Falls in older people: causes and prevention

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Falls are common in older people and can result in considerable morbidity

Approximately one-third of people aged over 65 years fall each year.[1] Half of all ACC claims and costs in this age group are the result of falls.[2] People aged in their nineties are particularly at risk of falling, lying for long periods afterwards and subsequently being admitted to hospital.[3]

Of those people aged over 65 years that fall:[2]

- 22–60% suffer injuries
- 10–15% suffer serious injuries
- 2–6% suffer fractures
- 0.2–5% suffer hip fractures

Falls resulting in fractures are more common in residential care and hospitals, with about 10–20% of falls leading to a fracture.[4]

Key concepts:

- Falls are common in older people and can result in considerable morbidity
- Enquire about whether older people have fallen in the last year
- Management is guided by the cause of the fall
- Interventions to prevent falls include strength or balance training, medication review, vitamin D supplementation, vision assessment and correction and home hazard assessment and modification

Why do older people fall?

Causes of falls in older people are often multifactorial.

Risk factors for falls include:[1]

- Lower limb weakness
- History of falls
- Gait or balance disorders
- Functional and cognitive impairment
- Visual deficits
- Depression
- Polypharmacy

Polypharmacy (i.e. the use of four or more medicines) increases the risk of falls, particularly the use of sedatives, antidepressants, antihypertensives, antiarrhythmics, anticonvulsants and diuretics.[2]

Environmental hazards (e.g. poor lighting, loose carpets, and lack of bathroom safety equipment), dizziness, vertigo, drop attacks, postural hypotension and syncope can also lead to falls.[5]

Older people should be asked whether they have fallen in the last year

If a fall has not resulted in an injury requiring medical attention, the patient may never think to disclose this information. Enquiring about whether older people have fallen in the last year is a useful screening tool.

Exclude acute causes of falls

If an older person reports a fall has occurred, it can be a marker of underlying acute illness. Obtain a description of the circumstances in which the fall occurred e.g. a stumble or trip and any symptoms associated with it such as light-headedness or chest pain. Consider possible underlying medical problems. This can help work out what happened and whether the fall was "hot", associated with a medical event, or "cold", more likely due to multiple less acute factors.[6]

Some older people who fall will be anaemic from acute or chronic blood loss, have had a myocardial infarction (MI), have influenza, have a urinary tract infection (UTI) or be

constipated. Acute illness can be masked in older people and falls are an important marker of underlying disease states. The aim is to address any acute medical condition and then select the most successful strategy to prevent a future fall.[4]

Also consider the presence of possible risk factors for falling and how often the person has fallen.

Assess balance, gait and blood pressure

Balance and gait can be examined using the "Get Up and Go" test. Ask the patient to stand up from a chair, walk three metres, turn around, walk back and sit down.[7] Observe the patient, looking for unsteadiness and difficulties performing the test, which will indicate the need for further assessment. Timing the test increases sensitivity.[1] Patients who take longer than 30 seconds to perform the test are likely to have impaired mobility and are at high risk of falling.

Examine power to identify specific problems distinct from generalised mild weakness and frailty associated with disuse and ageing. Arthritis is a common risk factor for falls and if present, management of a painful joint and associated muscle weakness should be addressed.

Measure sitting and standing blood pressure to exclude postural hypotension.[4]

Target fall prevention interventions to individuals

Interventions to prevent falls include:[8]

- Strength or balance training, specifically the Otago Exercise Programme and Tai Chi
- Medications review, particularly aiming to reduce psychotropic medications
- Vitamin D supplementation for everyone in residential care and those in the community at high risk of vitamin D deficiency e.g. low level of sun exposure
- Vision assessment and correction
- Home hazard assessment and modification

Interventions that are targeted to individual risk factors are generally more effective than those applied as a "standard package".[9]

Strength and balance training

Older people often have a dramatic loss of muscle strength. Some of this loss may be attributed to normal ageing however some is due to decreasing physical activity. This loss of lower limb strength increases the risk of falling.[10] A reduction in balance control may also occur due to various age-related sensory and motor changes, further increasing the risk of falling.[10]

Exercise programmes that target lower limb strength and balance reduce the rate and number of people falling. Exercising in supervised groups, participating in Tai Chi, and carrying out individually prescribed exercise programmes at home are all effective.[8]

Tai Chi, which contains elements of strength and balance training is effective but may be less suitable for frail older people at high risk for falls.[9] The evidence is strongest for balance retraining.[1] ACC funds Tai Chi classes for older people throughout New Zealand.

For information about ACC funded Tai Chi classes visit: **www.acc.co.nz** and enter **"tai chi nz"** in the website search box.

