

What Every Oncologist Should Know About Geriatric Assessment for Older Patients With Cancer: Young International Society of Geriatric Oncology Position Paper

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ASSOCIATED CONTENT



See accompanying commentaries on pages 95 and 97



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Abstract

Aging is a heterogeneous process. Most newly diagnosed cancers occur in older adults, and it is important to understand a patient's underlying health status when making treatment decisions. A geriatric assessment provides a detailed evaluation of medical, psychosocial, and functional problems in older patients with cancer. Specifically, it can identify areas of vulnerability, predict survival and toxicity, assist in clinical treatment decisions, and guide interventions in routine oncology practice; however, the uptake is hampered by limitations in both time and resources, as well as by a lack of expert interpretation. In this review, we describe the utility of geriatric assessment by using an illustrative case and provide a practical approach to geriatric assessment in oncology.

CASE

J.K. is a 73-year-old man who presented to his primary care physician complaining of bright red blood per rectum. He has a medical history of coronary artery disease, hypertension, hyperlipidemia, and cerebrovascular disease. He is on aspirin, lisinopril, metoprolol, and atorvastatin. A subsequent colonoscopy revealed a 3-cm mass in his descending colon. Biopsy of the mass showed invasive adenocarcinoma. He underwent computed tomography scans of the chest, abdomen, and pelvis, which showed no evidence of metastases. A laparoscopic colectomy was performed, and his cancer was staged as T2N2 (stage III) and microsatellite stable. He is referred to you to discuss adjuvant chemotherapy.

INTRODUCTION

Older adults are the fastest-growing segment of the population. According to the International Aging Reports, adults age 65 years or older comprised 8.5% of the total population in 2015, but this is projected to increase to 12% in 2030 and to 16.7% in 2050.¹ More than 60% of patients who are newly diagnosed with cancer are age 65 years or older, which makes this the most common population seen in an oncology practice.² Older adults are heterogeneous and have varying degrees of comorbidities, functional impairments, geriatric syndromes, and social support systems. Because older adults are not well represented in clinical trials and those who are included are often a selection of fit older adults, it can be challenging for oncologists

to apply evidence-based medicine to this population. This can lead to undertreatment and overtreatment and impact patient morbidity and mortality.

Geriatric assessment has been advocated as a way to provide detailed evaluation of the health status of an older adult. Although recommended by the National Comprehensive Cancer Network and the International Society of Geriatric Oncology (SIOG), geriatric assessment is not routinely implemented in oncology practice as it is perceived to be time and resource consuming.^{3,4} Although the time commitment and burden on patients and caregivers are concerns, recently developed cancer-specific geriatric assessment tools can gather a wealth of information in a relatively short amount of time.^{5,6} In this work, we briefly describe the utility of geriatric assessment in the care of older adults with cancer and provide a practical approach to geriatric assessment in oncology.

WHAT IS A GERIATRIC ASSESSMENT?

A geriatric assessment is a multidisciplinary diagnostic process that can detect medical, psychosocial, and functional problems that are not identified by routine evaluation. This can subsequently guide the management of identified problems. It was initially developed and has been validated in the general geriatric population for detecting vulnerability and aging-related issues that are associated with mortality.⁷ These geriatric assessment tools were subsequently simplified and transferred to oncology clinics for the assessment of older patients with cancer.⁸⁻¹⁰

As shown in Table 1, a geriatric assessment includes an assessment of several domains, including functional status, psychological health, polypharmacy, comorbidity, nutrition, social support, and cognition. There are several well-validated tools available to assess these domains. Most of the instruments can be self-administered. The choice of specific geriatric assessment tools in clinical practice should be tailored to the local health structures and resources. If geriatric specialists are available, geriatric assessment tools that are familiar to and used by them should be considered. Although not part of a geriatric assessment, patient and caregiver goals, as well as end-of-life preferences, should also be discussed before the implementation of a treatment plan.

WHY PERFORM A GERIATRIC ASSESSMENT?

