

## Perspective

# Who should care about the patient's next fracture? A treatment gap after shoulder fractures in the elderly

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Submitted 2023-09-19. Accepted 2023-09-28.



Fractures of the proximal humerus are common injuries in the elderly. It is the third most common osteoporosis-related non-vertebral fracture, surpassed only by hip and wrist fractures. In a typical “fracture career,” shoulder fractures (mean age 69 years) occur after wrist fractures (mean age 61 years) and before hip fractures (mean age 81 years) [1]. Females account for 3 out of 4 [2]. The lifetime risk of suffering a proximal humerus fracture in a female aged 50 years was 13% in a Swedish population [3]. In the group aged 65 or above, 94% of the fractures were related to falls from standing height [4]. The incidence of proximal humerus fractures was 500/100,000 per year in Danish females aged 60 and above [5].

Most orthopedic surgeons acknowledge that osteoporosis should be addressed in hip fracture patients. Similar attention is not always given to elderly patients with low-energy shoulder fractures. They are often managed by changing surgeons in outpatient trauma clinics or simply discharged without follow-up.

Lack of secondary fracture prevention in the elderly has far-reaching consequences for the patients and the health-care system. A proximal humerus fracture is a substantial risk factor for a subsequent hip fracture [6]. Patients with low-energy trauma generally have an increased risk of a subsequent fracture, especially within the 2 years following the index fracture (imminent fracture risk) [7,8]. A hazard rate of almost 6 for suffering a hip fracture within the first year after a proximal humerus fracture has been reported [9]. A 2-year re-fracture rate of 15% following a proximal humerus fracture has been reported in a female Medicare population. After 5 years, the cumulated re-fracture rate had risen to 32% [8]. In a study of the fracture epidemiology in a Danish hip fracture population, 28% reported at least one fragility fracture in the previous 10 years. Wrist and shoulder fractures accounted for 70% of the fractures [10].

The potential for secondary prevention in the population of low-energy shoulder fractures seems obvious. The organization of local or national secondary fracture prevention pro-

grams may differ. The Fracture Liaison Service is an international screening program aiming to identify patients with needs for counseling or treatment for osteoporosis. Fall risk factors also need to be identified and addressed. Evidence-based global guidelines for fall prevention and management are available, including algorithms to support clinical assessment and treatment [11]. Although the benefit of secondary fracture prevention is supported by solid evidence [12], the availability is still variable. Thus, many elderly patients with wrist or shoulder fractures are not offered screening for osteoporosis. The prevalence of osteoporosis is high among elderly individuals with proximal humerus fractures. In our clinic, routine screening of patients with shoulder fractures with dual-energy X-ray absorptiometry (DXA) scan identifies roughly 40% with osteoporosis, 40% with osteopenia, and only 20% with normal bone mineral density (BMD). Unrecognized osteoporosis is also present in the background population. However, the imminent fracture risk provides a rationale for paying particular attention to BMD in the elderly with low-energy shoulder fractures.

Several surrogate measures of BMD based on radiographic measurements of the upper end of the humerus have been proposed, including the cortical thickness [13], the deltoid tuberosity index [14], CT reconstruction of the opposite humeral head [15], and studies looking for associations between local BMD and postoperative radiographic outcome [16]. Surprisingly, these measures were developed to predict the risk of failure of a planned osteosynthesis, not to prevent a subsequent hip fracture. Thus, the purchase of the screws in the osteoporotic humerus seems to have been the primary concern. It is questionable whether these measurements add value to the patients. In randomized trials, osteosynthesis with locking plates in elderly patients has repeatedly been reported as non-superior to non-surgical treatment [17]. The surrogate measures may even worsen the patient's prognosis if a systemic assessment of BMD is

neglected. Assessing the risk of failure of a redundant surgical procedure should not divert our attention from preventing a subsequent hip fracture.

Although the evidence base for different follow-up regimes after shoulder fractures is still weak, the evidence base for secondary prevention is strong. Leaving elderly patients with shoulder fractures without adequate follow-up does not benefit patients or society. Secondary fracture prevention is an orthopedic core responsibility requiring referral to an endocrinologist for eventual DXA scan with measurement of BMD, even if patients are treated without surgery.

The author reposts no conflict of interests. Completed disclosure forms for this article following the ICMJE template are available on the article page, doi: 10.2340/17453674.2023.21273

Handling co-editor: Cecilia Rogmark

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