Management of older patients presenting after a fall – an accident and emergency department audit

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Background. It is common for older patients to present to accident and emergency (AE) departments after a fall. Management should include assessment and treatment of the injuries and assessment and correction of underlying risk factors in order to prevent recurrent falls.

Objectives. To determine management of older patients presenting after a fall to the AE department of Groote Schuur Hospital in Cape Town, South Africa.

Method. Hospital records were reviewed for a random sample of 100 patients aged 65 years and older presenting to the AE department after a fall, between December 2001 and May 2002.

Results. The mean age of the sample was 78.6 years (range 65 - 98 years); 72% of subjects were female. History of a previous fall, and history of drug or alcohol intake, were recorded in less than 20% of cases. Blood pressure and pulse rate were recorded in approximately 90% of cases, and pulse rhythm and postural blood pressure in 2%. Examination of the musculoskeletal system was done in 86% of cases and that of other systems in less than 50%; cognitive assessment was conducted in less than 30%. Radiological investigations were performed in 89% of cases, glucose and haemoglobin in 32%, renal profile and electrocardiogram in 5%, and urinalysis in 4%. Three-quarters of the patients were referred for further management: 52% to orthopaedic surgery, 12% to other surgical subspecialties, 6% to the general medical department, and 6% to other hospitals and clinics. No referrals were made to geriatric medicine, physiotherapy or occupational therapy.

Conclusions. In managing elderly patients after a fall, the AE department focused on injuries sustained. Little effort was made to establish and manage risk factors, hence to prevent recurrent falls. Guidelines are needed for the management of such patients in AE departments.

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It is common for older patients to present to accident and emergency (AE) departments after a fall. In half of all cases the falls are recurrent.[1] The incidence of falls in community-dwelling persons aged 65 years and older is 35 - 40%.[2] The incidence of falls in nursing homes and hospitals is up to 3 times these rates.[2] Injury rates are high, with 10 - 20% of falls resulting in fracture, laceration or a need for hospital care.[2] Even where no injury is sustained, falls have psychological sequelae which may include post-fall anxiety syndrome and function-impairing fear of falling with consequent increased risk of future falls.[3]

Falls typically result from the interaction of multiple and diverse, usually correctable, risk factors and situations. Individual risk factors include cognitive impairment, visual impairment, neurological and musculoskeletal disabilities, postural hypotension, balance and gait disorders, use of medication, and presence of environmental hazards.[4] Risk of falling increases with an increase in the number of risk factors for an individual.[5] The risk of recurrent falls in community-dwelling individuals has been shown to increase from 10% to 69% as the risk factors increase from 1 to 4 or more.[2] Current management practice commonly focuses on the injury, with little attention given to identification of risk factors, functional consequences and possibilities for prevention of future falls.[1] AE departments are in a unique position to identify functional problems in older patients and to make appropriate patient referrals, yet studies have shown an underdiagnosis of remediable problems in these patients.[1]

Clinical trials have demonstrated the benefits of a structured interdisciplinary approach to the management and prevention of falls in the older population.[1] The present study set out to assess the current management of older patients presenting to the AE department of Groote Schuur Hospital (GSH) after a fall. GSH is a teaching hospital for the University of Cape Town. The hospital has specialist geriatric clinics but few patients are referred to these clinics for further management following a fall.

Objectives

The aims of the study were to assess the management of older patients presenting after a fall to the AE department of a tertiary hospital, and to assess the frequency of determination of known predisposing factors for falls.

This was accomplished by: (*i*) identifying information in hospital records to establish circumstances surrounding the fall; (*ii*) determining predisposing factors elicited from the history to establish causation of the fall; (*iii*) identifying factors elicited on

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physical examination that may have contributed to the fall and subsequent management of the factors; and (*iv*) determining referral patterns for risk-factor management and intervention.

Method

The study was a retrospective audit of the hospital's AE department records for a 6-month period (December 2001 - May 2002). Identifying information was obtained for patients aged 65 years and older presenting after a fall. A detailed folder review of 100 randomly selected patients was conducted.

