A Prospective Study of the Incidence of Falls in Patients With Advanced Cancer

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Abstract

Context. The association between aging and falls risk, and the morbidity and mortality resulting from falls in older persons, is well documented. Results from a small number of studies of patients with cancer in inpatient settings suggest that patients with advanced cancer may be at high risk of falling. We present preliminary results pertaining to the incidence of falls in patients with advanced cancer from an ongoing study of risk factors for falls.

Objectives. To measure incidence of falls in patients with advanced cancer receiving palliative care, and to test the hypothesis that patients aged ≥65 years are at greater risk of falling than those aged <65 years.

Methods. Ambulant patients with cancer admitted to palliative care services were recruited. Demographic details were ascertained by patient interview and routine record review. Participants were followed-up by weekly telephone calls for up to six months.

Results. Follow-up has been completed for 119 patients; mean age was 66.91 (±12.86) years and 53.8% were male. Sixty-two participants (52.1%) fell during follow-up. The median time to fall for participants aged <65 and ≥65 years was 85 days (95% confidence interval [CI] 51.54–118.46) and 80 days (95% CI 44.07–115.93), respectively (χ² = 0.034, P = 0.85). The incidence density of falls was 2770 per 1000 person-years.

Conclusion. One in two patients with advanced cancer fell during follow-up of up to six months, regardless of age. There is a need to investigate the sequelae of falls in patients with cancer, to ascertain the risk factors, and in particular, the modifiable risk factors in this population. J Pain Symptom Manage 2011;42:535–540. © 2011 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.
Introduction

The association between aging and falls risk in older persons has long been recognized by specialists and generalists alike. As a result of research conducted over the past three decades, it is recognized that approximately 30% of community-dwelling older persons fall per annum because of a complex interaction of intrinsic and extrinsic risk factors. Approximately 10% of falls result in fracture, head injury, or serious soft tissue injury.\(^1,2\) Even noninjurious falls have significant negative consequences for the individual, with up to 40% of those who fall subsequently experiencing a fear of falling. Fear of falling is associated with self-imposed activity restriction, leading to decline in physical performance independent of baseline function, and to development of gait and balance problems.\(^3\) The evidence supports the theory of a functional downward spiral, whereby the negative sequelae of falling predispose to further falls: a history of falling in the past year is associated with a relative risk of further falls of 3.7.\(^4\) The financial cost of falling in older persons is not insignificant. In Ireland, during 2004, direct costs of falls and fractures in persons aged 65 years and older accounted for 1.6% of the total public health expenditure.\(^5,6\)

Prevention of falls in older persons is a principal strategic objective for health and social policy makers in developed countries. Initiatives include screening all older persons annually for a history of falls, conducting a comprehensive fall evaluation in those presenting with a fall, and increasing awareness in the general population of interventions that may improve balance and falls risk.\(^7,8\) Evidence of effective interventions for reducing falls risk, in selected or unselected populations of older persons, is steadily emerging. Multicomponent interventions that target multiple risk factors, targeted exercise interventions, home hazard modification, reducing psychotropic medication, and correction of vitamin D depletion have all been shown to be effective interventions for community-dwelling older persons.\(^9,10\)

In comparison, very little is known of the epidemiology of falls in people with cancer. The literature published to date is limited to a small number of studies of incidence of and risk factors for falls in inpatient settings and retrospective case finding in cohorts of older persons with cancer attending outpatient services.\(^11\) Based on the analysis of incident forms in inpatient palliative care units, where 97.5%—100% admissions had malignant disease, researchers in the United Kingdom, Canada, and Switzerland reported fall rates of 15.6, 16.9, and 6.9 falls per 1000 patient bed days, respectively; in comparison, the average rate of falling in acute hospitals in the United Kingdom in 2005–2006 was 4.8 falls per 1000 bed days, suggesting that a diagnosis of advanced cancer confers a greater risk of falling than other illnesses.\(^11,13,14,19\)

