

Comprehensive Geriatric Assessment for Older Patients With Cancer

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ABSTRACT

Purpose

During the last decade, oncologists and geriatricians have begun to work together to integrate the principles of geriatrics into oncology care. The increasing use of a comprehensive geriatric assessment (CGA) is one example of this effort. A CGA includes an evaluation of an older individual's functional status, comorbid medical conditions, cognition, nutritional status, psychological state, and social support; and a review of the patient's medications. This article discusses recent advances on the use of a CGA in older patients with cancer.

Methods

In this article, we provide an update on the studies that address the domains of a geriatric assessment applied to the oncology patient, review the results of the first studies evaluating the use of a CGA in developing interventions to improve the care of older adults with cancer, and discuss future research directions.

Results

The evidence from recent studies demonstrates that a CGA can predict morbidity and mortality in older patients with cancer. Accumulating data show the benefits of incorporating a CGA in the evaluation of older patients with cancer. Prospective trials evaluating the utility of a CGA to guide interventions to improve the quality of cancer care in older adults are justified.

Conclusion

Growing evidence demonstrates that the variables examined in a CGA can predict morbidity and mortality in older patients with cancer, and uncover problems relevant to cancer care that would otherwise go unrecognized.

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INTRODUCTION

Comprehensive geriatric assessment (CGA) is a term coined by geriatricians to describe a multidisciplinary comprehensive evaluation of an older individual's functional status, comorbid medical conditions, cognition, psychological state, social support, nutritional status, and a review of the patient's medications. Initially, the use of a CGA in the care of older patients with cancer was based on an extrapolation of its ability to predict morbidity and mortality in the general geriatric population. More recently, however, accumulating data show the benefits of using a CGA particularly in patients with cancer. In this article, we provide an update on the ability of a CGA to predict morbidity and mortality in older patients with cancer, and discuss studies in which a CGA was used to guide interventions in this population.

GERIATRIC ASSESSMENT DOMAINS APPLIED TO THE GERIATRIC ONCOLOGY PATIENT

Older patients with cancer are more likely to require functional assistance than those without cancer.¹ This increased need for functional assistance persists in older cancer survivors for years after a cancer diagnosis.² Traditionally, the oncologist's assessment of functional status includes an evaluation of Karnofsky or Eastern Cooperative Oncology Group (ECOG) performance status (PS), whereas the geriatrician's assessment of functional status traditionally includes an assessment of the patient's ability to complete activities of daily living (ADLs) and instrumental activities of daily living (IADLs). ADLs are basic self-care skills needed to maintain independence in the home, such as the ability to bathe, dress, toilet, feed oneself, maintain continence, and transfer from a bed or chair without assistance. IADL skills are those required to maintain independence in the

community, such as using the telephone, taking transportation, shopping, doing housework and laundry, managing money, and taking medications.

An assessment of ADLs and IADLs is an integral part of a CGA. Accumulating evidence from multiple studies in older patients with cancer shows that an evaluation of IADLs in particular adds substantially to the functional information provided by the ECOG and Karnofsky PS. Approximately 20% of older patients with cancer present with an ECOG PS of at least 2; however, more than half of these patients need help with IADLs (Table 1). In particular, patients over the age of 80 years are more likely to require assistance in IADLs.³ In a study of 203 patients with cancer (median age, 75 years; range, 63 to 91 years), the correlation between the need for assistance in ADLs and IADLs and ECOG PS was moderate.⁴

Studies of CGA in older patients with cancer demonstrate that functional status predicts survival, chemotherapy toxicity, postoperative morbidity, and mortality (Table 2). In a study of older patients with advanced non-small-cell lung cancer who participated in a clinical trial evaluating the efficacy of single-agent or combination chemotherapy, pretreatment values of IADLs, but not ADLs, correlated with survival.⁵ In a study of older patients with ovarian cancer, functional dependence (defined as requiring assistance at home or requiring institutionalized care) or ECOG PS of at least 2 was associated with a risk of chemotherapy toxicity.⁶ In a study of older patients undergoing surgery, an increased need for assistance with IADLs was associated with increased postoperative complications ($P < .001$).⁷

