

Falls in Older People With Dementia

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Older people with dementia are at increased risk of falls and their adverse consequences. Postural instability (impaired gait and balance), medication, environmental hazards and neurocardiovascular instability, in particular orthostatic hypotension, are commonly identified as risk factors for falls in this patient group. It is possible to modify risk factors for falls in older people with dementia. However, to date it has not been possible to demonstrate conclusively that intervention can prevent falls in patients with dementia.

Key words: accidental falls, dementia, cognitive impairment, postural instability, neurocardiovascular instability (syncope).

Introduction

Falls are an important cause of morbidity and mortality in older people with dementia, which in the Western World has a prevalence of approximately 5% in those aged over 65 years and 15% in those aged over 80. However, in comparison with the extensive research base in cognitively intact older persons, relatively little is known about the etiology of falls in older people with dementia or how to prevent them. This article outlines the epidemiology of falls in older people with dementia, discusses possible causes of falls and considers the available evidence on prevention of falls in this patient group.

Epidemiology of Falls in Older People With Dementia

The annual incidence of falls in older people with dementia is around 70–80%,^{1,2} approximately twice the incidence of falls in cognitively intact older people.³ Older people with dementia also have an approximately three times increased risk of sustaining a fracture,^{2,3} and among these fractures they have an additional three times greater risk of sustaining a fractured neck of femur.^{2,3} Fractured neck of femur is associated with particularly poor outcomes in patients with dementia;² in a nursing home population, residents with dementia who fractured their neck of femur had a 50% excess mortality at one year.² Fallers with dementia are approximately five times more likely to

be institutionalized than older people with dementia who do not fall.⁴

Etiology of Falls in Older People With Dementia

Risk factors for falls in older people with dementia can be divided into those which are shared with cognitively intact older people and have particular relevance in older people with dementia, and those which are specific to older people with cognitive impairment and dementia (Table 1).

Postural Instability (Impairment of Gait and Balance)

Although impairment of gait and balance occurs with normal aging, older people

with dementia have more marked impairments^{5,6} (Table 2). For example, older people with dementia are slower to mobilize, take more steps over a defined distance and have a greater sway path than age- and sex-matched controls.^{5,6} Some of these impairments are likely to be caused by peripheral conditions such as visual impairment or due to medication side effects (see below). However, evidence suggests that central impairment of information management due to the dementia process itself may be an important contributor to postural instability in older people with dementia.⁷

As in cognitively intact older people, impairments of gait and balance are associated with increased risk of falls in older people with dementia.^{8,9} Patients with dementia who have a gait abnormality are approximately three times more likely to fall than those with a normal gait.^{8,9} Abnormal balance is associated with a similar increase in fall risk.⁸

Medication

Most classes of psychotropic medication (e.g., antipsychotics, antidepressants, anxiolytics and sedatives/hypnotics) have been associated with a small but consistent increased risk of falls.¹⁰ Specifically in older people with dementia,

Table 1

Risk Factors for Falls in Older People with Dementia

Risk factors shared with cognitively intact older people, with particular relevance in older people with dementia	Risk factors specific to older people with cognitive impairment and dementia
Postural instability (impairment of gait and balance)	Wandering
Medication—particularly psychotropics	Agitation
Neurocardiovascular instability (orthostatic hypotension)	Perceptual difficulties
Environmental fall hazards	
Visual impairment	

Table 2

Gait and Balance Impairments in Older People with Dementia^{5,6}

Gait impairments in older people with dementia*	Balance impairments in older people with dementia*
Slower walking speed	Increased double support time
Reduced step frequency	Increased sway path
Shorter step length	Increased unsteadiness
Increased postural flexion	Impaired one/two leg balance, eyes open/closed

*Compared with age- and sex-matched controls/corrected for age and sex.

these medications have been associated with a doubling of fall risk in nursing home residents, accounting for up to one-third of the attributable risk.¹¹ Psychotropic drugs increase risk of falls through effects on balance, reaction time and other sensorimotor functions, as well as possibly via the side effects of orthostatic hypotension (see below) and extrapyramidal symptoms.

