ORIGINAL ARTICLE

Spontaneous fractures in nursing home residents

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Objectives To evaluate spontaneous long bone fractures occurring in nursing home residents and to identify what factors put them at risk for fractures.

Design Retrospective study.

Setting Department of Orthopaedics and Traumatology of a pubic hospital in Hong Kong.

Patients A total of 30 nursing home residents who developed spontaneous long bone fractures between 1994 and 2005 were reviewed.

Main outcome measures Demographic data, mechanism of injury, pattern of fractures, associated risk factors, complications, outcomes, and post-treatment status.

Results The mean age of patients was 84 years. Co-morbidities were as follows: 22 patients were bedridden, 21 required long-term feeding by Ryle's tube, 19 had a history of cerebrovascular accident and 18 of whom had a long bone fracture on the side of the hemiplegia, 15 had dementia, and 25 had lower limb contractures. Closed supracondylar fractures of the femur occurred in 23 patients, 17 of whom presented with limb deformity. In 21 patients, fractures were treated successfully with hinged braces. In one patient, the fracture changed from closed to open. In five patients, the fractures were complicated by sacrum or heel sores, and in one by infected nonunion. In 28 patients, the fractures eventually healed without further complications. Three formerly bedridden patients were able to sit after their fractures had been treated.

Conclusions Female nursing home residents who require long-term Ryle's tube feeding, have dementia, hemiplegia, lower limb contractures, osteoporosis, or are bedridden, are at high risk for spontaneous fractures.

Key words
Femoral fractures; Fractures, spontaneous; Nursing homes; Risk factors

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Introduction

Nursing home residents, particularly those who are bedridden or chair-bound, are physically fragile and vulnerable to injuries. Long bone fracture is one of the major causes of morbidity and mortality among them. Although the literature mentions 'spontaneous fractures' occurring without precipitating factors and without the degree of trauma that usually causes a bone break,[1] reports of such spontaneous long bone fractures are scarce. We conducted a retrospective review of the demographic data, mechanism of injury, and the pattern of such fractures in 30 nursing home residents admitted to our institution.

Methods

We reviewed 30 records of nursing home residents admitted to our institution for long bone fractures between 1994 and 2005. Both bedridden and chair-bound patients were included in our study; those who could walk, those who could perform activities of daily living without assistance, and those who had experienced physical abuse were not included. All patients were admitted for spontaneous long bone fractures. We also reviewed associated risk factors, complications, outcomes, and post-treatment status, with a view to identifying what predisposes to fractures. The patients were all treated either surgically or conservatively, depending on the AO (Arbeitsgemeinschaft für Osteosynthesefragen) injury classification and the patient's general fitness for surgery (as determined by the American Society of Anesthesiologists [ASA] grade).

護老院舍中住院老人的自發性骨折

目的 評估護老院舍中住院老人的自發性長骨骨折，以及查找使他們有機會骨折的因素。

設計 回顧研究。

安排 香港一所公營醫院的矯形及創傷外科。

患者 1994至2005年間，出現自發性長骨骨折的30位護老院老人。

主要結果測量 與人口學有關的數據、致傷的機制、骨折的形式、相關的致危因素、併發症、結果以及治療後的情況。

結果 病者平均年齡84歲，伴發病症如下：22位病者臥床不起，21人需長期靠胃喉餵食，19人曾有中風紀錄，其中18人在偏癱的一邊有長骨骨折，15人有痴呆症，25人有下肢攣縮。23人股骨髁上閉合骨折，其中17人有肢體畸形。21人以鉸鏈支具成功處理。1人的骨折由閉合性轉化為開放性。5人的骨折伴隨有骶部或踝部潰瘍，1人則伴有感染性骨不癒合。28人的骨折最後能夠癒合，無進一步的併發症。3位之前臥床不起的病人，骨折經過治理後能夠坐起。

結論 研究發現護老院舍中要長期靠胃喉餵食的女性、有痴呆症、偏癱、下肢攣縮、臥床不起，以及骨質疏鬆，都是自發性骨折的高危群體。

FIG 1. Knee contracture with poor muscle bulk in a nursing home resident

Results

A total of 30 patients (2 men, 28 women) were reviewed; their mean age was 84 (range, 62-104) years and 17 were between 80 and 90 years old. Their mean length of hospital stay was 11 (range, 4-34) days. Co-morbidities were as follows: 22 were bedridden; 8 were chair-bound; 21 were in receipt of long-term feeding by Ryle's tube; 19 had a history of cerebrovascular accident, 18 of whom had a right-sided hemiplegia and had previously sustained a long bone fracture on the same side. Fifteen of the 30 had dementia, and 25 had hip or knee contractures (Fig 1). Twenty-three patients had closed supracondylar fractures of the femur. Among these, 19 had an A1 (simple extra-articular) fractures (Fig 2) and four had a B2 (medial condylar sagittal plane) fractures; six patients had closed fractures of the femoral shaft—five of whom had A1 (simple spiral) fractures and one had a B1 (spiral wedge) fracture. One patient had A1 (simple spiral) closed fractures of the distal tibia and fibula. Of the 30 patients, 18 had fractures involving the right side.

