Fragility Fractures Requiring Special Consideration

Vertebral Fractures

Christian Kammerlander, MD, PD[a,*], Michael Zegg, MD[a], Rene Schmid, MD, PD[a], Markus Gosch, MD[b], Thomas J. Luger, MD[c], Michael Blauth, MD[a]

KEYWORDS

• Fracture treatment • Elderly • Osteoporotic fracture • Vertebral fracture • Augmented instrumentation • Comorbidities • Odontoid fracture

KEY POINTS

- The incidence of osteoporotic vertebral compression fractures (VCFs) is steadily increasing, although many VCFs in the elderly remain undiagnosed.
- The comorbid conditions of the elderly, and especially their underlying osteoporosis, are the main factors that make the management of these types of fractures difficult.
- There is still an ongoing discussion as to whether odontoid fractures should be managed operatively or conservatively.
- Early mobilization is the key for improved outcome of patients with thoracolumbar fractures; surgical stabilization, including the use of bone cement, may be helpful in achieving this goal, although there is ongoing debate on the efficacy of this approach.

INTRODUCTION

Epidemiology

Advanced age and osteoporosis have been identified as the 2 main risk factors for vertebral fractures[1–3]; hence, vertebral compression fractures (VCFs) in the thoracolumbar spine as well as fractures of the cervical spine increase with the aging of the population.

Osteoporosis causes more than 8.9 million fractures annually worldwide (approximately 1000 per hour).[4] VCFs are the most common manifestation of osteoporosis. In geriatric patients with osteoporosis, the probability of suffering from VCF is high.

None of the authors has a conflict of interest regarding the topics discussed in this article.

[a] Department for Trauma Surgery and Sports Medicine, Medical University of Innsbruck, Anichstrasse 35, 6020 Innsbruck, Austria; [b] Department of Acute Geriatrics, State Hospital Hochzirl, Austria; [c] Department of Anaesthesia and Intensive Care, Medical University of Innsbruck, Anichstrasse 35, 6020 Innsbruck, Austria

* Corresponding author. Department for Trauma Surgery and Sports Medicine, Medical University of Innsbruck, Anichstraße 35, Innsbruck 6020, Austria.

E-mail address: christian.kammerlander@uki.at

Clin Geriatr Med 30 (2014) 361–372

http://dx.doi.org/10.1016/j.cger.2014.01.011 **geriatric.theclinics.com**

0749-0690/14/$ – see front matter

The number of annually new osteoporotic vertebral fractures is 214,000 in America, 490,000 in Europe, 253,000 in South-East Asia, 405,000 in Western Pacific, including Japan and China, and 12,000 in Africa.[4] The estimated costs of osteoporotic fractures were reported to be 37 billion euros in 2010, whereas vertebral fractures counted for 1.8 billion euros,[5] and in the United States, total costs, including prevalent fractures, exceeded 19 billion dollars.[6] In Europe, the incidence of a new vertebral fracture at the age 50 to 79 years is 1.1% per year in women and 0.6% per year in men. Furthermore, the incidence of fracture increases with age in both women and men, with a prevalence of 50% in a geriatric population.[7–9] The estimated number of unreported cases is probably higher, given that many VCFs do not come to medical attention; only one-fourth to one-third of vertebral fractures are clinically diagnosed.[10–13] Because of decreasing bone density in geriatric patients, the risk of developing a VCF increases approximately 2 times for every standard deviation lower than average vertebral bone density.[14]

Because of demographic changes, the prevalence of cervical spine injuries in the elderly is expected to increase progressively in Europe and North America. Although the incidence of neck injury in individuals younger than 65 years is declining, it is constant or increasing for the elderly after a minor trauma.[15,16] Moreover, upper cervical spine injuries are the most common.[16–18]

Challenge: Geriatric Patient

Comorbidities

A similarly severe injury in elderly patients leads to inferior clinical outcome with higher mortality compared with younger patients.[19–22] The presence of comorbidities complicates recovery after trauma. More than 50% of elderly trauma patients have underlying hypertension and more than 30% have heart disease.[23] Moreover diabetes, previous cerebrovascular events, chronic obstructive pulmonary disease, dementia, arrhythmias, and endocrine disorders are each identified in more than 10% of the geriatric trauma population.[23] Because of the impaired health of elderly patients at baseline, they are at increased risk of certain types of trauma and in-hospital complications after any trauma.[24] Vertebral fractures after a simple fall are associated with increased risk of death, because of preexisting comorbidities.[25,26] In elderly patients with chronic lung disease, a vertebral collapse with subsequent thoracal kyphosis leads to further loss of vital capacity and resulting breathlessness. Medical treatment, including oral steroids, induces further loss of bone mass and thereby increases the fracture risk.[12]

Interdisciplinary management of geriatric patients with fracture is crucial to ensure quality, prevent complications, and (depending on the patient's individual needs) optimization of concurrent medication. Over the last decade, there have been several studies showing the advantages of an interdisciplinary approach to fragility fractures, which was originally championed by the British Orthopedic Association.[27–33]

Osteoporosis

Vertebral fractures are the most common manifestation of osteoporosis. Bone density of the vertebral column decreases steadily with age, and women have lost almost half of their bone mass by the time they reach their 80s.[34] About 50% of men and women with symptomatic vertebral fractures have evidence of osteoporosis on densitometry, and a further 40% have osteopenia.[35,36] Identification of the individual fracture risk and determination of who should receive a specific antiosteoporotic medication are the main goals when evaluating patients for osteoporosis. Detecting osteoporosis after diagnosed VCF in the elderly is crucial for further treatment determination. The gold standard for measuring bone mineral density is the dual-energy radiograph absorptiometry.[37]