It is unlikely that there is a specific interaction between psychotropic medications and dementia. The particular significance of these medications in dementia is their increased prescription. Psychotropic medication was prescribed in 63% of nursing home patients with dementia,¹¹ compared with 4% of community-dwelling cognitively normal older people³ in similar years in the U.S.

Older people with dementia also are susceptible to the same increased fall risk with cardiovascular medications as their cognitively normal counterparts.¹⁰

Neurocardiovascular Instability

Neurocardiovascular instability refers to impaired cardiovascular regulation detected clinically as orthostatic hypotension, vasovagal syncope or carotid sinus hypersensitivity.¹² Of these diagnoses, orthostatic hypotension (Table 3; see article, page 32) is a common contributor to the increased risk of falls in patients with dementia.

The prevalence of orthostatic hypotension in older people with

dementia is around 40%,^{13,14} well above the expected prevalence in those aged over 80 (approximately 25%).¹³ Some studies have found this increased prevalence to be independent of medication,^{12,14} suggesting that central autonomic dysfunction contributes to orthostatic hypotension in older people with dementia.¹⁵

One of the most common presentations of orthostatic hypotension is as a fall.¹⁶ Several studies have identified hypotension or orthostatic hypotension as a risk factor for falls specifically in patients with dementia.^{11,14}

Environmental Fall Hazards

Studies frequently identify environmental hazards in the homes of older people who fall. However, the majority of studies find no association between the pres-

ence of environmental fall hazards and risk of falling. The limited research specifically in older people with dementia reaches similar conclusions.¹⁷ The interaction between the person and their environment may be the important factor. An association between environmental hazards interfering with the performance of activities of daily living and risk of falling has been identified.¹⁸

Visual Impairment

A number of studies in older people both with⁸ and without dementia have identified visual impairment as a risk factor for falls. In addition to visual acuity, contrast sensitivity and depth perception also are important. Increased reliance on slow visual reflexes to control posture is also thought to contribute to the greater risk of falls with increasing age.

Wandering, Agitation and Perceptual Difficulties

Wandering and agitation both have been associated with increased risk of falls in older people with dementia.^{2,19} However, care must be taken when interpreting these data, as patients with dementia who have behavioural problems are more likely to be prescribed psychotropic medication, a known independent risk factor for falls. Perceptual deficits such as lack of visuospatial awareness or lack of fear have been postulated as risk factors for falls in patients with dementia, although no definite association has been identified.

Table 3

Definition of Orthostatic Hypotension

Drop in systolic blood pressure of ≥ 20 mmHg on standing, <i>or</i>
Drop in diastolic blood pressure of ≥ 10 mmHg on standing, <i>or</i>
Drop in systolic blood pressure to 90 mmHg or less on standing.
Readings should be taken in first two or three minutes of standing after 10 minutes of supine rest.
Morning measurements are more reproducible.
Continuous monitoring (e.g., Portapres) is more likely to make the diagnosis.
Diagnosis also can be made using Head-up Tilt Testing.

Variation with Type of Dementia

Some evidence suggests that patients with vascular dementia or with Lewy body disease may be at greater risk for falls than those with Alzheimer disease.^{20,21} Patients with vascular dementia have more marked gait abnormalities compared with both healthy controls and patients with Alzheimer disease, including significantly slower velocity and shorter step length.²¹ Repeated unexplained falls are significantly more common in patients with neuropathologically confirmed Lewy body dementia compared to those with Alzheimer disease,²⁰ a trend that has yet to be explained.

Multifactorial Etiology of Falls in Older People With Dementia

It is likely that most falls in older people with dementia have a multifactorial etiology. In a recent study looking only at risk factors in common with older people who do not have dementia, a median of four risk factors for falls was identified in each cognitively impaired older subject.¹ The most commonly identified risk factors were postural instability (impairment of gait and balance; 99%), environmental hazards (80%), medication (70%) and neurocardiovascular instability (60%), in particular orthostatic hypotension (40%).¹

Prevention

Many studies have shown it is possible to prevent falls in older people who do not have dementia. The majority have been conducted in the community and successful interventions have included exercise alone, multifactorial intervention (physiotherapy, occupational therapy, review of medication, treatment of orthostatic hypotension), environmental modification after hospital discharge and withdrawal of psychotropic medications. The evidence that falls can be prevented in older people with dementia is much less robust.