Information taken from patient records included age, gender, events preceding the fall, symptoms before the fall, history of previous falls, co-morbidity, use of medication, vital signs (pulse, blood pressure, temperature, respiratory rate), investigations done (urinalysis, glucose, haemoglobin, radiological examination, electrocardiogram), and patient referral.

Outcome variables were: (*i*) the proportion of patients for whom risk factors were identified and managed; and (*ii*) the proportion of patients for whom an appropriate intervention was implemented.

Ethical approval for the study was obtained from the Research Ethics Committee of the Health Sciences Faculty of the University of Cape Town.

Data were entered onto a standard spreadsheet (Excel) and descriptive statistics were derived using Statistica Version 5.1 1998 software.

Results

The mean age of the study sample (N = 100) was 78.6 years (range 65 - 98 years). Twenty-eight patients were male and 72 female.

History

Cause of the fall, history of a previous fall, and history of drug and alcohol intake were recorded in less than 20% of cases (Table I).

Vital signs

Blood pressure and pulse rate were recorded in approximately 90% of patients, while pulse rhythm and orthostatic blood pressure were recorded in approximately 2%.

Systemic examination

Findings on examination of the musculoskeletal system were recorded in 86% of cases, while findings for the respiratory, cardiac and neurological systems were recorded in less than 50% of cases. Cognitive status was recorded in less than 30% of patients, and vision, hearing, gait and balance status less than 5%.

Investigations

Radiological tests, including head computed tomography (CT) scan, were performed in over 80% of cases. Glucose was checked in 31% of cases – 90% were glucometer readings and 10% were laboratory glucose readings. Haemoglobin was recorded in 32% of cases, of which 87.5% were haemoglobinometer readings and 12.5% were laboratory readings. Renal profile and electrocardiogram were done in 5% of the sample and urinalysis in 4%.

Table I. Descriptive statistics

	Subjects (N = 100)
Age (yrs) (mean (range))	78.6 (65 - 98)
Gender	
Female	72
Male	28
History of the fall recorded	
Cause of fall	21
History of co-morbidity	6
Current medication	23
History of alcohol intake	3
Vital signs recorded	
Pulse rate	91
Pulse rhythm	1
Blood pressure	92
Orthostatic blood pressure	2
Systemic examination recorded	
Musculoskeletal system	86
Respiratory system	51
Neurological status	38
Cardiac system	22
Cognitive/mental status	22
Gait/balance	5
Vision	1
Hearing	1
Investigations performed	
Radiological tests	89
Laboratory	
Full blood count	4
Glucose	3
Electrolytes, urea, creatinine	5
Non-laboratory	
Glucose	28
Haemoglobin	28
Electrocardiogram	5
Urinalysis	4
Referral to other services	
Orthopaedic surgery	52
Other surgical subspecialties	12
General medicine	6
Referring hospital/clinic	6
Geriatric medicine	0
Physiotherapy	0
Occupational therapy	0

Type of injury

The type of injuries sustained were recorded for all patients. Fifty-five per cent had sustained fractures, 10% lacerations, 25% bruises and 3% subdural haematomas. Nine per cent had

sustained no injuries. Thirty-six per cent of fractures involved the lower limb, of which 27% involved the femur, including neck of the femur, 16% were fractures of the upper limb, 3% shoulder dislocations, 2% fractures of the facial bones, 1% fractures of the base of the skull, and 1% vertebral fractures (Table II).

Table II. Type of fractures

Site	Percentage
Lower limb	
Pelvis	4
Neck of femur	18
Femoral shaft	9
Patella	1
Ankle	3
Foot	1
Upper limb	
Humerus	4
Ulna and radius	3
Wrist	6
Hand	3
Shoulder dislocation	3
Facial bones	2
Base of skull	1
Vertebra	1

Risk factor identification

Risk factors for the fall were determined in only 8% of cases. One patient had Parkinson's disease, 1 had had a previous stroke with residual disability, and 6 were referred to physicians for management of underlying acute co-morbidity.

