



Hip fracture

Challenges in prevention and management



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BACKGROUND

Hip fracture is a common 'geriatric syndrome', presenting general practitioners with complex challenges in prevention and management. Hip fracture entails a high cost to both the individual and the community.

OBJECTIVE

This article reviews the management of hip fractures focussing on prevention and treatment. The aim of the review is to help the GP address risk factors for hip fracture, understand what happens to their patients while in the hospital 'black box', and to care for their patients postfracture.

DISCUSSION

General practitioners have a key role in preventing hip fracture and optimising the ongoing care of patients who have suffered a fracture.

Hip fracture is a common injury of the elderly with enormous consequences for both the individual and the community. Australian audit data suggests that mortality is quadrupled after a hip fracture. One year after hip fracture less than one-quarter of survivors feel that they can walk as well as before the fracture.¹ The risk of suffering a hip fracture rises exponentially with age, with 75% of hip fractures occurring in women (reflecting female longevity and the higher prevalence of osteoporosis in women). The 'greying' of our population is estimated to almost double the overall incidence of this injury in the next 20 years if effective preventive strategies are not instituted.²

Anatomy of hip fracture

Anatomy of the proximal femur is shown in *Figure 1*. There are three categories of proximal femoral (hip) fracture:

- femoral neck (45%) – between the femoral head and the trochanters
- intertrochanteric (45%) – between the greater and lesser trochanters, and
- subtrochanteric (10%) – inferior to the trochanters.

Femoral neck fractures are intracapsular and can disrupt femoral head blood supply leading to poor healing. Intertrochanteric fractures

are in a well vascularised area but malunion with leg shortening is possible. The Garden classification distinguishes nondisplaced (Garden I and II) from displaced fractures (Garden III and IV) (*Figure 2, 3*).

Prevention of hip fracture

The majority of hip fractures occur in osteoporotic persons who fall. The occurrence of a minimal trauma fracture, in the absence of another cause of pathologic fracture (eg. myeloma) is highly suggestive of the diagnosis of osteoporosis. Bone densitometry measurement, using dual energy X-ray absorptiometry (DEXA) assists in the diagnosis of osteoporosis and monitoring the response to treatment. The t-score represents the number of standard deviations the measured bone density is from normal young mean bone density, while the z-score indicates the number of standard deviations the measured bone density varies from an age matched mean value. A t-score less than 2.5 is consistent with the diagnosis of osteoporosis. Each standard deviation reduction in bone density is associated with an approximate doubling of the risk of hip fracture.³ Bone densitometry is occasionally difficult to interpret. For example, vertebral degenerative changes can elevate



Figure 1. Anatomy of the proximal femur
A = acetabulum, FH = femoral head, FN = femoral neck, F = femur,
G = greater trochanter, L = lesser trochanter

spinal bone density results. Alternatives to DEXA are available (eg. heel ultrasound), but DEXA remains the most validated and widely used technique.

Medicare rebates bone densitometry to investigate minimal trauma fracture and in patients with defined risk factors for osteoporosis such as hypogonadism, prolonged glucocorticoid therapy, thyrotoxicosis or rheumatoid arthritis. It is therefore important to consider the possibility of asymptomatic fractures such as vertebral crush fractures, especially if the patient reports loss of height or appears kyphotic. The elderly patient may also forget a history of fracture, unless prompted.

General practitioners can help prevent hip fractures by addressing each of the following areas:

- increasing bone density
- decreasing falls risk, and
- reducing the impact of falls.

Multidisciplinary fracture prevention and falls clinics are provided by some aged care services and facilitate holistic assessment by both medical and allied health professionals. Timely referral to aged care assessment services assists in ensuring appropriate fracture prevention strategies are in place.