Geriatric assessment should be performed in older patients with cancer for multiple reasons.³⁵ First, it has been shown that geriatric assessment can identify areas of vulnerability that

may otherwise be missed in routine oncology visits. For example, in patients with an Eastern Cooperative Oncology Group performance status score of < 2 , 38% required assistance in instrumental activities of daily living, such as taking medications, transportation, using the telephone, or managing finances.³⁶ In addition, a recent study has shown that, in 51.2% of patients, a geriatric assessment can identify abnormalities that are not otherwise detected during regular consultation, including poor physical functioning (40.1%), poor nutritional status (37.6%), falls (30.5%), depression (27.2%), and cognitive impairment (19.0%).³⁵ These impairment were independently associated with worse outcomes in patients with cancer.³⁸⁻⁴²

Second, geriatric assessment can predict survival and adverse events of treatment to assist clinical decision making. Treatment decisions in older patients with cancer can be challenging, as other comorbid conditions may limit life expectancy and the ability to tolerate oncologic treatment. A geriatric assessment can assist this process, as it can predict the risk of dying from causes other than cancer, and it can predict treatment toxicity. A systematic review of 51 studies that assessed the predictive value of geriatric assessment on survival concluded that several geriatric assessment domains, including performance status, geriatric depression scale, and nutritional status, were independent predictors of mortality.^{35,43-46} A geriatric assessment can also predict early death—6 and 12 month overall survival—in older patients.^{44,45} Several tools that use data from a geriatric assessment, such as the Chemotherapy Risk Assessment Scale for High-Age Patients (CRASH) and the Cancer and Aging Research Group (CARG) chemotherapy toxicity calculator, have been developed to assist in the prediction of chemotherapy toxicity. The Pre-Operative Assessment of Cancer in the Elderly study also demonstrated that 30-day postoperative morbidity could be predicted by the number of impaired domains that were detected on a geriatric assessment.⁴⁷ In hematologic malignancies, functional impairment identified on geriatric assessment was associated with hospitalizations.⁴⁸ Furthermore, it has been shown that a geriatric assessment can change treatment decisions for 5% to 50% of older patients.^{49,50} In these studies, 2% to 28% of patients had changed to more intensive treatment, whereas 17% to 37% had changed to less intensive treatment.^{10,50-53}

Third, geriatric assessment identifies areas where interventions can be performed, such as dietary advice, physical therapy, and social support, which can help patients tolerate

Table 1. Domains of a Full Geriatric Assessment and Examples of Tools Used

Tool by Domain	Time to Administer (min)	Abnormal Score
Demographic and social status		
Conditions of living, marital status, educational level, financial resources, social activities, family support	10	
Identification of the caregiver and burden (Zarit Burden Interview)	15-20	> 20
Comorbidity		
Charlson comorbidity index ¹¹	2	
CIRS ¹²		
CIRS-G ¹³		
Physical Health Section (subscale of OARS) ⁸		
Simplified comorbidity score ¹⁴		
Polypharmacy		
Beers criteria ¹⁵		
STOPP and START criteria ¹⁶		
Functional status		
ADL (Katz index) ¹⁷		< 6
IADL (Lawton scale) ¹⁸		< 8
Visual and/or hearing impairment, regardless of use of glasses or hearing aids		
Mobility problem (requiring help or use of walking aid)		
Timed Get Up and Go ¹⁹		
Hand grip strength		≥ 14s
Walking problems, gait assessment, and gait speed ^{20,21}		< 1m·s ⁻¹
Self-reported No. of falls (within different time frames)		
Cognition		
Mini-Mental State Examination ^{22,23}	10-15	< 24
Montreal Cognitive Assessment ^{24,25}		< 26
Clock-drawing test ²⁶		< 5
Blessed Orientation-Memory-Concentration Test ²⁵		> 4
Mini-Cog ^{27,28}		< 4

(continued in next column)

Table 1. Domains of a Full Geriatric Assessment and Examples of Tools Used (continued)

Tool by Domain	Time to Administer (min)	Abnormal Score
Mood		
GDS (Mini-GDS, GDS-15, GDS-30) ^{29,30}	15	Mini-GDS: < 1; GDS-15: > 5; GDS-30: > 10
Hospital Anxiety and Depression Scale ^{31,32}		> 7
Distress thermometer		
Nutrition		
Body-mass index (weight and height)		< 23
Weight loss (unintentional loss in 3 or 6 months)		
Mini-Nutritional Assessment ^{33,34}		< 24
Dentition		
Fatigue		
MOB-T ³⁵		
Geriatric syndrome ³⁶		
Dementia		
Delirium		
Incontinence (fecal and/or urinary)		
Osteoporosis or spontaneous fractures		
Neglect or abuse		
Failure to thrive		
Pressure ulcer		
Sarcopenia		

Abbreviations: ADL, activity of daily living; CIRS, Cumulative Illness Rating Scale; CIRS-G, Cumulative Illness Rating Scale-Geriatrics; GDS, Geriatric Depression Scale; IADL, instrumental activity of daily living; MOB-T, Mobility Tiredness Test; OARS, Older Americans Resources and Services; PS, performance status; START, Screening Tool to Alert Doctors to Right Treatment; STOPP, Screening Tool of Older Person's Prescriptions.

