

## CLINICAL VIGNETTE

# Spontaneous Fractures in Nursing Home Patients

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### *Clinical Vignette*

A 92-year-old male with dementia, coronary artery disease, hypothyroidism, and a remote history of osteomyelitis in his left shoulder was admitted to the hospital for altered mental status and subsequently discharged to a skilled nursing facility (SNF) for rehabilitation. At baseline, he was wheelchair bound and needed assistance with all his activities of daily living. During his stay at the SNF, he was found to be totally functionally dependent, requiring two-person assist for transfers out of bed. A few weeks later, he was sent from the SNF to the emergency department (ED) for left shoulder pain. He was diagnosed with a proximal left shoulder fracture and discharged back to SNF. Nine days later, he was sent back to the ED after an x-ray obtained at SNF suggested a right humeral fracture. X-ray in the ED confirmed an acute fracture of the mid-diaphysis of the humerus with some displacement and the patient was admitted to the Geriatrics Service for pain control. The patient's son was very upset at the recurrent fractures. He wanted to know why these fractures kept occurring while the patient was at the SNF and expressed his intent to initiate a lawsuit.

### *Discussion*

Spontaneous fractures are those that occur without precipitating factors and without the degree of trauma that is usually required to cause a bone break<sup>1</sup>. These fractures are also referred to as insufficiency or minimal trauma fractures<sup>2</sup>. Insufficiency fractures in the elderly patients are common especially among those with functional impairment<sup>3,4</sup>. Although vertebral fractures and pelvic bone fractures in nursing home patients have been well-documented<sup>4,5</sup>, there are few reports of spontaneous fractures of the long bones in this patient population.

Spontaneous fractures of the long bones (humerus, femur, tibia-fibular and ulna) often result from turning or transferring. They occur from either direct force or torque. Two important contributing factors are the decrease in bone mass and bone quality and

increased torque during passive transfer. It is thought that humeral fractures occur less frequently as there is less torsion torque on upper limbs during transfer. Patients may present with spontaneous pain, deformation, hematoma, pain or audible crack during transfer or turning maneuvers, leading some to call it a "transfer" or "turning" fracture<sup>6</sup>. Fractures in the SNF setting often raise suspicion of abuse or mistreatment, which may lead patients' families to contemplate lawsuits for possible abuse.

Kane and Goodwin were the first to report in 1991 six long-term care residents in a three-year period with fractures of the long bone not related to obvious trauma<sup>7</sup>. All the patients had been non-weight bearing for at least the past 2 years. Aside from osteopenia, they had no other risk factors such as cancer or Paget's disease. Fractures occurred in the hips or long bones of leg and arm. While it may be difficult to exclude physical abuse, two of the patients were cognitively intact and gave no history of abuse.

A subsequent one-year prospective study found that the overall incidence of long bone fractures was 3.5 per 100 subjects per year and the incidence of minimal trauma or spontaneous fractures was 0.8 per 100 subjects per year in eleven SNFs in the state of Wisconsin<sup>2</sup>. The spontaneous fractures occurred in individuals who were less mobile and more likely to be bed-bound. Most of the patients had no clear precipitating factor other than severely impaired mobility. The location was more likely to be in the lower extremity below the hip. These findings suggest that the average skilled nursing facility would have one minimal trauma fracture per year.

In 2000, Martin-Hunyadi, et al published a 20 month prospective observational cohort study involving 30 French long-term nursing homes, representing 3052 beds<sup>8</sup>. The prevalence of long bone insufficiency fractures (LBIF) during the study period was 1%. Fractures were noted in the hip, femoral shaft, tibia-fibula, humerus and cubitus. Fifty-three patients were noted to have 55 fractures. The majority (72%) of

these patients was bedridden and 20% of the fractures were in the humerus. Those with femoral shaft fractures had the highest mortality of 54% at 2 months. Overall mortality was 24% at 2 months.

Most recently in 2007, Wong et al reported on 30 patients from 1994 to 2005 that had spontaneous fractures in SNFs in Hong Kong<sup>9</sup>. Risk factors included female sex, bedridden status, feeding tube, dementia, contractures and ipsilateral hemiplegia. None of the patients had upper limb long bone fractures.

These studies suggest that long bone insufficiency fractures may occur in the course of providing necessary care to frail elderly patients who need assistance with routine activities of daily living such as getting in and out of bed or with repositioning to prevent serious pressure ulcers. Prevention and management of spontaneous fractures are generally no different from traumatic fractures but may be influenced by overall goals of care, functional status, and comorbidities. While this problem underscores the need to educate and train staff members in nursing home facilities on proper transfer techniques of high risk, bedridden patients who require the most assistance with transfers, the occurrence of spontaneous fractures also highlights the enormous challenge and burden that health care workers including nursing staff and caregivers face when providing necessary day to day care for frail, totally physically dependent elderly patients. Educating family members that spontaneous or minimal trauma fractures can be a complication of prolonged bedrest in patients who have low bone mass may help allay the confusion that these incidents will often cause.

## REFERENCES

1. **Jeffery CC.** Spontaneous fractures of the femoral neck. *Orthop Clin North Am.* 1974 Oct;5(4):713-27. PubMed PMID: 4415867.
2. **Kane RS, Burns EA, Goodwin JS.** Minimal trauma fractures in older nursing home residents: the interaction of functional status, trauma, and site of fracture. *J Am Geriatr Soc.* 1995 Feb;43(2):156-9. PubMed PMID: 7836640.
3. **Johnell O, Kanis JA.** An estimate of the worldwide prevalence and disability associated with osteoporotic fractures. *Osteoporos Int.* 2006 Dec;17(12):1726-33. Epub 2006 Sep 16. PubMed PMID: 16983459.
4. **Rodondi A, Chevalley T, Rizzoli R.** Prevalence of vertebral fracture in oldest old nursing home residents. *Osteoporos Int.* 2012 Nov;23(11):2601-6. PubMed PMID: 22302103.
5. **Benzinger P, Becker C, Kerse N, Bleibler F, Büchele G, Icks A, Rapp K.** Pelvic fracture rates in community-living people with and without disability and in residents of nursing homes. *J Am Med Dir Assoc.* 2013 Sep;14(9):673-8. doi:10.1016/j.jamda.2013.03.012. Epub 2013 May 13. PubMed PMID: 23680402.
6. **Sherman FT.** "Transfer" and "turning" fractures in nursing home patients. *Am J Med.* 1991 Dec;91(6):668-9. PubMed PMID: 1750442.
7. **Kane RS, Goodwin JS.** Spontaneous fractures of the long bones in nursing home patients. *Am J Med.* 1991 Feb;90(2):263-6. PubMed PMID: 1899968.
8. **Martin-Hunyadi C, Heitz D, Kaltenbach G, Pfitzenmeyer P, Mourey F, Vogel T, Niederberger B, Kiesmann M, Berthel M, Kuntzmann F.** Spontaneous insufficiency fractures of long bones: a prospective epidemiological survey in nursing home subjects. *Arch Gerontol Geriatr.* 2000 Dec;31(3):207-214. PubMed PMID: 11154775.
9. **Wong TC, Wu WC, Cheng HS, Cheng YC, Yam SK.** Spontaneous fractures in nursing home residents. *Hong Kong Med J.* 2007 Dec;13(6):427-9. PubMed PMID: 18057429.

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