Postural hypotension and falls

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Falls

Falls are the most common cause of accidents in older people.¹ Accidents at home account for 37% of fatal accidents and of these 57% occur in people of 75 years and above.² In the *Health of the Nation*, the Government propose a target reduction of 33% for fatal accidents in the elderly by the year 2005. The medical workload from accidents and the numbers of unreported accidents in older people are much higher than previously recognised.³ Although the proportion of falls which result in a serious injury is low, the absolute number of older people who suffer fractures is high, and places a heavy demand on both the health and social services. Even falls which result in only minimal physical injury can have significant psychological and social consequences.

Older people fall for many reasons and often with disastrous consequences; a serious injury may signal the end of that older person's independent lifestyle. Illnesses, impairment of the special senses, adverse reactions to drugs and environmental hazards may all contribute. These causes require thorough and skilled detection and assessment followed by proper treatment and preventive measures. In one study, 51% of falls in women over 65 years were associated with environmental factors and the frequency of intrinsic factors increased from 13% in women aged 65–69 years to 43% in those over 85 years.⁴ Studies have demonstrated that the main intrinsic factors are poor balance and muscular weakness.⁵ Muscular weakness in the elderly can be improved by a physical education programme which has also been shown to help balance.⁶

Trials that have looked at the effect of health promotion on the incidence of fractures and accidents in the elderly have produced conflicting results. A study from Oregon randomly selected an intervention group of elderly people who were advised on the removal of hazards from their own homes and given education on health at four group sessions, including advice on exercise, diet, drug safety, and fall prevention.⁷ A reduction of falls and hospitalisation rates were seen in the intervention group. In contrast, a study from Cardiff has shown no effect on fracture rates in an elderly general practice population with a risk of accidents who were targeted for health education, treatment of medical conditions and removal of environmental hazards.⁸ The authors suggest that the health visitors carrying out the study may have increased the risks of accidents by encouraging the elderly, frail, people to be more active. These studies probably show that health intervention has an effect but that current interventions are too little and too late.⁹ The younger elderly need to be encouraged to exercise more and have greater awareness of environmental hazards. More use could be made of existing hazard lists.¹⁰

A study from the Age Concern Institute of Gerontology, King's College, London investigated existing practice and promising innovations of assessment and management in six metropolitan districts in England.⁷ Consultants, senior nurses and other health care workers in the Accident and Emergency (A&E) department of each district and in the corresponding geriatric unit were interviewed. A&E staff perceived access to geriatric assessment in casualty to be a significant problem, and direct admission to geriatric beds to be a major problem in four districts. In two hospitals, there was a reluctance to use short-stay observation beds for elderly patients in case the beds became 'blocked'. In one unit with an integrated admissions policy for acute medical and geriatric patients, ambiguity existed over responsibility for non-medically acute elderly fallers. Geriatricians did recognise that perceived problems of access led to low rates of referral from A&E departments. The study identified a number of problems for elderly fallers: A&E departments concentrate on the treatment of injuries rather than establishing the cause of the fall; discharge planning is inadequate due to pressure of work; criteria for referral to geriatric departments is vague and follow-up and monitoring of elderly fallers after discharge from A&E is lacking. The report recommends greater involvement by geriatricians in A&E departments, the separate categorisation of 'falls' as a diagnostic group and the introduction of standard assessment procedures with increased use of short-stay

Falls and older people

- falling is a symptom and should be taken seriously
- a full diagnosis needs to be reached
- general advice on diet, fall prevention, and exercise can help in reducing further episodes
- all health districts should develop a protocol for dealing with people who fall

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assessment beds attached to casualty departments. Every district should have a protocol for dealing with elderly people who fall.

Postural hypotension in older people

Postural hypotension is present if there is a drop in systolic blood pressure of 20 mmHg or more from the supine to the standing position. Its prevalence ranges from 6% to 24%^{11–13} depending on the study population and the way the blood pressures are taken. It is positively correlated with supine systolic blood pressure, age, and inversely correlated with body mass index.^{14,15} Standing blood pressure is most commonly taken at one minute after standing and postural hypotension can normally be detected at that time in the symptomatic patients.¹⁶ Two or three minutes after standing has been used in some studies,^{17,18} however, and different people develop postural hypotension at different times.⁷ The clinical significance of asymptomatic postural hypotension is controversial.^{19–23} The diagnosis of postural hypotension should therefore be confined to those with symptoms.^{24,25} When symptoms are present they tend to fall into three groups: falls and mobility problems, mental confusion and cardiac symptoms.²⁶

