Multifactorial intervention after a fall in older people with cognitive impairment and dementia presenting to the accident and emergency department: randomised controlled trial

ELPS

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Abstract

Objective To determine the effectiveness of multifactorial intervention after a fall in older patients with cognitive impairment and dementia attending the accident and emergency department.
Design Randomised controlled trial.
Participants 274 cognitively impaired older people (aged 65 or over) presenting to accident and emergency department after a fall: 130 were randomised to assessment and intervention and 144 were randomised to assessment followed by conventional care (control group).
Setting Two accident and emergency departments, Newcastle upon Tyne.
Main outcome measures Primary outcome was number of participants who fell in year after intervention. Secondary outcomes were number of falls (corrected for diary returns), time to first fall, injury rates, fall related attendances at the accident and emergency department, fall related hospital admissions, and mortality.
Results Intention to treat analysis showed no significant difference between intervention and control groups in proportion of patients who fell during 1 year's follow up (74% (96/130) and 80% (115/144), relative risk ratio 0.92, 95% confidence interval 0.81 to 1.05). No significant differences were found between groups for secondary outcome measures.
Conclusions Multifactorial intervention was not effective in preventing falls in older people with cognitive impairment and dementia presenting to the accident and emergency department after a fall.

Introduction

Older people with cognitive impairment and dementia are at increased risk of falls, with an annual incidence of around 60% (twice that of cognitively normal older people).[1 2] They are also at increased risk of a major injury such as a fracture.[2] In the United Kingdom the national service framework for older people makes prevention of further falls in older patients who attend the accident and emergency department after a fall a priority.[3]

We aimed to determine the effectiveness of multifactorial assessment and intervention after a fall compared with conventional care in older people with cognitive impairment and dementia presenting to the accident and emergency department.

Participants and methods

We recruited older people (aged 65 or over) with cognitive impairment and dementia (mini-mental state examination score <24[4]) presenting to the accident and emergency department after a fall.[5] We excluded patients who were unable to walk, had a medical diagnosis that was a likely attributable cause of index fall (for example, cerebrovascular accident), were unfit for investigation within 4 months, were unable to communicate for reasons other than dementia, and had no major informant, defined as someone in contact with the patient at least twice a week.

Design

We conducted a prospective single centre randomised controlled trial of multifactorial assessment and intervention after a fall compared with assessment followed by conventional care. We recruited patients from two inner city accident and emergency departments, which were screened for 52 weeks.

At baseline interviews we recorded personal details, previous falls, current medical diagnoses, and research criteria for dementia.[6] The patients underwent multifactorial clinical assessment (medical, physiotherapy, occupational therapy, and cardiovascular) at baseline. Those randomised to the intervention group received intervention for all identified risk factors for falls (see bmj.com). Participants in the control group received conventional care from all health professionals who were or became involved in their management during the year's follow up.

We collected data on falls, injuries, attendance at accident and emergency department, hospital admission, and mortality prospectively for 1 year. At 3 months we repeated physiotherapy and occupational

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therapy assessments and cardiovascular tests if they were abnormal. We also assessed compliance with the multifactorial intervention at 3 months (see bmj.com).

Outcome measures

The primary outcome measure was number of participants who fell at least once in the year after intervention. Secondary outcome measures were number of falls (corrected for diary returns), time to first fall, injury rates, fall related attendance at accident and emergency department, fall related hospital admissions, and mortality.

We recorded data on falls prospectively by asking informants to complete a weekly diary in the form of a postcard. We collected additional data on injuries and hospital admission at monthly intervals from computerised records.

Statistical analysis

We estimated that at the 5% level we would require 90 patients in each group to give an 80% power of detecting a reduction of 30% (from an estimated 66%[1] to 46%) in the proportion of patients who had at least one fall. We calculated the weekly rate of falls for each patient by dividing the number of recorded falls by diary returns and used this when comparing differences in number of falls between control and intervention groups. We analysed data on an intention to treat basis.

Table 1 Risk factors for falls. Values are numbers (percentages) of patients

Risk factor for falls	Intervention group (n=130)	Control group (n=144)
Balance or gait:	129 (99)	142 (99)
Balance	129 (99)	142 (99)
Gait	122 (94)	137 (95)
Environmental fall hazards	108 (83)	118 (82)
Drugs:	96 (74)	99 (69)
Psychotropic drugs	55 (42)	53 (37)
Culprit drugs	83 (64)	88 (61)
Polypharmacy	58 (45)	52 (36)
Cardiovascular risk factor:	76/122 (62)	78/133 (59)
Orthostatic hypotension	47/122 (38)	55/133 (41)
Cardioinhibitory carotid sinus hypersensitivity	18/89 (20)	18/110 (16)
Vasodepressor carotid sinus hypersensitivity	23/89 (26)	29/110 (26)
Vasovagal syncope	7/94 (7)	4/108 (4)
Feet and footwear	37 (28)	45 (31)
Medical problem	35/123 (28)	36/134 (27)
Vision*	23/93 (25)	28/103 (27)
Depression	9/93 (10)	16/101 (16)
Cerebrovascular	15/123 (12)	9/134 (7)

*Department of Health criteria for partial sight.
Incomplete data due to lack of patient cooperation with assessment.