The correlation of ADL dependence and outcome is less established in studies of older patients receiving outpatient oncology care, probably because of the low proportion of patients who require ADL assistance. An assessment of ADLs may be more important in the inpatient setting, where a higher proportion of older patients with cancer are likely to require ADL assistance. For example, in a study of older patients with cancer admitted to an Acute Care for Elders (ACE) Unit, 45% required assistance in activities of daily living.⁸ In addition, older cancer survivors are more likely to report limitations in ADLs. For example, in a study of 964 cancer survivors and 14,333 controls, patients with a history of cancer were more likely to report limitations in ADLs ($P = .01$) and mobility ($P < .001$).²

Because direct functional assessment only partially correlates with questionnaire-based assessments, some study groups integrated objective performance-based measures of functional status in their CGA.^{9,10} Commonly utilized performance-based measures of functional status include the "Timed Up and Go," the 6-minute walk, and grip strength. Additional studies are needed regarding the prognostic ability of performance-based measures of functional status, and the correlation between objective and subjective measures of functional status in the geriatric oncology patient. In addition, further studies are needed to evaluate the long-term impact of cancer and cancer therapy on functional status. As cancer therapies become more effective and the number of cancer survivors grows, outcomes such as the quality of survival, as well as disease-free survival (DFS) and overall survival (OS), will be important to measure. A longitudinal incorporation of CGA into clinical trials can help provide this important information.

COMORBIDITY

More data are also allowing us to estimate the impact of comorbidity on prognosis. These studies demonstrate that the overall burden of comorbidity is associated with a worse survival in patients with cancer.¹¹⁻¹⁵ Several studies have demonstrated the impact of comorbidity on treatment tolerance.^{12,16,17} However, this result is not demonstrated in all studies.^{6,18} The discrepancy is in part a result of the limitations of the instruments used to measure comorbidity. Although well validated and reproducible, weights are attributed to diseases according to either a particular end point, such as mortality for the Charlson Comorbidity Index (CCI), or a global assessment of severity such as in the Cumulative Illness Rating Scale-Geriatrics (CIRS-G). The ability of these scales to predict other end points, such as risk of toxicity from cancer therapy or risk of functional decline, is still under study. As our understanding of comorbidity increases, we will be able to design instruments to weigh the impact of comorbidity according to the end point measured.

Our understanding of the impact of comorbidity in cancer patients is also increasing on a disease-by-disease basis. It is becoming evident that concomitant diseases impact not only overall survival but

Table 1. CGA Profiles of Oncogeriatric Populations in Various Settings

Assessments	Oncogeriatric Outpatient US ⁷⁴	Oncogeriatric Out-/Inpatient Italy ³	VA Oncogeriatric Outpatient US ⁷⁵	Home Health US ^{76*}	Cooperative Trial Italy ⁵	IM/Ger Inpatient Canada ⁷⁹	OACE US ⁸
Age, years	75 (median)	72 (median)	68 (mean)	77-78 (mean)*	74 (median)	79 (mean)	74 (mean)
ECOG 0-1	83	74			81		
ADL independent, %	79	86	31		85	44	55
IADL independent, %	44	52	42		33	34	26
Depression, %†	26 (GDS)	40 (GDS)	14-26* (HADS)	17-19* (OASIS)			24 (GDS)
Cognitive impairment, %	25 (MMSE < 26)	37.8 (MMSE < 24)				Mean MMSE 22	51 (Clock)
Comorbidity, %	36 (CCI); 94 (CIRS)		5 (meant; OARS)	61-75* (NIA/NCI)	58 (CCI)		
Polypharmacy			6 (mean) meds				6 (mean) meds
Geriatric syndromes, %				35-51*			
Disability, %				25-45*			

NOTE. Numbers rounded to the nearest whole number.