AETIOLOGY

Apart from fluid balance problems, the commonest cause of postural hypotension is autonomic failure. In older people, drugs are an important cause of sympathetic dysfunction. Antihypertensives, anticholinergics, phenothiazines and benzodiazepines are the common offenders. Diabetes mellitus is a cause of autonomic dysfunction in all age groups. Dopamine β -hydroxylase deficiency is an important cause of postural hypotension as it is readily treatable with the precursor drug, L-dihydroxyphenylserine. It was thought to be a genetic disorder but recently an 80-year-old woman was reported to have the condition who had been symptom-free until the age of 60 years.²⁷

When postural hypotension is associated with neurological signs (parkinsonian, cerebellar, pyramidal), Shy-Drager syndrome and multiple system atrophy have been described. The autonomic failure is thought to be central in origin, and the prognosis of such patients is poor, most being dead at 5–7 years.²⁸ There remains a group of older people who suffer from chronic and often disabling postural hypotension, without any neurological deficit. This is classified as pure or peripheral autonomic failure. It has been suggested that there is end-organ failure of peripheral blood vessels at a precapillary level.²⁹

INVESTIGATION

Investigations can be helpful in confirming the diagnosis of postural hypotension, and to determine the site and extent of the sympathetic dysfunction. The most useful investigation is the head tilt test: the subjects rest supine on an electrically driven tilt-bed with foot support for a set period of time to achieve cardiovascular stability. They are then passively head tilted to 45° or 60°, or to standing erect. The heart rate is continuously monitored by electrocardiogram (ECG) and beat-by-beat blood pressures are measured electronically, as with Finapres.³⁰ The catecholamine levels when supine and on head tilt are measured. A single supine plasma level of catecholamines can be diagnostic of dopamine β hydroxylase deficiency: undetectable noradrenaline and adrenaline levels and raised dopamine level (normally undetectable).²⁷

Twenty-four hour ambulatory blood pressure may be helpful in determining factors that can contribute to hypotension: time of day, food and exercise. It can be used to assess supine hypertension and to evaluate the efficacy of therapy. Growth hormone response to an intravenous dose of clonidine can be used to distinguish pure (peripheral) autonomic failure from central autonomic failure (Shy-Drager syndrome, multiple system atrophy). The growth hormone level rises in response to clonidine in the former but not in the latter.³¹

MANAGEMENT

Management of symptomatic postural hypotension in older people should start with the review of medication. Information and advice on life styles which influence blood pressure can be helpful. Postural hypotension is usually more severe in the morning, mainly because of nocturnal recumbent polyuria.³² Food ingestion often aggravates postural hypotension.³³ Exposure to a warm environment, straining during micturition and defaecation, and alcohol are other aggravating factors. Patients with autonomic failure are very sensitive to changes in plasma volume and have an impaired ability to conserve sodium.³⁴ They should therefore be encouraged to maintain hydration and have an adequate sodium intake. A head-up tilt at night is probably the most useful non-pharmacological intervention.³⁵ It reduces overnight fluid loss and hence

Postural hypotension in the older person

- postural hypotension is present if the systolic blood pressure drops by 20 mmHg or more on standing
- autonomic failure is the commonest cause of acute postural hypotension in older people
- ideally blood pressure should be measured supine, 1–3 min after standing
- the prevalence of postural hypotension increases with age
- postural hypotension may be part of a more generalised problem
- treatment may be either pharmacological or mechanical

increases blood volume. Caffeine with meals may attenuate postprandial hypotension³⁶ but tolerance may occur.³⁷ Physical manoeuvres such as squatting, leg crossing, placing a foot on a chair, and bending forward, if practicable, can alleviate symptoms.³⁸

Drug treatment of symptomatic postural hypotension is difficult and the responses vary markedly between patients. The evaluation of drug trials has been hampered by small sample sizes and imprecise diagnosis. Fludrocortisone remains the drug of choice; 0.1 mg at night leads to effective vasoconstriction on standing without aggravating supine hypertension. Higher doses expand plasma volume and necessitate closer observation.³⁵ Postaglandin synthetase inhibitors (eg, indomethacin) may be beneficial in some patients³⁹ and may be added to fludrocortisone. Nasal desmopressin at night prevents nocturnal polyuria and morning hypotension which are common in people with autonomic failure.³² Because of the risk of water intoxication, it needs to be started in hospital, and plasma osmolality and sodium concentration need to be closely monitored. Subcutaneous octreotide, a somatostatin inhibitor, may be helpful in postprandial hypotension.⁴⁰

There have been reports of treatment of postural hypotension with many different drugs affecting different parts of the sympathetic system.⁴¹ They are α -adrenoceptor agonists, (eg, midrodrine), ephedrine, clonidine, vasopressors (eg, ergotamine), monoamine oxidase inhibitors, β -blocking drugs with high intrinsic sympathomimetic activity (eg, pindolol and xamoterol). Their use is limited by unpredictability of response and supine hypertension.

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