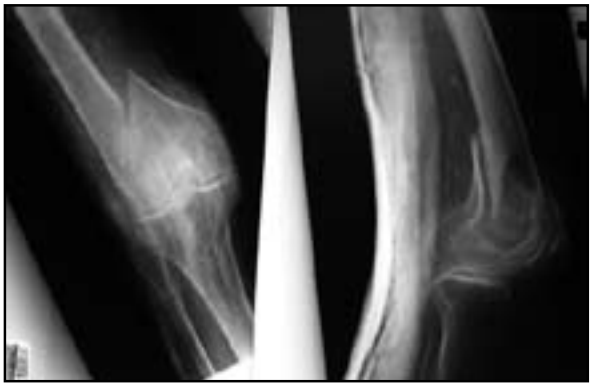

FIG 2. Anteroposterior (left) and lateral (right) radiographs showing an A1 supracondylar fracture of the femur in a nursing home patient with a plaster slab

FIG 3. Conservative treatment involving a hinged brace for a patient with a long bone fracture

None of the patients had upper limb long bone fractures. Twenty-seven presented with limb deformity of unknown cause, and three acquired fractures whilst being transferred to another surface or by being turned. In 21 patients, the fractures were treated conservatively with hinged braces (Fig 3). Excepting the patient with distal tibia and fibula fractures, they all had either A1 supracondylar fractures of the femur or an ASA grade IV or higher fractures, none of which qualified for surgery. Possible associated predisposing/risk factors for these fractures are summarised in Figure 4.

Four patients with B2 supracondylar fractures of the femur were treated by open reduction and condylar plating. Four others with A1 femoral shaft

fractures and one with a B1 femoral shaft fracture were treated by closed reduction and intramedullary nails. Three patients underwent hip adductor tenotomy for their lower limb contractures.

One patient with an open A1 femoral shaft fracture, who was unfit for surgery, subsequently died. Five patients had sacral or heel sores that healed after dressing. One patient had an infected nonunion after open reduction and plating and underwent amputation. Fractures healed in the remaining 28 patients. None of the patients had any further complications, and three formerly bedridden patients were able to sit after treatment.

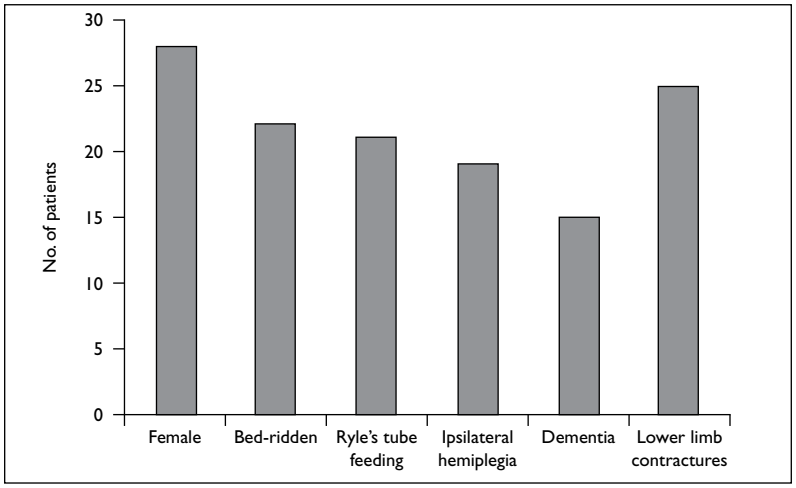

FIG 4. Risk factors for fracture in our patients

Discussion

As the number of elderly as well as average life expectancy increase, both geriatricians and orthopaedic surgeons will need to focus as much on providing preventive care as on treating fractures. Most fractures in the elderly are partially or fully preventable.

In our series, most were elderly women, whose mobility was severely impaired,[2,3] mainly due to cerebrovascular accidents or dementia. Patients with dementia appeared at higher risk of fracture, because of their poor communication skills; they tended to present with limb deformity rather than pain. In osteoporotic patients, spontaneous fractures may have occurred as a result of undocumented falls, especially in those who have had a stroke. In patients with a combination of lower limb contractures and osteoporotic bones, a simple twisting force or mild contusion is sufficient to cause fracture, especially during the provision of nursing care.[4] In our series, no spontaneous upper limb fractures were detected, though they have been reported elsewhere.[4,5]

The high incidence of fractures in patients requiring long-term feeding by Ryle's tube may have been due to poor nutritional status, as pointed out by Miller and Glazer.[3] These patients may need supplementary nutrition (vitamin D if deficient) and treatment for osteoporosis. However, as they are very often demented and already have limited life expectancy, any beneficial effects may not be very significant. Although we believe that none of our patients experienced physical abuse, unexplained fracture should also prompt physicians to investigate possible abuse.[4]

Conservative treatment yielded favourable results with A1 supracondylar fractures of the femur. Surgery yielded good results with B2 supracondylar and shaft fractures of the femur; most healed without complications. However, this was not the experience in the series reported by Miller and Glazer.[3] Hip adductor tenotomy is unlikely to provide a better nursing position to release the lower limb contractures, as long-term hip contractures may due to joint contractures rather than soft tissue contractures.

Although mortality was low in our series, incidences as high as 50% have been reported,[6] particularly for femoral shaft fractures. In addition, the need for adequate pain relief, good nutrition, and good nursing care is critical.[7]

We believe that prevention is better than cure. Identifying high-risk patients and providing meticulous nursing care, especially regarding methods for lifting and transferring patients, are paramount.

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