Abbreviations: CGA, comprehensive geriatric assessment; VA, Veterans Affairs IM/Ger, Internal Medicine/Geriatric; OACE, Oncologic Acute Care for the Elderly Unit; GDS, Geriatric Depression Scale; HADS, Hospital Anxiety and Depression Scale; MMSE, Mini-Mental Status Exam; CCI, Charlson Comorbidity Index; CIRS, Cumulative Illness Rating Scale-Geriatric; OARS, Older Americans Resource and Services Survey; OASIS, Outcome Assessment Information Set; Clock, Clock Construction Test Score; NIA, National Institute on Aging; NCI, National Cancer Institute.

*Three cohorts.

†Varying definitions of depression used.

Table 2. IADL Versus ECOG Performance Status As Independent Predictors of Outcome in Multivariate Analyses

Reference	Predictors of Outcome			Outcome(s)	Cancer Types	Comments
	IADL	ECOG	Other			
Extermann ⁵²	N	N	MAX2 index, diastolic BP, marrow invasion, LDH	Chemo toxicity	All	Small series
Maione ⁵	Y	Y	QOL, No. of sites of disease	OS	NSCLC	MILES study
Audisio ⁷	Y	Y	No. of comorbidities, GDS, ADL, IADL	30-d post-op morbidity	All	Preliminary Results; ASA score not predictive
Ramesh ⁷⁷	Y	Y	BFI	30-day postoperative morbidity	All	Multicenter study
	Y	N	BFI	Length of hospital length		
Wedding ³²	Y	Y	Comorbidity	OS	All	
Soubeyran ⁵³	N	N	MNA, advanced disease	Early death	All	Chemotherapy treated
Robb ²⁶	Y	Y	MMSE	OS	All	
Freyer ⁶	Y*	Y	Depression	Chemo toxicity	Ovary	Multicenter study
	N	N	Depression, FIGO stage IV, initial nonoptimal surgery	PFS		
	N	N	Depression, FIGO stage IV, > 6 meds/d	OS		

Abbreviations: ADL, activities of daily living; IADL, instrumental activities of daily living; ECOG, Eastern Cooperative Oncology Group; Chemo, chemotherapy-related; OS, overall survival; PFS, progression-free survival; MMSE, Mini-Mental Status Exam; GDS, Geriatric Depression Scale; Y, Yes; N, No; LDH, lactate dehydrogenase; MNA, Mini-Nutritional Assessment; QOL, quality of life; NSCLC, non-small-cell lung cancer; BFI, Brief Fatigue Inventory; BP, blood pressure; MILES, Multicenter Italian Lung Cancer in the Elderly Study; FIGO, International Federation of Gynecology and Obstetrics; ASA, American Society of Anesthesiologists.

*Fully independent versus at home with assistance, or nursing home.

also the behavior of the cancer itself. For example, diabetes decreases the 8-year DFS of stage III colon cancer patients to an extent similar in magnitude to the beneficial effect of fluorouracil/levamisole adjuvant therapy (Fig 1).¹⁹ Hyperinsulinemia is associated with a worse disease-specific survival in prostate cancer,²⁰ colon cancer,¹⁹ and breast cancer.²¹ Obesity is associated with a worse progression-free survival (PFS) and OS in patients with ovarian cancer.²² PFS was 32, 24, 18, and 21 months for underweight, normal weight, overweight, and obese patients, respectively ($P = .02$). The corresponding figures for OS were as follows: not reached, 70, 79, and 33 months, respectively ($P = .02$). (For a detailed review, see Extermann.²³) These studies provide strong evidence for the impact of comorbidity on disease-free and overall survival in older patients with cancer. On the basis of these results, a routine assessment of comorbidity should be included in clinical trials and controlled for as a potential confounder of study results.