Referral pattern

Seventy-five per cent of the patients were referred for further management. Of these referrals, 52% were to orthopaedic surgery and 12% to other surgical subspecialties (neurosurgery, plastic surgery, hand clinic, maxillofacial surgery, vascular and cardiothoracic surgery). Six per cent were referred to the general medical department and 6% were referred back to the referring hospital or clinic. There were no referrals to geriatric medicine, physiotherapy or occupational therapy.

Discussion

The study aimed to determine efforts made by AE medical personnel to identify high-risk patients, and referral of the latter to professionals who would implement preventive programmes to reduce the likelihood of further falls. Results show that there was little elicitation of known individual risk factors for falls in the management of such patients. Emphasis was on determination of the extent of the injuries sustained and their management thereof. This is supported by an 86% rate of recording of findings of the musculoskeletal system examination and less than 50% documentation for other systems and a predominance of referrals to surgical subspecialties, while attempts to identify underlying risk factors leading to the fall were made in only 8% of cases.

Baseline laboratory tests that should be performed in the case of an elderly person who has had a fall include full blood count, serum electrolytes, urea and creatinine, glucose, vitamin B_{12} and thyroid function. These tests were performed in less than 30% of cases. Other tests should be performed depending on the presenting history and findings on physical examination.[6] A high fracture rate of 55% recorded is noteworthy. Some studies have shown that approximately 5% of all falls result in fractures.[7-9] The high fracture rate in the present study could be attributed to the study site being a tertiary referral centre and the patients being a select population, referred to the hospital according to the severity of the sustained injury.

Assessment following a fall should include taking a history of the circumstances surrounding the fall; assessment of medication status, acute or chronic medical problems, and mobility levels; examination of vision, gait and balance and lower-extremity joint function; examination of basic neurological function, including mental status, muscle strength, lower-extremity peripheral nerve function, proprioception, reflexes, and tests of cortical, extrapyramidal and cerebellar function; and assessment of basic cardiovascular status, including heart rate and rhythm, postural pulse and blood pressure. This assessment should be performed by a physician with appropriate skills and experience, which necessitates referral to a specialist and the implementation of multifaceted fall intervention programmes.[2]

It is neither practical nor feasible for all old people who fall to undergo a detailed assessment in an AE department. However, using easily identifiable risk factors for falls, it is possible to streamline referrals to professionals who institute preventive programmes. The onus is on the AE personnel to identify those at risk of recurrent falls and to refer them appropriately. As identified in the literature, predictors of future falls include a history of one or more falls, a fall occurring indoors, inability to get up from the floor after a fall, and polypharmacy (4 or more regularly prescribed medications).[10]

Successful intervention programmes include medical and home-safety assessment and advice, changes in prescribed drugs, environmental changes, tailored exercise, training in transfer skills (e.g. from a chair to a bed) and gait, and referral of clients to relevant health care professionals according to need.[11]

Studies assessing fall intervention programmes have shown that exercise alone does not reduce the rate of falls. However, exercise is a component of several multifactorial programmes for prevention of falls and has other health benefits. Multifaceted interventions aimed at postural hypotension, gait, balance, transfers and strength, and the range of motion of lower extremities have been associated most with a reduced incidence of falls.[12,13]

A follow-up study[1] of older people presenting to an AE department after a fall found that patients who received medical and occupational therapy assessment at home with directed intervention when appropriate and referral to relevant health care professionals when necessary, showed a notable decrease in the number of falls. Four community-based studies assessing the home environment and medical problems of older persons who had fallen or who were at risk of a fall, but that did not implement an intervention programme, found no reduction in the number of falls.[12] Studies in residential settings have shown that the number of falls decreased when residents were assessed after falling, when individual treatment plans were developed, and when staff education was implemented.[14]

In most parts of Africa, including South Africa, geriatric medicine does not form part of the core curriculum at either undergraduate or postgraduate level. Medical personnel, including those who work in AE departments, are mostly unaware of the physiological changes that occur with ageing, which in part modify disease presentation in this age group. AE departments have an excessive burden of major trauma patients requiring urgent assessment and management. In such an environment and with inadequate education in the modified presentation of disease in older persons, AE personnel are likely to emphasise management of the resultant injury, as is done for younger patients.