The existing research on falls in community-dwelling patients with cancer seems to refute this: The proportion of patients aged ≥70 years with cancer at any stage, reporting at least one fall in the preceding 12 months in the studies conducted by Overcash et al., were 22.4% (37/165) and 27% (81/297). Bylow et al. reported that only 22% (11/50) of men aged ≥70 years with prostate cancer, with either biochemical recurrence or asymptomatic metastatic disease, reported at least one fall in the preceding three months. However, all of the studies used convenience sampling of patients and used retrospective reporting of falls. The latter is particularly susceptible to recall bias, as elucidated by Overcash and Rivera in a later study of 20 cancer patients aged ≥70 years, in which 13 patients reported having fallen in the past year but 15 reported having fallen in the past three months.\(^15\)–\(^18\)

In this article, we present preliminary findings pertaining to the incidence of falls, and details of falls, in consecutive recruits to an ongoing prospective study designed to evaluate the risk factors for falls in patients with advanced cancer. We hypothesized that patients with advanced cancer have a high incidence of falls and that patients with advanced cancer aged ≥65 years have a greater risk of falling than those aged <65 years.

Methods

Setting and Participants

Consecutive admissions to the palliative care services provided by Our Lady’s Hospice and Care Services (November 24, 2008 until June
were invited to participate. The palliative care services consist of inpatient care provided in a 36-bed inpatient unit (IPU), a Day Hospice service, and a Home Care Service. The IPU offers admission to patients for symptom control, terminal care, rehabilitation, and respite; in 2009, there were a total of 427 admission episodes and 250 deaths. The activity of Day Hospice follows the model of therapeutic rehabilitation whereby patients attend a six-week individualized program designed to assist return to their prior level of functioning.

Patients aged 18 years or older with a diagnosis of metastatic or loco-regionally advanced cancer were eligible for inclusion. Exclusion criteria were as follows: being unable to stand and mobilize unassisted, actively dying or considered too unwell by the admitting and research teams, registered as blind, using continuous oxygen, and being aphasic or unable to converse in English.

Eligible patients received written information on the study at the time of admission to services. Enrollment of patients with impaired cognition (Short Orientation-Memory test greater than 11) required the assent of the patient in addition to consent from their proxy. All other participants provided informed consent. The study was approved by St. Vincent’s University Health Group Ethics Committee.

**Data Collection and Patient Follow-Up**

Demographic data were collected by transcription of data routinely recorded on the admission proforma and verified by patient interview at the time of risk factor assessment. Performance status was measured using the Palliative Performance Scale. Patients were contacted weekly from the date of baseline assessment, by telephone or in person, to determine if they had fallen during the preceding seven days and to record details of the fall if this had occurred. A fall was defined as an event whereby an individual inadvertently comes to rest on the ground or lower level, with or without loss of consciousness. Follow-up continued until six months from the time of baseline assessment, or until the occurrence of a fall or death if these occurred before six months. Information regarding survival of patients who completed the study was obtained from an electronic palliative care administration database system, used by Our Lady’s Hospice & Care Services and the hospitals within its catchment area.

**Statistical Analysis**

Descriptive analyses of number and details of falls were conducted. Incidence density of falls was calculated as the total number of falls per the sum of patient days of follow-up, expressed as number of falls per 1000 patient years. Time to first fall was examined using survival analysis methods, including the log rank test. A term for age <65 and ≥65 years was included and 95% confidence intervals (CIs) presented for median survival estimates. Demographic characteristics of participants and those who declined participation were compared using the Pearson Chi-squared test and the two-sample *t*-test. Statistical analysis was performed using SPSS (Version 16) (SPSS, Inc., Chicago, IL) statistical software.