COGNITION

Studies that included a screening cognitive exam as part of the CGA for older patients with cancer have found that up to 25% to 50% had abnormalities that warranted further evaluation (Table 1). These findings have significant implications for oncologic care in terms of understanding the etiology of cognitive dysfunction (cancer-related *v* a pre-existing condition) and the impact of the dysfunction on the ability to weigh the risks and benefits of cancer therapy, comply with the treatment plan, and recognize the signs of toxicity that call for medical attention.

Two studies using the Surveillance, Epidemiology and End Results–Medicare database demonstrate that cognitive function influences the diagnosis and treatment of older adults with cancer. Gupta and Lamont²⁴ found that older patients with colon cancer who had a diagnosis of dementia were more likely to have a noninvasive diagnosis rather than a tissue diagnosis, less likely to receive curative surgical therapy, and less likely to receive adjuvant chemotherapy. Gorin et al²⁵ found that older patients with Alzheimer's disease were more likely to

be diagnosed at a later stage of breast cancer and less likely to receive surgery, chemotherapy, and radiation. On the other hand, the Moffitt group²⁶ found that, when treated in a specialized geriatric oncology program, cognitively impaired patients received similar treatments compared with nonimpaired patients. Their survival duration, however, was about a third of that of nonimpaired patients in various tumor types and stages.

The potential impact of cancer therapy on cognitive function also has important survivorship implications, which may influence an older patient's willingness to receive a specific therapy. In a survey of older, seriously ill patients, 88.8% of patients stated that they would not choose the treatment if the outcome was survival but severe cognitive impairment.²⁷

In a study of older patients with breast cancer, approximately half perceived a decline in cognitive function from before chemotherapy to 6 months after chemotherapy, most pronounced in patients who perceived pre-existing cognitive problems.²⁸ Data are emerging regarding the longitudinal use of CGA to evaluate the impact of cancer therapy and supportive care on cognitive function. For example, two pilot longitudinal studies performed a CGA at serial time points to evaluate the impact of cancer treatment on cognitive functioning. These studies demonstrated no significant change in Mini-Mental Status Exam (MMSE) scores after chemotherapy²⁹ or hormonal therapy³⁰; however, the ability to detect subtle changes in cognitive function is limited with this screening tool. In another study of 964 cancer survivors and 14,333 control patients, there was no difference in cognitive status between the cancer survivors and controls based on a telephone interview of cognitive status.²

Two studies included more detailed neuropsychological assessments to evaluate the impact of cancer therapy on cognitive function. The first series assessed 28 older patients with breast cancer who were undergoing adjuvant chemotherapy, and performed neuropsychological testing and a CGA before chemotherapy and 6 months after completion of chemotherapy. The number of neuropsychological test scores 2 standard deviations below normative data were calculated at