Increasing bone density

General nonpharmacological measures

such as exercise, adequate sun exposure and adequate dietary calcium intake should be considered for all patients at risk of hip fracture. Physical activity is encouraged, both to maintain bone mass and improve coordination and strength, and thus decrease falls risk. A study of a large cohort of postmenopausal women demonstrated a linear reduction in the incidence of hip fractures with increasing duration and intensity of exercise.⁴ Patients should be encouraged to cease smoking for many reasons. It is also

possible, but controversial, that smoking is an independent risk factor for osteoporosis.⁵ Low body weight is a risk factor for hip fracture and inadequate nutritional status should be explored.⁵

Vitamin D deficiency is common among people who are housebound and living in residential care facilities.³ This relates to reduced sunlight exposure and frailer skin resulting in less cutaneous conversion of 7-dehydrocholesterol to vitamin D3 (cholecalciferol). Levels can be assayed routinely. There is good evidence that vitamin D and calcium supplementation can increase bone density and reduce the incidence of fractures in elderly people at high risk of vitamin D deficiency, such as those living in residential care facilities.^{6,7}

Bisphosphonates decrease bone turnover by inhibiting osteoclast activity. They are currently only available on the Pharmaceutical Benefits Scheme for patients with osteoporosis who have had radiologically demonstrated fracture incurred with minimal trauma. Both risedronate and alendronate reduce the incidence of hip fracture in postmenopausal women with osteoporosis.³ Patients need to remain upright while taking the medication and for 30 minutes subsequently to try and reduce the risk of oesophagitis. Disodium pamidronate and the potent new bisphosphonate, zoledronic acid

(which can be given by annual intravenous dosing), are used 'off label' in some specialised centres to treat those unable to take oral bisphosphonates.

Alternative therapies include selective oestrogen receptor modulators (raloxifene) and hormone therapy (HT). Current data supports a role for raloxifene in the prevention of vertebral fractures.⁸ Hormone therapy is uncommonly used due to frequent side effects and concern regarding long term safety. The parathyroid hormone analogue teriparatide is an exciting new treatment that will probably be aimed at patients with severe osteoporosis. Enthusiasm for the use of the new agent is tempered by the need for daily subcutaneous injections and concerns regarding safety.⁹

Decreasing falls risk

Ninety percent of femoral fractures in the elderly are preceded by a fall.¹ Table 1 lists risk factors for falls, some of which are modifiable. A 10–30% falls risk reduction has been achieved with programs that are multifactorial, address home hazard reduction, decrease the use of psychotropic medicines, or use tailored exercise interventions.¹⁰

Home hazard modification, including simple measures such as rails and nonslip mats, should be discussed with the patient and their



Figure 2. Undisplaced fracture of the left hip



Figure 3. Displaced fracture of the left hip

family. Shoes should have low heels and nonslip soles. Unifocal lenses should be recommended for people who wear spectacles.¹¹ Use of psychotropic medications and polypharmacy are associated with falls risk.¹² In many cases, the risks of long term psychotropic medications may outweigh their benefits.

The view that it is too late to change lifestyle once elderly is not supported by the evidence,¹³ and improving a person's mobility can be a significant factor in improving their quality of life. A physiotherapist experienced in falls prevention is the best prescriber of an exercise program for those at increased risk of falls, as there is some concern that an unsupervised program may increase falls risk in the vulnerable.¹⁴

Reducing the impact of falls

Hip protectors are shields approximately 20 x 10 cm in dimension (Figure 4). Two are worn in lateral pockets of specially designed undergarments. They absorb shock and distribute the impact of a fall to the soft tissues surrounding the bone. Compliance is poor due to cost, comfort, toileting issues, and aesthetics.

Diagnosis

The classic presentation of hip fracture is with

a shortened externally rotated leg after a fall. Initial investigation of the patient with new hip pain is with plain radiograph. If a fracture is suspected clinically and is not evident on plain film, magnetic resonance imaging (MRI) will confirm whether a fracture is present. More than 48 hours after suspected fracture, a bone scan is an alternative.¹⁶

In hospital care

Preoperative care

Pain and dehydration are common pre-operative problems. Pain is managed either systemically with analgesics or regionally with a femoral nerve block. Dehydration is often predominantly from blood loss into the fracture site. In addition, the elderly patient living alone may not receive help until some time after a fall, or may have poor fluid intake as a result. Indwelling catheters are avoided as these are thought to predispose to delirium and sepsis. Antibiotics, pressure gradient stockings and low molecular weight heparin (or aspirin) are routinely used as prophylaxis against infection and thromboembolism.

