Comprehensive Geriatric Assessment in Oncology

Supriya G. Mohile • Allison Magnuson

School of Medicine and Dentistry, University of Rochester Medical Center, Rochester, N.Y., USA

Abstract

The incidence of cancer increases with advanced age and the majority of cancer deaths are in patients aged ≥65. The geriatric population is a heterogeneous group and a patient’s chronologic age does not always correlate with underlying physiologic status. Oncologists need to be able to obtain information on physiologic and functional capacity in older patients in order to provide safe and effective treatment recommendations. The Comprehensive Geriatric Assessment (CGA) is a compilation of validated tools that predict morbidity and mortality in community-dwelling older adults. The various components of the CGA have also been shown to influence clinical decision-making and predict outcomes in older cancer patients. The combined data from the CGA can be used to stratify patients into risk categories to better predict their tolerance to treatment and risk for chemotherapy toxicity. However, the CGA is a comprehensive tool requiring significant time and training to perform. A variety of screening tools have been developed which may be useful in the general oncology practice setting to identify patients that may benefit from further testing and intervention. This chapter will review the components and predictive value of CGA in older cancer patients, with emphasis on how CGA can practically be incorporated into clinical practice.

Older patients commonly have health status issues that can affect cancer outcomes. For example, up to 50% of cancer patients require assistance with independent activities of daily living, which measure the ability for an older person to complete tasks necessary to live independently in the community [1]. Additionally, one quarter of patients have some form of cognitive impairment which can impact cancer-related outcomes [2]. The Comprehensive Geriatric Assessment (CGA) is an evaluation tool utilized by geriatricians to assess overall health status. The CGA includes validated tools of functional status, comorbidities, cognition, social support system, nutrition and medication review. In community-dwelling older adults, impairments in these domains predict morbidity and mortality. In cancer patients, measures within geriatric assessment can predict postoperative morbidity, toxicity of chemotherapy, and
mortality [1]. CGA can aid oncologists in predicting outcomes and selecting appropriate treatment regimens and interventions for their patients. However, it is a comprehensive tool requiring significant time and manpower to adequately perform, and may not be practical for the general oncologist in the outpatient setting. Therefore, a variety of screening tools which aim to assess patients for potential areas of impairment are being researched.

In this chapter, we will provide an overview of the components of the CGA. We will provide information on validated tools that can help identify impairments in geriatric domains within the CGA and also describe the predictive value of each of these tools in identifying vulnerability in older adults with cancer. We will also provide practical considerations on how to utilize CGA in clinical practice to inform decision-making for treatment, identify those patients most likely to develop chemotherapy toxicity, and to guide interventions to improve outcomes.

**Components of Geriatric Assessment (table 1)**

*Functional Status*

Traditionally, oncologists have used performance status (i.e., ECOG or Karnofsky performance status scales) as an assessment of functional status. Poor performance on the ECOG scale has been associated with decreased survival in older patients being treated with palliative chemotherapy for advanced cancer [3, 4]. Functional assessment using oncology performance status measures alone, however, is inadequate when determining risk for many older adults with cancer. Scores of 0–2 encompass a broad range of functions in older adults. Many older patients present with an ECOG score of <3 in clinical practice [5]. Extermann and Hurria [1] demonstrated that although only 20% of geriatric oncology patients present with a performance status of ≥2, more than half of this population needs assistance with instrumental activities of daily living (IADLs), which measure the ability of a person to perform tasks that allow for living independently in the community (e.g., shopping, managing money). Repetto et al. [5] studied 363 elderly cancer patients and found that of those with good performance status, 37.7% had IADL limitations.

In geriatrics, functional status is commonly assessed using activities of daily living (ADL) and IADL scales [6, 7]. ADLs are skills required for basic self-care, such as the ability to bathe, feed, dress, toilet and transfer oneself as well as maintain continence [6]. These skills are necessary to maintain independence in one’s own home whereas IADLs are the skills necessary to maintain independence in the community. IADLs include the ability to perform housekeeping and laundry, meal preparation and grocery shopping, medication administration, finance management, ability to access transportation systems, and use the telephone [7]. These task-specific scales have been proposed for use in a geriatric assessment for older cancer patients, since they add vital information to the ECOG and Karnofsky performance scales. Dependence
on others for ADL and IADL assistance has been shown to be predictive of mortality in geriatric oncology patients [8] and it has been observed that older patients with cancer have a higher incidence of ADL and IADL deficiencies when compared to age-matched controls [9].

In studies of geriatric assessment of older patients with cancer, a substantial number presented with ADL or IADL disabilities [10–12]. For example, Girre et al. [11] evaluated 105 patients aged ≥70 with breast cancer, and reported that 42% required
assistance with ADLs and 54% required assistance with IADLs, despite the fact that only 7% of patients received an ECOG score >2. A significant proportion (>40%) of patients had functional deficits as measured by IADLs in two large studies developed to examine factors that predict chemotherapy toxicity [13, 14]. Predictive models for chemotherapy toxicity and survival are discussed later in the chapter. At the time of this review, there is no consensus regarding how to modify treatment plans according to underlying functional status and more studies are needed to evaluate the safety and efficacy of standard treatment approaches for cancer in patients with baseline IADL deficits.