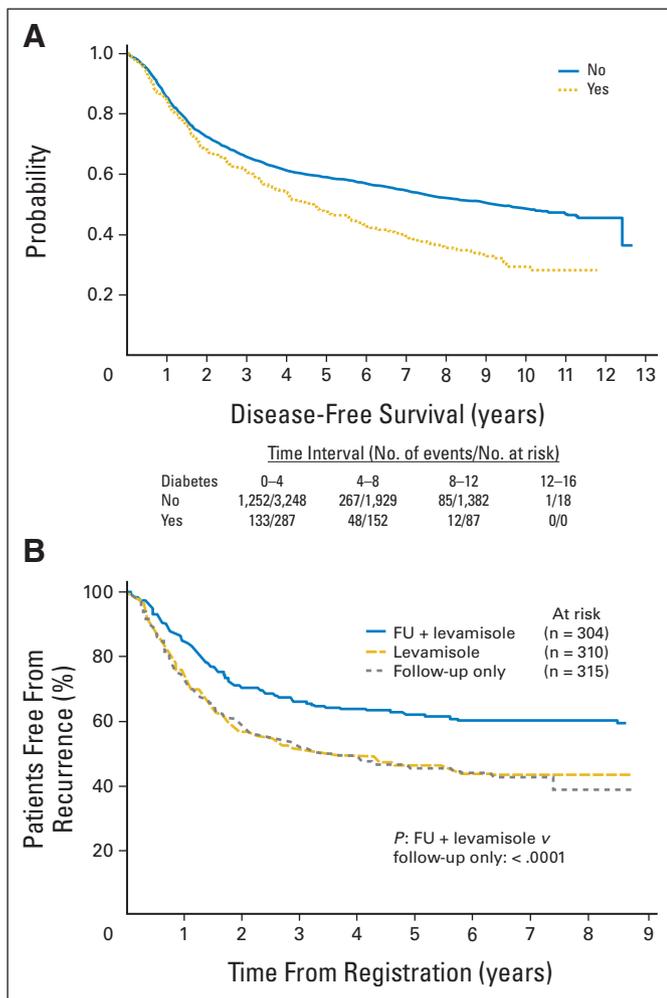


Fig 1. Impact of diabetes and adjuvant chemotherapy on the disease-free survival (DFS) of stage III colon cancer patients in randomized trials. (A) DFS of diabetics (lower curve) versus nondiabetics.¹⁹ (B) DFS of patients with adjuvant fluorouracil (FU)/levamisole (top curve) versus controls.⁷⁸

each time point: 50% of patients had no change, 39% worsened, and 11% improved ($P = .05$).³¹ Exploratory analyses of longitudinal CGA results demonstrated no longitudinal changes in functional status, comorbidity, or depression scores. Another study compared 34 patients age 60 or older and 43 patients younger than 60 years receiving chemotherapy for hematologic or GI malignancies, and could not identify any deleterious cognitive effect from baseline to 6 months after the start of chemotherapy treatment.³²

The studies of cognitive changes associated with cancer therapy demonstrate that such changes are subtle, affecting only a subset of the population. Further studies are needed to explore the impact of mild or perceived cognitive impairment on diagnosis, treatment choice, treatment toxicity, and risk of further cognitive decline as a consequence of cancer therapy. A screening cognitive test will likely lack the sensitivity to detect subtle longitudinal changes in cognitive function associated with cancer therapy, and a more detailed neuropsychological evaluation will be needed to accomplish this goal. A CGA performed in conjunction with neuropsychological testing can provide correlative data regarding the longitudinal impact of cognitive changes on everyday functioning.

NUTRITIONAL STATUS

Several studies have demonstrated the importance of weight loss as a prognostic factor for survival in patients with cancer.³³⁻³⁵ Even small amounts of weight loss (0% to 5% of body weight) can be clinically significant in patients with cancer. Similarly, in the general geriatric population, weight loss or a low body mass index (BMI) is associated with an increased risk of mortality.³⁶⁻³⁹ A commonly used screening tool for nutritional status is the Mini-Nutritional Assessment (MNA). In a study using the MNA in older patients with advanced prostate cancer, 50% of patients were at risk for malnutrition compared with 7.5% of patients in a control group with benign prostatic hyperplasia. Poor nutritional status was associated with a higher degree of depressive symptoms as well.⁴⁰

Other studies have reported an increase in obesity in older cancer survivors. In a study of 964 patients who had survived cancer for 4 years and 14,333 controls who did not have a history of cancer, cancer survivors reported higher rates of obesity than noncancer survivors.² In a study of older cancer survivors who participated in a home-based diet and exercise intervention program, 71% were deemed to be overweight (BMI > 25). Patients randomly assigned to the intervention arm experienced an improvement in diet quality ($P = .003$) and an improvement in physical functioning ($P = .23$), although these improvements were not statistically significant.⁴¹