and complete prescribed systemic therapy. Kalsi and colleagues⁵⁴ compared the outcomes of older patients who underwent chemotherapy and who received interventions on the basis of issues that were identified on a geriatric assessment with those patients who received standard oncology care. High-risk patients were defined on the basis of the presence of active comorbidity, significant quality of life or functional difficulties, and geriatric assessment-detected vulnerabilities. Although the overall toxicity rate was not significantly different, high-risk patients in the geriatric assessment arm were

more likely to complete cancer treatment and required fewer treatment modifications.⁵⁴

WHEN TO PERFORM A GERIATRIC ASSESSMENT

Because biologic age often does not correspond to chronologic age, it is difficult to define the chronologic age above which a geriatric assessment should be done systematically. Several geriatric oncology experts recommend that all patients age 75 years of older should receive a geriatric assessment.⁵⁵ International organizations have also recommended that a geriatric assessment be performed in all older patients—those age 70 years or older—or at least in those older patients before the initiation of anticancer therapy.^{3,4} The selection of the age cutoff may also depend on available resources.

GERIATRIC SCREENING TOOLS

Given the time and resource barriers that are associated with geriatric assessment, the use of a geriatric screening tool to identify frail and/or vulnerable patients who are most likely to benefit from a geriatric assessment is appealing. Multiple screening tools have been developed, both in the general geriatric population and the cancer population. Some of them have been specifically tested in the cancer setting. These vary in the domains assessed, the length of the assessment, the time to complete, and test properties. Some of these screening tools, such as the Geriatric 8 (G8) and Senior Adult Oncology Program 2,^{56,57} are composed of items that sample several geriatric domains, whereas others, such as the abbreviated Comprehensive Geriatric Assessment, consist of selected questions from validated geriatric tools, such as the Geriatric

Depression Screen and Mini-Mental Status Exam. Characteristics of the most widely used and tested screening tools in older adults with cancer are listed in Table 2. The choice of screening tool depends on the clinical resources that are available at a center, the goals of screening, and familiarity with the tool. Although the updated SIOG recommendations on screening tools suggests that the G8 (shown in Appendix Table A1, online only⁶⁵) has been the best studied with highest sensitivity, the choice of screening tools depends on context, and no tool is recommended over another.⁶⁶ For oncologists with limited staff support, a fully self-reported geriatric screening tool, such as the Vulnerable Elderly Survey-13 (VES-13; shown in Appendix Fig A1, online only⁶⁷), that can be completed in < 10 minutes (median, 4 minutes) may be considered.^{58,68} For a more in-depth review of geriatric screening tools tested in the oncology population, we refer to a recent systematic review by Hamaker and colleagues or to the SIOG guidelines on this topic.^{66,69}

The value of utilizing geriatric screening tools if patients who are positive upon screening cannot receive a subsequent geriatric assessment is debated. One feasible option is the use of the self-reported geriatric assessment developed by the Alliance—formerly Cancer and Leukemia Group B—that is primarily self-reported in those patients who screen positive. Geriatric assessment tools can be completed by patients and/or caregivers using paper and pencil or a touchscreen computer in 15 to 20 minutes, and is available online (www.mycarg.org/tools) in English, Spanish, and Chinese⁹ (Fig 1). Other options are to integrate the geriatric assessment within existing local geriatric clinics. A useful feature of the online CARG geriatric assessment

Table 2. Selected Geriatric Screening Tools

Tool	No. of Items	Score Range	Time to Perform (min)	Abnormal Score	Sensitivity for Abnormal CGA (%)	Specificity for Abnormal CGA (%)	PPV (%)	NPV (%)	Positive Screen (%)
G8 ^{56,58,59}	8	0-17	4.4	≤ 14	65-92	3-75	44-86	8-78	64-94
VES-13 ⁶⁰	13	0-10	5.7	≥ 3	39-88	62-100	60-100	18-88	29-60
TRST ⁶¹	5	0-6	2	≥ 1	91-92	42-50	81-87	63	74-82
GFI ^{59,62}	15	0-15	N/A	≥ 4	30-66	47-87	86-94	40-59	64-79
Abbreviated CGA ⁶³	15	—	4	≥ 1	51	97	97	48	68
Fried frailty criteria ⁶³	5	—	5	≥ 3	37-87	49-86	77-95	16-66	66-88
SAOP2 ⁶⁴	27	—	N/A	≥ 1	100	40	90	100	84

Abbreviations: CGA, comprehensive geriatric assessment; G8, Geriatric 8; GFI, Groningen Frailty Index; NPV, negative predictive value; PPV, positive predictive value; SAOP2, Senior Adult Oncology Program 2; TRST, Triage Risk Screening Tool; VES-13, Vulnerable Elders Survey-13.