The Otago Exercise Programme (OEP) is delivered by a physiotherapist or nurse trained in its use and consists of a series of leg strengthening and balance retraining exercises that get progressively more difficult as the person gets stronger. This is also combined with a walking plan.[2] The OEP has been shown to reduce falls and fall

related injuries by about one-third in older people living in the community.[10] There are providers of this programme throughout New Zealand. ACC no longer funds the OEP for new participants, however the programme is still available through alternative funding sources in some areas. Patients may require a referral.

Review medications

Medication is a modifiable risk factor for falls.[7] Drugs which have adverse effects that can contribute to falling (e.g. drowsiness, decreased postural reflexes, extrapyramidal symptoms) are potentially inappropriate for older people. Polypharmacy and age related changes in drug metabolism can increase the frequency and severity of these adverse effects.[11]

A recent meta-analysis found that antidepressants increased the risk of falling.[12, 13, 14] Other psychotropic drugs were also associated with increased risk including benzodiazepines, other sedatives, hypnotics and antipsychotics. Quetiapine is an antipsychotic with significant hypnotic, sedative and hypotensive effects. With respect to falls risk, quetiapine is not a safer alternative to other psychotropic drugs (also see page 30). The concomitant use of several CNS drugs should be avoided.[13]

Older people may require antidepressants and other psychotropic drugs for specific indications, but their use should be reviewed regularly. Withdrawing psychotropic medications has been shown to reduce the risk of falling.[8] However many people have difficulty being withdrawn from these medicines and restart them.[1]

Sleeping medications (i.e. sedatives or hypnotics) seem to be the most difficult to stop. Gradually reducing medication and providing advice and alternative strategies to enhance sleep such as sleep compression can be effective in reducing falls.[15] Sedatives or hypnotics are often not essential and in many cases the best option is not to initiate these in older people.[16] If these medications must be used, prescribe them at the lowest effective dose for the shortest possible time, and ensure the patient knows that they are not to be used long-term.

For more information about enhancing sleep and sleep compression see "Managing insomnia" BPJ 14, June 2008.

Vitamin D supplementation

Low serum 25-hydroxyvitamin D concentrations in people aged over 65 years are associated with an increased risk of loss of muscle strength and muscle mass and hip fractures. Vitamin D supplementation may improve bone mineral density and muscle function and reduce the risk of falls.[9, 17, 18]

Vitamin D supplementation at doses of 700–1000 IU a day reduces the risk of falls however, lower doses may not.[19]

It is recommended that older people living in residential care take Vitamin D supplementation. Older people in the community who are frail, have a chronic condition or limited mobility may also benefit from Vitamin D supplementation.[18] The recommended dose is 2 x 50,000 IU tablets (2.5 mg) Vitamin D3 in the first month followed by 1 x 50,000 IU tablet (1.25 mg) Vitamin D3 per month thereafter.

N.B. Vitamin D3 = Cholecalciferol

Calcium is no longer recommended at high dose as a longstanding trial of high dose supplementation showed an excess of vascular events.[20, 21] Aiming to achieve a calcium intake of approximately 1 g/day seems to be a reasonable strategy for older people. This can be achieved by enhancing dietary calcium and taking no more than 500 mg of supplementary tablet based calcium.[21]

Vision assessment and referral

Older people with visual impairment are more likely to fall than those with normal sight. Poor contrast sensitivity,

altered depth perception, reduced visual fields and poor distance vision are associated with falls.[22] However there is conflicting evidence about the effect of vision assessment and correction on reducing the rate of falls. In one study, referral for ophthalmology treatment, mobility training and the use of white canes increased the rate of falls. This was possibly due to an adjustment period required to adapt to new glasses.[23] Patients who receive major changes to prescription lenses should be extremely careful while adjusting to them.[22]

Wearers of multifocal glasses are at increased risk of falls because, when objects on the ground are viewed through the lower segment of multifocal glasses, vision can be blurred and depth perception can be impaired.[24]

Falls are reduced in people who have their first cataract surgically corrected.[8]

Home hazard assessment and modification

Home assessment and modification reduces the risk of falls, particularly for those discharged from hospital and for those with a history of falling.[25] This is best provided by an experienced occupational therapist who can organise modifications through publicly funded services. These can be as extensive as new stairs or as simple as mat removal and installation of rails. Home hazard assessment and modification is available via referral through older people's services at all DHBs. A limited number of occupational therapists offer this service privately.

Cardiac pacemaker

Insertion of a pacemaker reduces falls in people with frequent falls associated with carotid sinus hypersensitivity. This condition is rare and difficult to detect accurately, requiring 24 hour Holter monitoring, tilt table assessment and carotid massage under controlled conditions. If carotid sinus hypersensitivity is suspected refer to a falls or cardiology service for diagnosis and management.