SOCIAL SUPPORT AND PSYCHOLOGICAL STATE

An integral part of a CGA is an assessment of the older individual's social support and psychological state. In both the geriatric and oncology literature, social isolation has been linked to an increased risk of mortality.⁴²⁻⁴⁵ The Nurses Health Study evaluated the impact of social support in 2,835 women who were diagnosed with stage I to IV breast cancer from 1992 to 2002. Socially isolated women had a 66% increased risk of all-cause mortality and a two-fold increased risk of breast-cancer-specific mortality when adjusting for significant covariates including stage of disease, likely resulting a lack of access to care from adult children, friends, and relatives.⁴⁴ Similar findings have been reported in the geriatric literature, demonstrating that the absence of social support is a predictor of survival, independent of age.⁴³ Socially isolated older adults are particularly vulnerable for psychological distress.⁴⁶

Studies of geriatric assessment show that 14% to 40% of older patients have depressive symptoms as determined by commonly used screening scales for depression (Table 1). Depression in older adults has been associated with increased risk for resource requirements and informal caregiving needs.^{47,48} An assessment of an older patient's social support and psychological state is becoming increasingly important as the care of oncology patients is primarily moving to the outpatient setting, with an increased reliance on caregivers to assist with symptom management and daily activities.⁴⁹ On behalf of the Cancer and Leukemia Group B (CALGB), Kornblith et al⁵⁰ studied a novel method of using monthly telephone calls to evaluate and reduce depression in older patients with cancer. In this study, 192 older patients with advanced cancer were randomly assigned to either an intervention group that received monthly telephone calls to monitor for psychological

distress or a control group that did not receive calls. Both the intervention and control group received educational materials describing cancer-related psychosocial issues and available resources. Patients who were found to be distressed were referred to their oncology nurse for appropriate referrals. Patient who received the monthly telephone monitoring had significantly less anxiety ($P < .0001$), depression ($P = .0004$), and overall distress ($P < .0001$) compared with the control group.

Depression can also be associated with outcomes in older patients with cancer, even after controlling for the multiple variables measured in a CGA. A large epidemiologic study of 24,696 older breast cancer patients in the Surveillance, Epidemiology, and End Results–Medicare database (ages 67 to 90 years) revealed that women with a recent diagnosis of depression were at risk for receiving less-than-definitive treatment for their breast cancer, and they also experienced worse survival.⁵¹ Differences in treatment did not explain the worse survival. In a study conducted by the French Group d'Investigateurs Nationaux pour l'Etude des Cancers Ovariens (GINECO) group of platinum-based chemotherapy in older women with ovarian cancer, depression was the strongest prognostic factor, being the only one that correlated with all three outcomes of toxicity, PFS, and OS.⁶ The preliminary results of the PACE (Preoperative Assessment of Cancer in the Elderly) study reported that patients with depressive symptoms (evaluated by the Geriatric Depression Scale) had an increased risk of 30-day postoperative morbidity.⁷ Other series, however, did not reveal an independent predictive effect of depression.^{52,53} Many of these studies contained a relatively small number of patients, so we await data from larger trials to clarify the role of depression as an independent predictor in this population.⁵⁰

POLYPHARMACY

Physiologic changes associated with aging can contribute to differences in the pharmacokinetics and pharmacodynamics of cancer therapy. With aging, there is a decrease in total body water, an increase in body fat, a decrease in renal function, decrease in hepatic mass and blood flow, and decrease in bone marrow reserve. These changes, in combination with polypharmacy, can contribute to drug interactions and adverse drug events in older adults. Therefore, an integral part of the geriatric assessment is a review of the patient's medication list; discontinuation of any nonessential medications; and evaluation for drug interactions, adverse effects, and patient compliance.⁵⁴ Whereas articles on one-to-one drug interactions with chemotherapy are regularly published, data specific to the impact of polypharmacy on tolerance to cancer therapy are still scarce.⁵⁴ A review of data from the Moffitt Cancer Center on older patients receiving chemotherapy metabolized by cytochrome p450 highlighted that, on average, patients were taking six concomitant medications, including an average of two medications also metabolized by cytochrome p450.⁵⁵ A French series in a geriatric oncology inpatient unit showed that the inclusion of a pharmacist consultation can help decrease the risk of polypharmacy and lead to significant savings in drug expenditures.⁵⁶

