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Review article

Systematic review of falls in older adults with cancer

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ABSTRACT

Objectives: Older adults frequently experience falls, at great cost to themselves and society. Older adults with cancer may be at greater risk for falls and have unique risk factors.
Materials and methods: We undertook a systematic review of the available medical literature to examine the current evidence regarding factors associated with falls in older adults with cancer. PubMed, Embase, CINAHL, CENTRAL, DARE, Cochrane Database of Systematic Reviews and clinical trials.gov were searched using standardized terms for concepts of oncology/cancer, people 60 and older, screening, falls and diagnosis. Eligible studies included cohort or case-control studies or clinical trials in which all patients, or a subgroup of patients, had a diagnosis of cancer and in which falls were either the primary or secondary outcome.
Results: We identified 31 studies that met our inclusion criteria. Several studies suggest that falls are more common in older adults with a diagnosis of cancer than those without. Among the 11 studies that explored factors associated with outpatient falls, some risk factors for falls established in the general population were also associated with falls in older adults with cancer, including dependence in activities of daily living and prior falls. Other factors associated with falls in a general population, such as age, polypharmacy and opioid use, were not predictive of falls among oncology populations. Falls among older adults with cancer in the inpatient setting were associated with established risk factors for falls in people without cancer, but also with factors unique to an oncology population, such as brain metastases.
Conclusions: Falls in older adults with cancer are more common than in the general population, and are associated with risk factors unique to people with cancer. Further study is needed to establish methods of screening older adults with cancer for fall risk and ultimately implement interventions to reduce their risk of falls. Identifying which older adults with cancer are at greater risk for falls is a requisite step to ultimately intervene and prevent falls in this vulnerable population.

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1. Introduction

Falls are common, costly and under-recognized events in the lives of older adults, and are the leading cause of traumatic mortality in this age group.[1] Nearly one in three older adults fall each year.[2] At least 10% of falls result in injuries,[3] including head injuries and fractures; more subtly, falls are associated with fear of falling and functional decline.

Cancer is a disease of aging. The rising incidence of cancer, coupled with the aging of the population will result in an anticipated 67% increase in the incidence of cancer in older adults by 2030.[4] With the rising incidence of cancer in older adults who may be at greater risk for falls, attention to falls will be essential to meet the clinical needs of this growing population. The Institute of Medicine recently convened a committee to evaluate cancer care in older adults; their report, "Delivering High-Quality Cancer Care: Charting a Course for a System in Crisis," highlighted the need to "ensure that the care of older adults with cancer is well coordinated and comprehensive."[5] In order to ensure that older adults receive such comprehensive care, with attention to falls, we must determine whether older adults with cancer are at greater risk for falls, and what risk factors are associated with falls in this vulnerable population.

We therefore undertook a systematic review to examine the rate of falls and factors associated with falls, including demographics, comorbidities, functional status, medications and psychosocial factors, in older adults with cancer in both the inpatient and community setting.

2. Methods

2.1. Search Strategy

In the framework of the PRISMA guidelines (www.prisma-statement.org), in conjunction with a medical librarian (SF), two investigators (TMW, PD) searched the medical literature from PubMed 1946-, Embase 1947-, Cumulative Index for Nursing and Allied Health (CINAHL) 1937-, Cochrane Central Register of Controlled Trials (CENTRAL), Database of Abstracts of Reviews of Effects (DARE), Cochrane Database of Systematic Reviews, and clinicaltrials.gov. Standardized terms and keywords were combined in the search for the following concepts: oncology/cancer, people sixty and older, screening, falls and diagnosis (See Appendix 1 for full details of search strategy). All searches were completed in March 2014, and limited to English language using database supplied limits. All results were exported to EndNote. Duplicates were identified and removed. Inclusion criteria included manuscripts, abstracts or clinical trials examining falls in humans with cancer. Eligible studies included retrospective cohort studies, case-control studies, prospective cohort studies or clinical trials in which at least either all patients had cancer, or a diagnosis of cancer defined a subgroup, and falls were a primary or secondary outcome. Studies were excluded if they did not examine falls as an endpoint, did not include patients over age 60, or did not include patients with a diagnosis of cancer. Review articles were excluded. Two authors (TMW and PD) reviewed the titles and abstracts. Full manuscripts were obtained on a subset of articles and reviewed with the inclusion criteria. The references of selected relevant articles were hand-searched for any additional articles that met our inclusion criteria. No meta-analysis was planned *a priori*.

Two authors examined the eligible full manuscripts; data was extracted by author (PD) and double-checked by another (TMW). First author, year of publication, type of study, sample size, type of cancer included, type of cancer treatment (if specified), age of participants (mean or median, and standard deviation, if reported), and site of enrollment (inpatient or outpatient) or type of database were extracted and recorded in a Microsoft Excel database. Whether falls were assessed prospectively or retrospectively was recorded. The method of falls ascertainment or definition of falls used was recorded, if reported. The rate of falls and ascertainment period was recorded. In some cases, only the odds ratio for falls among patients with cancer relative to controls was reported, and this data was recorded. The rate of injurious falls was recorded, if reported.

Manuscripts were stratified into those that examined outpatient/community falls and those that examined inpatient falls. Studies that examined factors associated with or predictive of falls were identified. When an association between a predictor and falls was examined, the odds ratio for falls associated with each factor was recorded, if statistically significant. If the relationship was statistically significant but not reported as an odds ratio, then it was recorded as a qualitatively positive relationship.

In the outpatient falls strata, demographic information extracted included age, race and gender. Comorbidities included osteoporosis, arthritis, or overall comorbidity score. Functional measures included Eastern Cooperative Oncology Group (ECOG)[6] or Karnofsky[7] performance status, activities of daily living (ADLs), instrumental activities of daily living (IADLs), objective measures of physical performance, a prior history of falls, and use of an assistive device for walking. Psychosocial or cognitive factors included cognitive impairment, social support/marital status or depression. Measures of medication included the number of medications, or certain classes of medications, including antipsychotics, corticosteroids, benzodiazepines, and opiates. Factors associated with the cancer diagnosis or its treatment included pain, fatigue, anemia, androgen deprivation therapy, use of chemotherapy, cancer stage and the presence of brain metastases. Finally, other factors, including visual impairment, a positive screen on the Vulnerable Elders Survey-13[8] or nutritional risk were recorded.

In the inpatient falls strata, demographic information included age, race and gender. Comorbidities included cardiac disease, chronic kidney disease, chronic obstructive pulmonary disease or comorbidity scores. Functional measures included ECOG or Karnofsky performance status, ADLs, IADLs, measures of physical performance, prior history of falls, or use of an assistive device for walking. Psychosocial or cognitive factors recorded included cognitive impairment, delirium or depression. Medication factors included the number of medications, or certain classes of medications: antipsychotics, corticosteroids, benzodiazepines, and opiates. Factors associated with cancer or its treatment included pain,