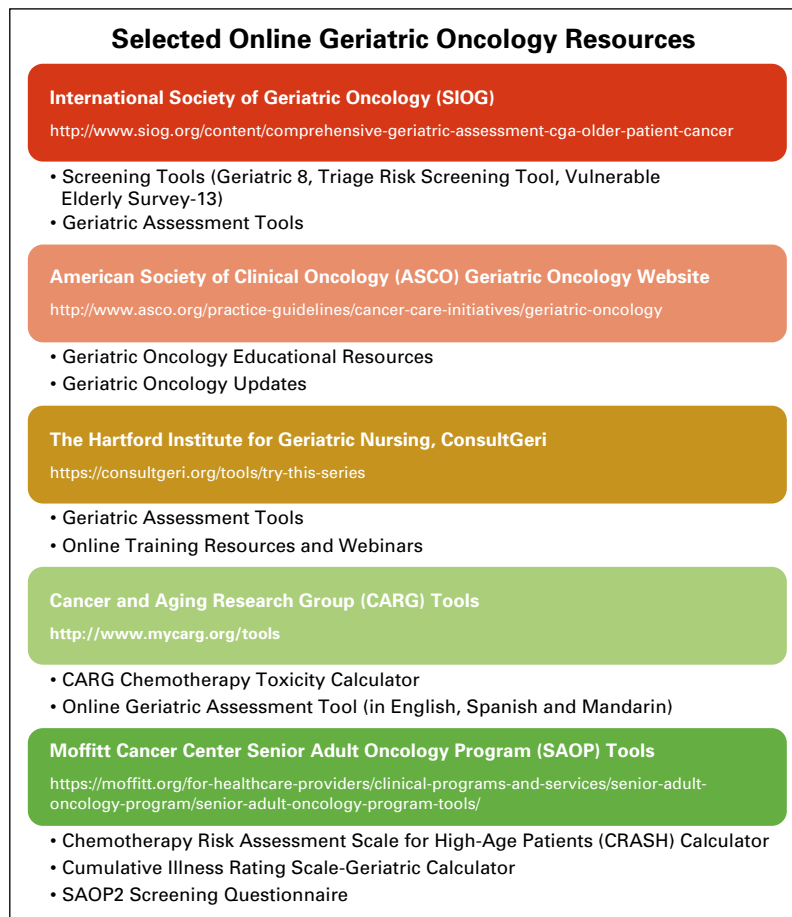


Fig 1. Online resources containing useful geriatric assessment tools and calculators.

tool is that, once the patient completes the assessment, a set of recommendations that are tailored toward identified issues can be visualized and printed as a PDF file. These can assist a busy clinician to interpret the results, and to tailor and implement specific interventions for the patients.

Even if a geriatric assessment cannot be performed, geriatric screening tools can provide useful information, and abnormal results in these tools have been associated with cancer outcomes. An abnormal G8, VES-13, and Triage Risk Screening Tool have been associated with functional decline and poorer survival.^{60,61,70} The Groningen Frailty Index has also been associated with worse survival.^{46,71} Thus, it may not be unreasonable to consider performing a geriatric screen even in those centers in which a subsequent full geriatric assessment would not be possible. Geriatric screening tools provide a rough, but objective, view of patients' underlying health status, and responses on individual components of the screening tools may unmask underlying impairment.

OTHER BRIEF MEASURES AND GERIATRIC ASSESSMENT–BASED TOOLS

Aside from the geriatric screening tools described above, several other brief measures are predictive of important outcomes that may influence treatment decisions. The Timed Up and Go (TUG) is a brief assessment of a patient's mobility and balance that can be easily administered using a chair, a stopwatch, and a 3-m walkway. The tester asks the patient to stand, walk 3 m, turn around, walk back, and sit.¹⁹ No specific training is needed to perform this test. A good example of how to perform a TUG can be found in a free online video produced by the Centers for Disease Control and Prevention.⁷² A TUG of > 13 seconds is associated with increased risk of falls in community-dwelling adults.⁷³ In patients with cancer, a TUG of > 20 seconds has been associated with shorter survival and three times higher odds of major postoperative complications.^{45,74} An abnormal score (≥ 5) on the Geriatric Depression Scale-15, which is a

self-reported 15-item measure, is also predictive of an increased risk of functional decline.⁷⁵