Objective Physical Performance
Physical performance measures are standardized objective measures that provide a quantitative and reproducible assessment of specific functional tasks such as walking speed, lower extremity strength, or grip strength. These tests complement self-report functional assessment by detecting subclinical changes that may also predict morbidity and mortality. Objective physical performance measures have been shown to predict hospitalizations, disability, and mortality in the ambulatory geriatric population [15, 16]. These measures include the Short Physical Performance Battery (SPPB) and the ‘Timed Get Up and Go’ test, and isometric grip strength [15–17]. The SPPB measures balance, chair stands (strength), and gait speed. This tool has been validated in community-dwelling older adults and is highly predictive of future disability, nursing home placement, and mortality [18]. Although the predictive value of the SPPB for predicting adverse outcomes in older cancer patients is yet unknown, specific populations of older cancer patients have been shown to have significant issues with physical performance as measured by the SPPB. For example, in a study of 50 older men with prostate cancer on androgen deprivation therapy, 56% had abnormal SPPB findings and deficits occurred within all subcomponents (balance, walking, and chair stands) [19]. The Timed Get Up and Go test has been evaluated as part of a geriatric assessment in older cancer patients and has been shown to be feasible in both the clinical and cooperative (clinical trial) group setting [20]. This test measures how many seconds it takes an individual to stand from a seated position, walk a distance of 10 ft, turn, walk back to the chair and sit down again [17]. The simplicity of this test makes it a practical choice for the clinical setting.

Consensus guidelines, including the NCCN, do recommend physical performance assessments in addition to oncology performance scales in making decisions about treatment [21–23]. Future prospective studies will help to validate these measures and provide clinical cutoff scores to be used in different clinical settings.

Comorbidity
The relative incidence of comorbid conditions increases with age. This holds true for cancer patients as well. Yancik [24] evaluated 7,600 patients with cancer and found that those aged ≥75 years had an average of 4.2 comorbid conditions, whereas those <75 years had an average of 2.9 comorbid conditions. Several studies have shown
similar associations between the presence of comorbid conditions and prognosis in older cancer patients [25–28].

Comorbid conditions may affect a patient’s toxicity risk from treatment for their cancer. In a study by Wildes et al. [29], 152 patients who underwent BEAM conditioning followed by autologous stem cell transplantation were studied to evaluate the impact of comorbidity on toxicity and mortality. Comorbid conditions, as assessed by the Charlson Comorbidity Index, significantly correlated with treatment-related mortality. Several studies have reported that hormonal treatment (i.e., androgen deprivation therapy) is associated with increased mortality in patients with underlying heart disease [30, 31]. In a randomized adjuvant chemotherapy trial of patients with high-risk stage II and III colon cancer, those with diabetes mellitus experienced a significantly higher rate of overall mortality and cancer recurrence [32]. One nationally representative population-based study reported a significantly higher number of comorbidities in cancer survivors compared to those without cancer [33].

Analysis of a patient’s life expectancy from comorbid conditions versus the malignancy-related mortality must be considered when evaluating treatment options. If an alternative comorbid condition portends a shorter survival time than expected from the malignancy, the risks of cancer therapy could outweigh the benefit. Life expectancy can be obtained from life expectancy tables published by multiple national organizations [34] and from Walters et al. [35].

**Polypharmacy**

Age-related changes in physiology can influence the pharmacodynamics and pharmacokinetics of cancer-related drugs, thus affecting the efficacy as well as toxicity [36, 37]. Predicting drug efficacy and tolerance is even more complicated because of the high prevalence of polypharmacy in this population [38, 39]. The prevalence of polypharmacy in the elderly ranges widely and depends on the population studied as well as the definition of polypharmacy used. In studies evaluating community-dwelling individuals over the age of 65 in the ambulatory care setting, the prevalence of polypharmacy ranged between 15.6 and 94.3% [40–43]. Studies of older adults with cancer report the average number of medications ranges from 4 to 9, depending on the population sampled [38, 39, 44, 45].

Polypharmacy is associated with adverse drug reactions, increased risk of drug-drug interactions, and decreased compliance with medications [38]. These risks are particularly important considerations in older adults who are challenged with chemotherapy treatments. There are no evidence-based guidelines for evaluation and management of polypharmacy in older cancer patients. The Beers Criteria identifies specific drugs or drug classes which may have increased side effect profiles in older patients in general, particularly when a safer alternative drug option exists [46]. It is also important to assess a patient’s non-prescription medication, including all herbals and supplements. Recent studies suggest the prevalence of complimentary/alternative medication use in the elderly population is 26–36% [47, 48]. Herbal supplements increase the risk for