Table 2 Intention to treat analysis. Values are numbers (percentages) of patients unless stated otherwise

Outcome	Intervention group (n=130)	Control group (n=144)	Relative risk ratio (95% CI)
Patients falling in 1 year	96 (74)	115 (80)	0.92 (0.81 to 1.05)
Median No of falls (interquartile range)*	3 (0, 7)	3 (1, 8)	–0.02 (–0.32 to 0.09)†
Median time (weeks) to first fall (interquartile range)	11 (2, 41)	11 (2, 33)	P=0.459‡
Major injury	37 (28)	31 (21)	1.32 (0.87 to 2.00)
Fractured neck of femur	6 (5)	12 (8)	0.55 (0.21 to 1.43)
Fall related accident and emergency department attendance	52 (40)	46 (32)	1.25 (0.91 to 1.72)
Fall related hospital admission	19 (15)	19 (13)	1.11 (0.61 to 2.00)
Mortality	27 (21)	29 (20)	1.03 (0.65 to 1.64)

*Corrected for diary returns.
†Estimated mean difference (95% confidence interval).
‡Log rank test.

Results

We recruited 308 patients and report on 274; data on initial multifactorial assessment or outcome of falls (diary returns) were not obtained on 34 patients who died (n=24) or withdrew (n=10) shortly after recruitment. Overall, 88% of diaries were returned (11 095/12 542).

The baseline characteristics of the patients are shown on bmj.com. Overall, 73% (n=199) of participants cooperated with multifactorial assessment (medical 86% (236), cardiovascular 73% (201), physiotherapy 78% (214), occupational therapy 79% (216)). We identified 1011 risk factors for falls (485 in intervention group, 526 in control group); for both groups, median number 4 (interquartile range 3-5). We found no significant differences in baseline characteristics or risk factors for falls between intervention and control groups (table 1).

The intervention group had 652 falls and the control group 728 falls during the year's follow up. We found no significant differences between the intervention and control groups for any study outcomes (table 2).

Discussion

Our study is the first randomised controlled trial to evaluate multifactorial intervention to prevent falls in older patients with cognitive impairment and dementia who present to the accident and emergency department after a fall. Intention to treat analysis showed no difference between intervention and control groups for any of the outcomes we measured.

About 10% fewer patients fell in the intervention group than in the control group. As the sample size was calculated to detect a 30% difference in fall rates, similar to outcomes achieved by multifactorial intervention in cognitively normal older patients, this was not significant.[7 8] When calculating the sample size, we judged that routine clinical implementation of any positive findings would require us to show similar effectiveness of multifactorial intervention after a fall in older patients both with and without dementia.

Strengths and limitations

It is unlikely that contamination of the control group was a major factor in the negative outcome. The control and intervention patients lived in the same residential or nursing homes, and all received a comprehensive assessment of risk factors at baseline. However, although 14% of control patients had changes in drugs meeting criteria for compliance with intervention, for all other key risk factors less than 10% of control patients received intervention outwith the study. Fall rates in the control group were equivalent to the highest reported rates of nursing home populations including residents with dementia.[2 9] Poor compliance with intervention was anticipated, yet compliance with key interventions at 3 months was similar to that reported in studies where multifactorial intervention had been successful in preventing falls (see bmj.com).[8 10]

What is already known on this topic

Multifactorial intervention prevents falls in cognitively normal older people living in the community and in those who present to the accident and emergency department after a fall

Fall prevention strategies have not been tested by controlled trials in patients with cognitive impairment and dementia who fall

What this study adds

No benefit was shown from multifactorial assessment and intervention after a fall in patients with cognitive impairment and dementia presenting to the accident and emergency department

The intervention was less effective in these patients than in cognitively normal older people

Our study is limited by lack of generalisability—there was relative under-recruitment of participants from the community, and recruitment was from a specific population in a single centre. A further limitation is that effective single blinding was feasible for only the primary outcome measure (number of participants who fell) and the secondary outcome measures of number of falls and time to first fall.

Practical implications and conclusion

The recommendations for fall prevention within the national service framework for older people are broadly similar to a guideline issued in 2001 by a joint panel of the American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopaedic Surgeons.[11] Implementation of these recommendations will have considerable resource implications for the NHS in the United Kingdom. It seems appropriate, particularly in areas where effective services for falls do not yet exist, to target scarce resources where benefit is proved. Research data support multifactorial intervention in cognitively normal older people living in the community with risk factors for falls and those who present to the accident and emergency department after a fall.[7 8] Several studies also support the use of exercise as a single intervention in cognitively normal older people living in the community.[12 13] Although one randomised controlled trial of multifactorial intervention showed a reduction in recurrent falls in residents of nursing homes, most studies in this setting have been unable to prevent falls.[5 10 14]

Our study suggests that multifactorial intervention after a fall is less effective in patients with cognitive impairment and dementia than in cognitively normal older people. Limited resources may be used more effectively if targeted towards cognitively normal older people who fall. However, as older people with cognitive impairment and dementia are at particularly high risk of falls and their associated morbidity, it is important that prevention of falls remains a research priority in this patient group. Further work is required in patients with cognitive impairment and dementia who fall to determine optimal delivery of interventions and to identify the most important modifiable risk factors.

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Corrections and clarifications

Minerva
"Stibogluconate, which is used to treat cutaneous leishmaniasis of the new world, is not an arsenic based compound, as stated in the text accompanying the Minerva picture on p 1122 in the issue of 9 November; it is an antimony based compound."

Making progress with competing interests
We published an incorrect URL in this editorial by Richard Smith (14 December, pp 1375-6). The correct URL for the statement of competing interests of BMJ editors, editorial board, and group executive is http://bmj.com/aboutsite/competing_interests.shtml.

Faltering steps towards partnerships
In this article by Gavin Yamey (23 November, pp 1236-40) the initial of the author cited in reference 15 is J [not R].