Two geriatric assessment-based tools, the CARG chemotherapy toxicity calculator (shown in Appendix Table A2, online only⁷⁶) and the CRASH score,⁷⁶ can also be used by health care providers to understand the patient's toxicity risk and guide shared decision-making when starting a new line of treatment in an older patient.^{78,79} These two calculators, which can be freely accessed online, use patient, tumor, and geriatric assessment information to predict the probability of experiencing grade ≥ 3 toxicities. The CARG tool, for instance, uses data that had been already obtained during a regular clinical encounter—age, tumor type, planned chemotherapy, weight, height, creatinine, and hemoglobin—and adds five additional questions regarding falls, social support, the ability to take medications, hearing impairment, and physical performance.⁸⁰ Both CRASH and CARG scores have been shown to be superior to other tools that are commonly used to predict toxicity in oncology practice, such as the Karnofsky performance status.^{36,77,80} Figure 1 contains a list of selected free online resources that can be used in everyday clinical practice to assess older adults with cancer.

Although many models for the delivery of geriatric oncology care have been developed, one size does not fit all clinical practices or settings^{36,81}; however, regardless of the available resources, health care providers who care for older patients with cancer should make an effort to foster collaboration with available institutional or external resources, such as geriatricians, social workers, physical and occupational therapists, pharmacists, and nutritionists, and work together to provide care for patients with deficits that were identified using screening tools or geriatric assessments.^{55,82} Fostering these multidisciplinary collaborations may allow for the referral of vulnerable patients to a geriatric medicine provider or geriatric oncologist, which, in turn, could have a positive effect on the outcomes of cancer treatments.

GERIATRIC ASSESSMENT FOR RADIATION AND SURGICAL ONCOLOGY

Although a larger body of work on geriatric assessment exists for older patients who received systemic cancer treatment, a systematic review found that components of the geriatric assessment, such as functional status, cognition, and depression, were consistently associated with worse postoperative outcomes.⁸³ Some of these geriatric assessment components—functional status, cognition, depression, nutritional status, medication review, and frailty—are recommended in the checklist for optimal

preoperative assessment of older patients who undergo surgery by the American College of Surgeons.⁸⁴ Research in radiation oncology is scant, but a prospective study has suggested that impaired score on VES-13 was associated with a higher probability of not completing radiation.⁸⁵ Readers are referred to a review on best practices in radiation oncology for older adults with cancer by SIOG.⁸⁶

OUR RECOMMENDED APPROACH

All oncologists should strive to include some form of geriatric assessment in their everyday clinical practice (Table 3). We believe that it is not only feasible, but necessary to provide older patients with high-quality cancer care. During the last decade, a huge effort has been undertaken to make the geriatric assessment less burdensome and accessible to non-geriatricians, and current cancer-specific geriatric assessment tools are easy to perform, even in busy clinical settings. In cancer centers in which resources are more widely available, a full geriatric assessment should be performed in all older patients with cancer age 70 years and older who are considered for any cancer treatment, as well as younger patients with age-related health concerns. The exact tools may differ as long as the geriatric assessment includes the following domains: functional status, psychological health, polypharmacy, comorbidities, nutrition, social support, and cognition (Table 1). In these high-resource settings, the availability of multidisciplinary teams makes it feasible to implement multicomponent interventions that are aimed at ameliorating or solving identified deficits.

The mean time to completion of a geriatric assessment ranges from 15 to 30 minutes on the basis of published studies.^{8,9,87} We recommend mailing the self-administered portions of the geriatric assessment to patients before their appointment so they can complete these at home to limit disruptions to clinic workflow and to allow patients to complete the geriatric assessment at their leisure. If they are unable to complete the assessment at home, patients can complete these in the clinic while waiting to be seen by their oncologist. After that, a trained nurse or patient-care technician can perform the objective assessment of cognition and physical function (approximately 5 to 10 minutes). Alternatively, the assessment of cognition and physical function can be incorporated into the physical examination by the oncologist. If a comprehensive geriatric assessment is primarily used to guide supportive care interventions during cancer treatment, it can also be done over multiple clinic visits.