There is an urgent need for the inclusion of geriatric medicine in undergraduate medical training. With the rapid turnover of personnel in most AE departments there is a need for a simple protocol designed by geriatricians in consultation with AE specialists. Such a protocol should form part of the orientation programme for new AE health personnel. The protocol should be easy to implement and should not add to the existing workload of AE personnel. Continuing medical education seminars for AE personnel should include topics specific to the management of disease syndromes in older patients.

Conclusion

A programme of medical and environmental assessment following a fall, with client education on risks and referrals to relevant health care professionals, can reduce the risk of future falls. A simple protocol is needed in AE departments to identify individuals at risk of future falls and to educate health personnel on the management of falls. Only when there is effective referral to preventive services within and outside a hospital, will the outcome be improved for older patients presenting after a fall.[10]

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References

1. Close J, Ellis M, Hooper R, *et al*. Prevention of falls in the elderly trial (PROFET): a randomised controlled trial. *Lancet* 1999; **353:** 93-97.
2. American Geriatrics Society, British Geriatrics Society, American Academy of Orthopaedic Surgeons Panel on Falls Prevention. Guideline for the prevention of falls in older persons. *J Am Geriatr Soc* 2001; **49:** 664-672.
3. Bell AJ, Talbot-Stern JK, Hennessy A. Characteristics and outcomes of older patients presenting to the emergency department after a fall: a retrospective analysis. *Med J Aust* 2000; **173:** 179-182.
4. Tinetti, ME, Speechley M, Ginter SF. Risk factors for falls among elderly persons living in the community. *N Engl J Med* 1988; **319:** 1701-1707.
5. Perrell KL, Nelson A, Goldman RL, *et al*. Fall risk assessment measures: An analytic review. *J Gerontol A Biol Sci Med Sci* 2001; **56A:** M761-M766.
6. Tinetti ME. Preventing falls in elderly persons. *N Engl J Med* 2003; **348:** 42-49.
7. Rivara FP, Grossman DC, Cummings P. Medical progress: Injury prevention. *N Engl J Med* 1997; **337:** 613-618.
8. Tinetti ME. Factors associated with serious injury during falls by ambulatory nursing home residents. *J Am Geriatr Soc* 1987; **35:** 644-648.
9. Gryfe CI, Amies A, Ashley MJ. A longitudinal study of falls in an elderly population. I. Incident and morbidity. *Age Ageing* 1977; **6:** 201-210.
10. Close J, Glucksman E. Falls in the elderly; what can be done? We need to streamline referral to falls programs and co-ordinate services within and outside hospitals. *Med J Aust* 2000; **173:** 176-177.
11. Tinetti ME, McAvay G, Claus E. Does multiple risk factor reduction explain the reduction in fall rate in the Yale FICSIT trial? Frailty and injuries co-operative studies of intervention techniques. *Am J Epidemiol* 1996; **144:** 389-399.
12. Feder G, Cryer C, Donovan S, Carter Y. On behalf of the guidelines' development group. Guidelines for prevention of falls in people over 65. *BMJ* 2000; **321:** 1007-1011.
13. Haines TP, Bennell KL, Osborne RH, Hill KD. Effectiveness of targeted falls prevention programme in subacute hospital setting: randomised controlled trial. *BMJ* 2004; **328:** 676-678.
14. Ray W, Taylor J, Meador K, *et al*. A randomised trial of a consultation service to reduce falls in nursing homes. *JAMA* 1997; **278:** 557-562.

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