CGA INTERVENTION IN OLDER PATIENTS WITH CANCER

Published studies using a CGA-based intervention in older patients with cancer are still rare. At the 2006 conference of the International Society of Geriatric Oncology, Soejono et al⁵⁷ presented the results of an Indonesian randomized trial of 87 older patients with stage III hepatocellular carcinoma randomly assigned to either admission to the geriatric ward (which implemented interventions based on a CGA) or an internal medicine ward. At discharge, there was a significant improvement in the ability to complete ADLs, as well as an improvement in pain and quality of life in patients who received care in the geriatric ward. Rao et al⁵⁸ reported on a subset analysis of older patients with cancer who participated in a randomized study to evaluate the benefits of geriatric assessment and management units. Among the 99 patients with cancer, patients randomly assigned to inpatient geriatric assessment and management units experienced improved pain control and mental health scores.

Two randomized studies evaluated the impact of incorporating elements of a CGA in the outpatient care of older patients with cancer who had undergone surgery. McCorkle et al⁵⁹ published the results of a randomized study in which 375 patients (age range, 60 to 92 years) with cancer who had undergone surgery were randomly assigned to either a 1-month home intervention or usual postoperative care. The intervention consisted of home visits and telephone contact by an advanced-practice nurse, and included an evaluation of the patient's functional status, comorbidity, depressive symptoms, and symptoms of distress. On a stratified log-rank analysis, the patients in the intervention group had an increased survival at a median follow-up of 44 months ($P = .002$). A Cox proportional hazard model, adjusted for covariates including cancer stage and length of hospitalization, demonstrated that the relative risk of death for the control group was 2.04 (95% CI, 1.33 to 3.12; $P = .001$). This advantage in survival was evident among patients with advanced-stage disease (67% intervention group v 40% control group alive at 2 years). The authors suggested that attention to the needs of patients and family, and the monitoring of physical status and offsetting of early complications might account for this benefit. Another possible hypothesis is that this short intervention prevented acute deconditioning, which can lead to a protracted decline in physical function.

In a randomized study, Goodwin et al⁶⁰ assessed the impact of nurse case management in the treatment of 335 older women with breast cancer. Patients in the intervention arm were more likely to have a return to normal functioning 2 months after completion of surgery, and were more likely to feel that they had a real choice in their treatment decisions. Women with poor social support derived the greatest benefit from this intervention.⁶¹ In addition, data from a small pilot study highlighted the fact that patients with breast cancer presented with multiple unaddressed geriatric problems, and that an intervention might impact cancer treatment.³⁰

The sum of these intervention studies suggests that a CGA can be performed in a variety of settings (inpatient, outpatient, or home), is a multidisciplinary effort, and can lead to interventions that may decrease the risk of morbidity and mortality in older patients with cancer. Further studies are needed using a CGA to (1) guide and test interventions to improve the care of older adults with cancer, and (2) evaluate the impact of cancer therapy on geriatric assessment domains.

SCREENING TOOLS

An important practical aspect of a CGA is the feasibility of incorporating it into an already busy clinical oncology practice. One approach is the development of screening tools that would sort out who is an “older adult” with intact physiology and psychosocial conditions, and who is in need of further multidisciplinary evaluation. This two-tiered, time-saving approach was investigated in a series of studies using two different instruments in an emergency room setting.^{62,63} A geriatric nurse/nurse practitioner evaluated patients who screened above a certain threshold, made referrals, and followed up to ensure compliance. This resulted in a reduced rate of functional decline (IADLs and death),⁶³ and increased referrals to primary physicians and home health services.^{62,63}