Table 3. Proposed Approaches for the Implementation of Geriatric Assessment and/or Geriatric Screening Tools in a Routine Oncology Setting**Proposed Approach**

Geriatric assessment in all patients age 70 years and older are considered for any cancer treatment and younger patients with age-related health concerns in high-resource settings

Self-administered portion*

Functional evaluation—for example, ADL and IADL

Depression—for example, GDS-5

Medications are generally evaluated at clinic visits; for older individuals, greater emphasis is needed to minimize potential drug–drug interactions and deprescribe unnecessary medications

Comorbidity is often assessed at clinic visits, but oncologists may consider using a validated comorbidity index to quantify comorbidity

Nutritional evaluation—for example, weight loss and MNA

Social support; living situation and need for additional home support for older individuals—a social worker or other allied health care professional will often inquire about these circumstances

Health care professional portion†

Cognitive screening—for example, Mini-Cog or MMSE

Physical performance—for example, TUG

Chemotherapy toxicity risk calculation—for example, CARG or CRASH toxicity scores

Geriatric screening tool (one of the following) if at risk, followed by geriatric assessment described above—this may spare the efforts of full geriatric assessment in 20%-40% of patients

Geriatric 8

Vulnerable Elders Survey-13

Triage Risk Screening Tool

Groningen Frailty Index

Senior Adult Oncology Program 2

Abbreviated Geriatric Assessment

Fried frailty criteria

Low-resource setting or if time is limited (one or more of the following):

One of the geriatric screening tools described above and chemotherapy toxicity risk calculation—for example, CARG or CRASH toxicity scores

Referral to geriatrician if screened positive for impairment on geriatric screening tools

If a geriatrician is not available, consider other tests on the basis of clinical impression and health areas at risk—for example, as indicated by screening tool; may consider ADL, IADL, and Mini-Cog in addition to the geriatric screening tool

Abbreviations: ADL, activity of daily living; CARG, Cancer and Aging Research Group; CRASH, Chemotherapy Risk Assessment Scale for High-Age Patients; GDS-5, Geriatric Depression Scale-5; IADL, instrumental activity of daily living; MMSE, Mini-Mental State Examination; MNA, Mini-Nutritional Assessment; TUG, Timed Get Up and Go.

*The self-administered portion can be done at home before the clinic visit or at the waiting area before physician encounter.

†The health care professional portion can be done while patients are waiting to be seen. Geriatric assessment can also be done over multiple visits.

We have also performed the assessment in the infusion center while patients received cancer treatment or supportive care interventions, such as intravenous fluids.

Oncologists who practice in settings with less support should take advantage of several of the tools described in this article and include them in their everyday clinical workflow. Screening tools could be used to identify fit older patients who do not require additional assessments or interventions and highlight domains that may require more attention, as well as those patients who may be at high risk of chemotherapy toxicity or early mortality. Many of these can be performed by oncologists and only require several minutes.

We recommend that oncologists consider using either the G8 or VES-13 to screen patients, as these are the two most commonly studied tools (Table 2, Appendix Table A1, and Fig 1). If a nurse practitioner or other staff member is available, the G8 tool can be administered before the oncology consultation. In practices where this is not possible, patients could also complete a self-reported screening tool, such as the VES-13, while waiting to see the oncologist. The next step for patients who screen positive depends on the existing resources at the practice and in the community. If a geriatrician is readily available, patients who screen positive for a full geriatric assessment should be referred to a geriatrician for comanagement of the patient

during treatment. If a geriatrician is not available, patients could undergo TUG and the online CARG self-reported geriatric assessment, which will provide the oncologist with a set of recommendations that could be discussed with the patient and implemented using resources available in the community, such as physical therapists, social workers, nutritionists, or pharmacists. If the online CARG self-reported geriatric assessment is not possible, an assessment of activity of daily living, instrumental activity of daily living, and cognition—using mini-Cog—should at least be considered.^{17,18,28}

Finally, oncologists should use geriatric assessment–based calculators—CARG or CRASH score—to determine chemotherapy toxicity risks in all older adults with cancer. Although treatment modifications on the basis of these tools have not been shown to improve outcomes, the information can be helpful when discussing the risks and benefits of treatment, ultimately promoting shared decision-making. In addition, these tools could help clinicians identify high-risk patients who may require closer monitoring or follow-up, thus allowing for a more efficient use of available resources.