Surgical care

Very few patients do not undergo surgery. Nonoperative management will occasionally be considered, usually for patients at exceptionally high risk with anaesthesia. Early surgery is recommended (within 24 hours) as these patients will often be at high risk of complications when immobilised.¹⁷

Displaced femoral neck fractures (Garden III and IV) are associated with poorer healing, as are fractures in frail patients. Nondisplaced femoral neck fractures and intertrochanteric fractures tend to require less intervention for a good prognosis. Therefore, internal fixation with screws is often used to treat intertrochanteric fractures and femoral neck fractures in patients less than 70 years of age. Hemiarthroplasty, where the femoral head is replaced by a prosthetic head but the

Table 1. Falls risk factors

Previous falls
Polypharmacy
Cognitive impairment or depression
Impaired vision and hearing
Gait deficit
Use of assistive device or impairment in the activities of daily living function
Arthritis and mechanical foot problems
Impaired balance
Muscle weakness
Incontinence
Unfavourable environment

acetabulum remains untouched, is used for femoral head fractures in the more elderly, or in cases with displacement. If arthritis has damaged the acetabulum, a total hip replacement may be preferred.¹⁶

Anaesthetic care

Anaesthesia may be either by general or regional anaesthesia. Some studies have shown a decreased short term mortality with regional anaesthesia but their relevance to current anaesthetic practice is uncertain.¹⁸

Postoperative care

Patients are usually mobilised within the first 24 hours of a hip fracture repair if a check X-ray is satisfactory. Early mobilisation is thought to be important both to prevent complications and maximise successful rehabilitation.

Delirium is a common complication when an elderly person suffers a fractured neck of

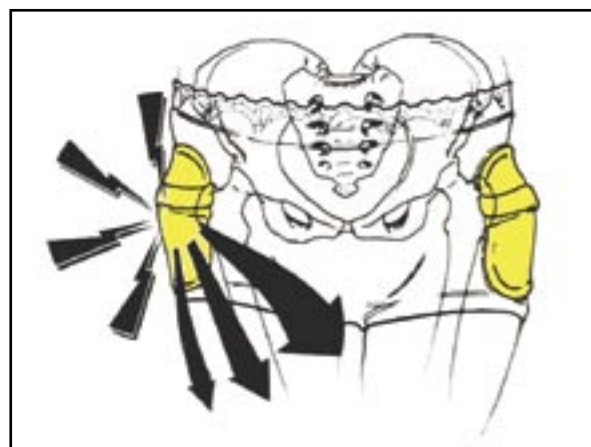


Figure 4. Hip protectors

femur, with up to half of patients becoming confused postoperatively.¹⁹ Delirium in hip fracture patients is usually multifactorial in aetiology. Elderly patients with cognitive or functional impairments and multiple comorbidities are particularly at risk. There is evidence that the prevalence of delirium may be reduced with early geriatric consultation and structured multidisciplinary intervention programs.²⁰ There is some concern over long term cognitive decline after general anaesthesia, but there is currently no strong evidence to support this.²¹

Rehabilitation and ongoing care

Most patients will require significant rehabilitation after a hip fracture. Early discharge is pursued in many centres, which depending on available outreach services, may transfer some of the burden of care to GPs and community services. The need for analgesia, side effects of analgesia such as constipation, wound infection, and postoperative complications such as deep venous thrombosis could potentially prompt presentation to the GP.

The risk of subsequent fracture is increased above baseline once a patient has suffered a fractured hip. Postoperatively it is important to address ongoing risk factors for falls and fracture.

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