Influence of Interventions on Risk Factors for Falls: Evidence

Intervention in older people with dementia can influence known risk factors for falls. Physical training in older people

with moderate dementia (mean Mini Mental State Examination [MMSE] score of 16) and a history of falls has been shown to significantly improve postural instability, flexibility, mobility and walking speed on a within-group (but not between-group) comparison.²² Multifactorial intervention in a group of patients with dementia (median MMSE score of 13) who attended an accident and emergency facility after having fallen resulted in significant between-group differences in change from baseline of gait impairment, environmental risk factors for falls and neurocardiovascular instability (cardioinhibitory carotid sinus hypersensitivity).¹

Successful Prevention of Falls: Studies Including Older People With Dementia

A few successful fall prevention studies have included older people with dementia. The first of these was conducted in nursing home residents, a third of whom had dementia.²³ Participants were randomized to receive multifactorial intervention (modification of environmental hazards, psychotropic medication, impaired gait and transfers and orthostatic hypotension) or usual care. There was a significant reduction in recurrent falls, but sub-group analysis found that benefit was restricted to those who complied with intervention. It is likely that those with dementia were under-represented in this group.

A recent randomized controlled trial of exercise, education and environmental modification in nursing home residents showed success in reducing fall risk, with significantly fewer falls and fallers in the intervention group.²⁴ Of all the participants, 50% had cognitive impairment, although no definition of cognitive impairment or prevalence of dementia was reported.

RCTs of Fall Prevention in Older People with Dementia

This year the first randomized controlled fall prevention trial comprising only older people with cognitive impairment and dementia was published.¹ Partici-

pants were recruited from patients with cognitive impairment and dementia who attended an accident and emergency facility with a fall. The median MMSE score was 13, and 90% of participants met criteria for dementia. They were randomized to receive multidisciplinary assessment and intervention (physiotherapy, environmental hazard reduction, medical review including review of medication and vision, and cardiovascular interventions including treatment of orthostatic hypotension and carotid sinus hypersensitivity), or usual care. Intervention did not reduce falls, fractures, accident and emergency attendance, hospital admission or mortality.¹

Practical Approach to the Management of Falls in Older People With Dementia

In the absence of clear evidence on how to prevent falls in older people with dementia, a pragmatic approach is required. Some recommendations, made on the basis of my clinical experience and participation in the first randomized controlled trial in dementia patients,¹ are as follows:

1. The investigations and interventions that people with even quite severe dementia are able to co-operate with is often surprising.
2. It is important to consider a broad range of causes of falls. The history is usually unreliable and a witness account often unavailable.
3. Stopping medication is easier than commonly assumed and often worthwhile. Patients with dementia may have been prescribed psychotropics during an acute problem and there is potential for them to be stopped. Worsening dementia is associated with hypotension,²⁵ and the need for previously prescribed antihypertensives also should be reviewed. If the patient has become less mobile, previously prescribed anti-anginals may not be required.
4. Orthostatic hypotension is a common risk factor for falls in older people with dementia. It is relatively easily assessed and has potential for treatment.²⁶ If

possible, measurement should be by continuous monitoring with equipment such as a Portapres, a noninvasive blood pressure monitor that continuously measures the arterial blood pressure in the finger. Almost all patients will be able to co-operate with this method.²⁷

5. (Selected) patients with dementia should be referred for physiotherapy—some are able to benefit.
6. Small interventions, such as a change in walking aid or footwear, can make a large improvement in mobility.
7. Fracture prevention (medication or hip protectors) should always be considered.

Future Directions

Falls remain a major problem for older people with dementia. We have some idea of possible etiology, but effective fall prevention strategies still need to be found. It is important that research into prevention of falls in older people with dementia is made a priority. ♦

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