BACK TO THE CASE

In our 73-year-old patient, a G8 screening tool was performed, and he scored a 10 out of a total score of 17; therefore, he was sent to a geriatrician for a full geriatric assessment. He is independent with all activities of daily living, but does require assistance with shopping. He had two falls and has lost approximately 5 lbs in the preceding 6 months of his diagnosis. He screened negative for cognitive impairment (a score of 26 of 30 on Montreal Cognitive Assessment), but screened positive for depression (a score of seven out of 15 on the Geriatric Depression Scale-15). He reported good hearing and vision. He lives with his spouse at home. As a result of impairment in his functional status, he was referred to a physical therapist and was advised to exercise more frequently and consistently. For his weight loss, he was referred to a nutritionist for dietary advice. For his depression, mirtazapine was administered and he was also referred to a psychiatrist. The benefit of adjuvant chemotherapy was discussed, and the patient was told that his 5-year overall survival may improve by 7% on the basis of a pooled analysis of seven randomized trials in older adults with colon cancer.⁸⁸ His CARG toxicity score translated to an 82% probability of grade 3 to 5 toxicities with single-agent standard dose chemotherapy (Appendix Fig A2, online only); this risk

may be somewhat lower for fluorouracil, specifically—the score only takes into account single chemotherapy versus combination chemotherapy—but is likely to be substantial. The information was discussed with the patient and his family, and he ultimately decided not to undergo chemotherapy given the high risk of toxicities. He understood that the risk of colon cancer recurrence is higher and was willing to accept this possibility.

FUTURE DIRECTIONS AND CONCLUSION

In summary, understanding the health status of an older adult is just as important as understanding the underlying tumor biology. A geriatric assessment can identify areas of vulnerability, predict survival and toxicity, assist in clinical treatment decisions, and guide interventions in routine oncology practice. Ideally, all older patients who are being considered for cancer treatments should receive a geriatric assessment as part of their evaluation; however, in settings of limited time and resources, a geriatric screening tool could be used. Active research is ongoing to assess if geriatric assessment–guided interventions improve outcomes in older adults with cancer ([ClinicalTrials.gov](https://clinicaltrials.gov) identifiers: NCT01915056 and NCT02107443). To disseminate the use of a geriatric assessment and the various available screening tools, education of oncologists and geriatricians on tools that are validated, efficient, and predictive of outcomes is needed. Finally, collaboration among oncologists, primary care physicians/geriatricians, nurses, social workers, physical therapists, occupational therapists, nutritionists, and pharmacists is crucial to increase the utilization of geriatric assessment and geriatric assessment–directed interventions. **JOP**

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST**What Every Oncologist Should Know About Geriatric Assessment for Older Patients With Cancer: Young International Society of Geriatric Oncology Position Paper**

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Appendix

VES-13

1. Age _____

SCORE: 1 POINT FOR AGE 75-84
3 POINTS FOR AGE ≥ 85

2. In general, compared to other people your age, would you say that your health is:

☐ Poor,* (1 POINT)
☐ Fair,* (1 POINT)
☐ Good,
☐ Very good, or
☐ Excellent

SCORE: 1 POINT FOR FAIR or POOR

3. How much difficulty, on average, do you have with the following physical activities:

	<u>No Difficulty</u>	<u>A little Difficulty</u>	<u>Some Difficulty</u>	<u>A Lot of Difficulty</u>	<u>Unable to do</u>
a. stooping, crouching or kneeling?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *	<input type="checkbox"/> *
b. lifting, or carrying objects as heavy as 10 pounds?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *	<input type="checkbox"/> *
c. reaching or extending arms above shoulder level?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *	<input type="checkbox"/> *
d. writing, or handling and grasping small objects?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *	<input type="checkbox"/> *
e. walking a quarter of a mile?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *	<input type="checkbox"/> *
f. heavy housework such as scrubbing floors or washing windows?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> *	<input type="checkbox"/> *

SCORE: 1 POINT FOR EACH * RESPONSE IN Q3a THROUGH f . MAXIMUM OF 2 POINTS.

4. Because of your health or a physical condition, do you have any difficulty:

a. shopping for personal items (like toilet items or medicines)?

☐ YES → Do you get help with shopping? ☐ YES * ☐ NO
☐ NO
☐ DON'T DO → Is that because of your health? ☐ YES * ☐ NO

b. managing money (like keeping track of expenses or paying bills)?

☐ YES → Do you get help with managing money? ☐ YES * ☐ NO
☐ NO
☐ DON'T DO → Is that because of your health? ☐ YES * ☐ NO

Continued

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Fig A1. Vulnerable Elders Survey (VES-13); a score of ≥ 3 indicates impairment. Reprinted with permission from the Journal of the American Geriatrics Society.⁵⁸

c. walking across the room? USE OF CANE OR WALKER IS OK.

- | | | |
|---|--------------------------------|-----------------------------|
| <input type="checkbox"/> YES → Do you get help with walking? | <input type="checkbox"/> YES * | <input type="checkbox"/> NO |
| <input type="checkbox"/> NO | | |
| <input type="checkbox"/> DON'T DO → Is that because of your health? | <input type="checkbox"/> YES * | <input type="checkbox"/> NO |

d. doing light housework (like washing dishes, straightening up, or light cleaning)?

