmes have been shown to reduce falls among the elderly.<sup>4</sup>

### How to improve care for the patient with osteoporosis

**Awareness.** It is now recognised that insufficient priority is given to osteoporosis and the fractures it causes. The adherence to currently existing guidelines is not known, but is probably low. The outcome of surgical procedures should

be followed on a large scale through appropriate audit studies to evaluate the standard of care. Fracture registries could monitor the size of the problem, assess the success of treatment and assist in planning adequate provision of resources. Additional awareness and general education programmes for orthopaedic surgeons and patients need to be established.

**Research.** Research into better methods of managing these demanding fractures are needed to cope with the inevitable rise in their incidence and the surgical challenges which they pose. We need to improve further pharmacological and general management with strategies for primary and secondary prevention. We need to develop new surgical and/or biological techniques of repair for treating osteoporotic fractures.<sup>50</sup>

**Education.** Most orthopaedic surgeons felt that their education in osteoporosis was deficient. This needs to be improved in those surgeons already practising and additional emphasis on these disorders needs to be introduced into university and postgraduate training. In a recent report, the World Orthopaedic Osteoporosis Organisation (WOOO) has summarised its “Recommendations for Care of the Osteoporotic Fracture Patient to Reduce the Risk of Future Fracture”, and developed a clinical pathway to ensure that optimal care is provided for patients with fragility fractures.<sup>3</sup> The prevention of further fractures is based on three aspects: 1) the treatment of osteoporosis; 2) prevention of falls and 3) protection of the site of injury e.g. with hip protectors. These recommendations and the clinical pathway provide a useful resource for national orthopaedic associations to adapt for local use and implementation. This has already happened in the UK with the new booklet on “The Care of Fragility Fracture Patients” produced by the British Orthopaedic Association.<sup>51</sup> Orthopaedic surgeons have to ensure that every patient with a fragility fracture has the appropriate operative treatment and appropriate evaluation, treatment and advice for the underlying disease so that they are aware of the further risks and the opportunities to reduce them.

**Service provision and further development.** Each centre should guarantee that adequate access to measurements of BMD is available. A multidisciplinary meeting to agree on a standard protocol for the management of known osteoporosis both in pharmacological and general terms should be arranged.

The concept of a fracture liaison nurse has been introduced with much success in several countries. The major role is to coordinate and develop productive working relationships with the diverse teams of healthcare professionals needed to ensure that the patient receives appropriate treatment and care in addition to the management of the fracture.<sup>52</sup>

Every patient should receive an appropriate and technically satisfactory operation and be evaluated and treated appropriately for the underlying disease. They should be

advised as to their susceptibility to falls and of the changes in lifestyle which will help prevent future fractures.

In a number of countries "Care Pathways", blueprints of the standard management of common conditions are being developed. It is hoped that this study combined with the WOOO Guidelines will allow each hospital involved to develop a "Fracture Care Pathway" which will include the treating surgeon, nursing and theatre staff, the general practitioner (Family Doctor), the social worker and the physicians providing the local "Bone Treatment management" and the "Falls Prevention Service". By developing this care pathway we will reduce the number of patients returning to us with further fractures in the future, and thus reduce the deaths and severe disabilities which are a consequence.

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