Several tools that address the questions of time and efficiency are also being developed specifically for older patients with cancer, or are being adapted for this population. Some of these screening instruments were derived directly from CGAs conducted in older cancer patients.^{64,65} Overcash et al⁶⁴ isolated 15 items (an abbreviated CGA) that correlated with the findings of the entire CGA in a large database of older patients with cancer who underwent a CGA as part of their oncology evaluation. These 15 items include three questions about ADLs, four questions about IADLs, four questions from the MMSE, and four questions from the Geriatric Depression Scale. The correlation between the abbreviated CGA and the entire CGA was 0.84 to 0.96, depending on the dimension assessed. In another study, Overcash et al⁶⁶ identified threshold scores in the abbreviated CGA that would trigger a full assessment. For example, if the patient had any impairment in the ADL or IADL items in the abbreviated CGA, then the full ADL and IADL scales should be administered. Similar thresholds were identified for the cognitive and depression scale items. The authors estimated that if the abbreviated CGA screen were used to assess 100 older patients, assuming that 10 would screen positive for limitations (a low estimate; see Table 1), the total time involved in geriatric evaluation of this number of patients would drop from 50 hours to 18 hours and 20 minutes. In another study, Roehrig et al⁶⁵ identified a subset of six of 18 ADL and IADL questions that could recognize 98.5% of patients with limitations in ADLs and IADLs.

Another approach has been to empirically design an assessment instrument that addresses specific patient problems that require intervention. Such an instrument was developed by the multidisciplinary clinical team of the Senior Adult Oncology Program at Moffitt.⁶⁷ In addition to function, depression, and cognitive screening, the screen includes questions regarding quality of life, self-rated health, falls, nutrition, sleep, polymedication, and social questions (drug payment and caregiver availability). After more than 2 years of clinical use, this screen has demonstrated face validity, finding that 63% of senior cancer patients needed psychosocial counseling, 40% dietary intervention, and 14% medication counseling and assistance (the latter probably underestimated).⁶⁸ This instrument has not yet been formally compared to more comprehensive assessments.

Other investigators have worked on developing a geriatric assessment measure that can be incorporated as part of the baseline evalu-

ation for older adults in cancer clinical trials. Hurria et al¹⁰ have developed a brief, primarily self-administered CGA which includes validated measures of functional status, comorbid medical conditions, cognitive function, psychological status, social functioning and support, and nutritional status. This CGA is being pilot tested in the CALGB.

Other groups have analyzed the performance of general geriatric screening tools in cancer patients. Mohile et al analyzed the performance of the VES13⁶⁹ in older prostate cancer patients.⁷⁰ Fifty percent of patients were identified as impaired on the VES13 (score \geq 3). That cutoff had a sensitivity of 72.7% and a specificity of 85.7% for impairment in two or more questions on a CGA. Another level of screening for more impaired patients is needed to assess for frailty. Among existing geriatric frailty screens, the Cardiovascular Health Study short assessment has been proposed for use in cancer patients.⁷¹⁻⁷³ However, data specific to screening for cancer patients are still pending.

CONCLUSION

The evidence from recent studies demonstrates that the domains evaluated in a CGA can predict morbidity and mortality in older patients with cancer. This is particularly true for IADLs and comorbidities. These data and the results of the first comprehensive intervention studies should prompt cooperative groups to develop a standardized CGA, integrate the CGA into studies that includes a high proportion of older patients, test the impact of CGA in guiding interventions to improve the outcome of older patients with cancer, and include geriatric variables in decision making. Incorporating a CGA at serial time points during and after cancer treatment in older patients can provide information regarding the short- and long-term impact of cancer therapy on physical function and other geriatric assessment variables. Use of a CGA can stimulate the development of novel end points for clinical trials that address quality of survival and functional independence in addition to traditional end points, which evaluate length of DFS and OS. Several recent studies are also beginning to pinpoint screening strategies that might speed the integration of a geriatric assessment into the oncology setting. Efforts to address these research priorities are under way.

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

The authors indicated no potential conflicts of interest.

AUTHOR CONTRIBUTIONS

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