Acute management of an older person who has fallen

Management of a fall depends on the type of fall. Falls can be categorised into four groups:

1. Falls contributed to by **external factors** account for about 20% of falls. These factors include wet floors, ice, ladders, unseen objects or poor lighting.
2. Falls from **loss of consciousness** account for about 5% of falls. They are not usually categorised as an accidental fall but are defined by the cause of the fall. The most common causes are myocardial ischaemia or infarct (MI), aortic stenosis, hypotension, arrhythmia, syncope and epileptic seizure.
3. Falls associated with **acute illness** are known as **hot falls**. Serious illness can present non-specifically in people aged over 75 years, and a fall may be the first sign of this. Common causes of hot falls include gastrointestinal bleed, silent MI, stroke, infection, delirium, dehydration, medication toxicity or interaction and faecal impaction.
4. Falls that occur in the **absence of serious illness or loss of consciousness** are known as **cold falls**. While cold falls may involve an external cause, it is usually very hard to find a distinct cause for them. Falls prevention research often focuses on this type of fall.

To determine the type of fall that has occurred, it may be useful to ask the patient, or a witness, the following questions:

- What activities were involved when the patient fell? e.g. reaching, climbing, carrying, use of mobility aids (wheelchairs, walkers) or involvement of other people?
- Were there external factors involved? e.g. wet floors, cords, mats, ladders, furniture, doors?
- How were they feeling just before and during the fall? e.g. feeling faint, chest pain, confusion, weakness?
- What happened after the fall? e.g. could they get up, were they aware of their surroundings?

Also consider the presence of medical conditions that predispose to falls and medications used. Ask about the person's fear of falling and the effect this is having on functional ability.

Physical examination includes the assessment of:

- Vision
- Gait and balance
- Lower leg strength
- Neurological system, especially proprioception, coordination and mental status
- Cardiovascular system, especially heart rate, rhythm and murmurs, sitting and standing blood pressure

Management

Management of falls contributed to by external factors involves treating any injury, and depending on the type of external factor, arranging for completion of a home hazard assessment.

Falls due to loss of consciousness are acute medical emergencies and need more in-depth assessment. Once the condition causing the fall has been identified, it will require specific management strategies.

Falls due to acute illness (hot falls) require clinical evaluation to ensure there is no serious acute threat to health. If you suspect the patient to be unwell or not at their baseline functional status, then following a history and physical examination, suggested investigations include CBC, electrolytes, creatinine and blood glucose, MSU for culture, ECG if silent ischemia is suspected and chest x-ray (if short of breath or cough which might suggest pneumonia or congestive heart failure).

Management of a hot fall focuses on treatment of underlying illness followed by implementation of falls prevention strategies.

Management of cold falls relies on implementation of falls prevention strategies.

Discuss with patients the suitability of a medical alarm and an emergency strategy if a fall should take place e.g. call for help, keep warm, move to a soft surface, find something to pull themselves up with.

Interventions for older people in hospitals and residential care

Prescription of vitamin D reduces falls. All people in residential care should be taking vitamin D3, 50,000 IU monthly. Review of medications may also reduce falls. There is no evidence that other interventions targeting single risk factors, including exercise, reduce falls in people in residential care.

Interventions targeting multiple risk factors are not clearly effective for patients in residential care. Several successful trials in Europe have included strength and balance retraining, medical and medication review, environmental checks and staff education.[26, 27] However further research is needed in New Zealand before these measures are widely recommended. Trials of interventions that are of low level intensity and seemingly sensible have not been successful in reducing falls in New Zealand residential care.[28, 29]

Dementia and falling

People with dementia are at increased risk of falling compared to those without cognitive impairment.[30] Interventions to reduce falls should be the same for people with dementia, as for other older people, taking into account cognitive impairment.[30] However reducing falls in those with dementia is difficult and interventions that would have been expected to be successful have failed to reduce falls in this population.[31]

Some points to consider include:

Medication review. People with dementia may require drug therapy to treat depression or psychosis and these drugs often affect balance, gait and cognition and increase the risk of falls. While there are times when these medicines are necessary, consideration should be given to managing the patient in other ways initially, such as managing physical symptoms (e.g. pain, hunger) and environmental problems (e.g. noise, boredom). When drugs are used they should be reviewed regularly and used for the shortest time possible.[30]

Physical restraints. There is evidence to show that physical restraints do not reduce falls and may in fact increase the rate of injurious falls.[30] Managing difficult behaviours associated with dementia should be addressed with environmental and patient centred strategies (e.g. behaviour charts to identify triggers, increasing participation in activities, increased physical activity, staff education) rather than restraints.

ACKNOWLEDGMENT Thank you to **Professor Ngaire Kerse**, Department of General Practice and Primary Healthcare (Gerontology), University of Auckland, for expert guidance in developing this article

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