**Results**

Between November 11, 2008 and June 15, 2010, there were 1076 admission episodes, for a total of 761 patients, to the services from which patients were being recruited; 457 were ineligible and 169 declined. One hundred thirty-five patients have been recruited, of whom 119 have completed follow-up and 16 remain under follow-up. Of the participants for whom follow-up is complete, 55.5% were recruited from outpatient services and the remainder from the IPU; the mean age was 66.91 years (±12.86), and 53.8% were male. The most frequent cancer diagnoses were bronchial, breast, and lower gastrointestinal cancers. There were no significant demographic differences between patients who declined and those who participated (Table 1).

Sixty-two participants (52.1%) sustained a fall during follow-up, including 24 of 46 (52%) participants aged <65 years and 38 of 73 (52.2%) aged ≥65 years. The median time to fall for participants aged <65 and ≥65 years was 85 days (95% CI 51.54–118.46) and 80 days (95% CI 44.07–115.93), respectively ($\chi^2 = 0.034$, df 1, $P = 0.85$). There was no difference in gender composition, performance status, or median survival from time...
of recruitment between the two age groups. The incidence density of falls was 2770 per 1000 person-years.

Of the 62 patients who fell, including 20 who are alive at time of writing and hence have a “censored” survival date, the median survival post fall was 73 (95% CI 52.9–93) days. Fifty-five percent of falls occurred in the community (38.7% at home, 11.3% outside, 4.8% other indoors) and the remaining 45% in hospital or hospice inpatient settings. Of the 62 participants who fell, 28 sustained soft tissue injuries, two sustained fractures, and one patient sustained a dislocation.

**Discussion**

One in two adults with metastatic or loco-regionally advanced cancer fell at least once during follow-up of up to six months, regardless of age. Fifty-five percent of falls occurred outside the hospital/hospice setting and half resulted in physical injury. The estimated median survival of patients at the time of fall was 73 days—an underestimation, as one-third of patients who fell were alive at the time of analysis.

Our findings suggest that falls are more common in adults with advanced cancer than in community-dwelling older persons: the incidence density of falls was 2770 per 1000 person-years, more than double the rates reported for healthy older persons. These results are unprecedented; prior studies of patients with cancer reported that 22.4%–27% patients experienced at least one fall per annum. Possible explanations for the discrepancy are that the previous studies may have included patients with earlier stage disease, that case ascertainment was based on occurrence of falls in an earlier time period or that falls were under-reported because of recall bias.

It is a limitation of our study that more than 50% of eligible patients declined participation. However, the demographic profiles of participants and nonparticipants were similar and resemble that of the total population of persons in Ireland living with advanced cancer. Although our results may be subject to selection bias according to characteristics that make patients more likely to be referred to palliative care services, this may be offset to a certain extent by the breadth of palliative care services provided and our strategy of recruiting from

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<th>Demographic Details of Participants Who Have Completed Follow-Up to Date** (n = 119) and Patients Who Declined to Participate (n = 169)</th>
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<tr>
<td><strong>Gender</strong></td>
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<td>Male, frequency (%)</td>
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<td>Mean age (years)</td>
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<td><strong>Cancer diagnosis, frequency (%)</strong></td>
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all facets of these services. Increasing age does not appear to be an independent risk factor for falls in patients with advanced cancer, suggesting that the high prevalence of falls is related to factors other than the demographic profile of cancer.

We have identified that falls are an extremely common experience in advanced cancer, and yet have raised more questions than answers: What psychological impact do falls have in the context of cancer, and does this differ between younger and older age groups? Do falls cause a decline in physical performance independent of baseline functional ability, as in older persons? Are the risk factors, and in particular the modifiable risk factors, for falls in patients with cancer the same as in older persons? In the face of increasing numbers of people living with advanced cancer because of population aging and effectiveness of novel treatment modalities, we contend that there is an urgent need to address these issues. Knowledge of the risk factors for falls in patients with cancer will facilitate identification of patients who are most at risk and inform decision-making by clinicians and patients regarding balancing the risk-benefit ratio of any treatments shown to increase falls risk. It also will provide the foundation for falls prevention interventions tailored to the needs of patients with advanced cancer.

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**References**