- | | | |
|--|--------------------------------|-----------------------------|
| <input type="checkbox"/> YES → Do you get help with light housework? | <input type="checkbox"/> YES * | <input type="checkbox"/> NO |
| <input type="checkbox"/> NO | | |
| <input type="checkbox"/> DON'T DO → Is that because of your health? | <input type="checkbox"/> YES * | <input type="checkbox"/> NO |

e. bathing or showering?

- | | | |
|---|--------------------------------|-----------------------------|
| <input type="checkbox"/> YES → Do you get help with bathing or showering? | <input type="checkbox"/> YES * | <input type="checkbox"/> NO |
| <input type="checkbox"/> NO | | |
| <input type="checkbox"/> DON'T DO → Is that because of your health? | <input type="checkbox"/> YES * | <input type="checkbox"/> NO |

SCORE: 4 POINTS FOR ONE OR MORE *
RESPONSES IN Q4a THROUGH Q4e

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Fig A1. (Continued).

Gender: **Male** ▾
 Patient's Age: **73**
 Patient's Height: **Centimeters** ▾ **170** ▾
 Patient's Weight: **Kilograms** ▾ **80** ▾
 Cancer Type: **Gastrointestinal** ▾
 Dosage: **Standard dose** ▾ *
 Number of chemotherapy agents: **Mono-chemo therapy** ▾
 Hemoglobin: **≥11 g/dL** ▾
 How is your hearing (with a hearing aid, if needed)? **Good** ▾
 Number of falls in the past 6 months: **1 or more** ▾
 Can you take your own medicines?: **Without help (in the right doses at the right time)** ▾
 Does your health limit you in walking one block?: **Limited a little** ▾
 During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?: **Some of the time** ▾
 Select Serum Creatinine: **1** ▾
 Creatinine Clearance: **57** **
[Submit](#)
 Toxicity Score: **12**
 Risk of Chemotherapy Toxicity: **82%**
[What does this mean?](#)
 * Dose delivered with first dose for chemotherapy
 ** Jelliffe formula

Fig A2. Cancer and Aging Research Group (CARG) chemotherapy toxicity prediction tool. Based on the patient demographics, clinical and geriatric-assessment derived information, the probability of grade 3-5 toxicities was 82%.

Table A1. Geriatric 8 Screening Instrument

Item	Response (score)
Has food intake declined over the past 3 months as a result of loss of appetite, digestive problems, and difficulties with chewing or swallowing?	0 = Severe decrease in food intake 1 = Moderate decrease in food intake 2 = No decrease in food intake
Weight loss during the past 3 months	0 = Weight loss of > 3 kg 1 = Does not know 2 = Weight loss between 1 kg and 3 kg 3 = No weight loss
Mobility	0 = Bed or chair bound 1 = Able to get out of bed or chair but does not go out 2 = Goes out
Neuropsychological problems	0 = Severe dementia or depression 1 = Mild dementia 2 = No psychological problems
Body mass index	0 = $\leq 19.0 \text{ kg/m}^2$ 1 = $19.0\text{-}20.9 \text{ kg/m}^2$ 2 = $21.0\text{-}22.9 \text{ kg/m}^2$ 3 = $\geq 23.0 \text{ kg/m}^2$
Does the patient take more than three prescribed drugs per day?	0 = Yes 1 = No
Compared with other people of the same age, how does the patient consider his health status?	0 = Not as good 0.5 = Does not know 1.0 = As good 2.0 = Better
Age	0 = > 85 years 1 = 80-85 years 2 = ≤ 80 years
Total score	0-17

NOTE. A score of ≤ 14 indicates impairment (modified from Bellera et al⁵⁶).

Table A2. CARG Chemotherapy Toxicity Prediction Variables⁸⁰

CARG Grade 3-5 Toxicity Variable	Score
Age \geq 72 years	2
GI/genitourinary cancers	3
Standard dose chemotherapy	3
Polychemotherapy	2
Anemia (male < 11 g/dL; female < 10 mg/dL)	3
Creatinine clearance < 34 mL/min (Jelliffe equation, ideal body weight)	3
Falls in the last 6 months (more than one)	3
Hearing impairment (fair/worse)	2
Limited ability to walk one block (somewhat limited/limited a lot)	2
Requires assistance with medications (some help/unable)	1
Decreased social activities (limited at least sometimes)	1
Range: 0-25	

Abbreviation: CARG, Cancer and Aging Research Group.