

Health Status Screening in Elderly Patients – Is this the Way Forward?

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Abstract

The rapid ageing of the European population poses a challenge for healthcare systems. The incidence of cancers will rise as the number of adults aged 65 years and older increases. Moreover, the health status of individuals in this age group is diverse, and thus requires modern oncology to apply an individualised approach to treatment. There is a clear need to develop and validate health assessment tools enabling the identification of specific geriatric issues which might be overlooked by standard assessment methods. The Comprehensive Geriatric Assessment (CGA) is the 'gold standard' for geronto-oncology assessment. However, the complexity of this test has stimulated a search for pre-screening methods able to identify individuals with the potential to gain most from full pre-treatment CGA. Such tools consist of specific tests to evaluate health status in the important functional, psychological, social and cognitive domains. The choice of which tests are best to use within the various screening tools is still a subject of debate. This paper presents a review of the most commonly used tests within various health status domains as well as of the most valuable screening tools.

Keywords

Screening tools, geriatric assessment, oncogeriatrics, comprehensive geriatric assessment, elderly

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Europe is undergoing considerable demographic change. It is estimated that people aged over 65 years will make up 28 % of Europe's population in 2050.¹ Many neoplasms develop and are diagnosed in seniors; for example, 65 % of males with prostate cancer are aged over 65 years while women aged 75–79 years have the highest incidence rate of breast cancer at 441.9 cases per 100,000.²

At the same time, however, the outcomes of treatment of elderly patients suffering from cancer are far from satisfactory. This may be because patients who are over 75-years-old are underrepresented in the group of patients treated aggressively with radical intent. A good illustration of this was described in a study conducted by Aparicio, which revealed that 52 % of elderly patients diagnosed with colorectal cancer had sub-standard cancer treatment, especially with regard to adjuvant therapy.³ Bastiaannet et al. found striking differences in the relative survival rates of elderly breast cancer patients by comparison with younger patients.⁴ Lunbrook observed a similar situation in the treatment of small cell lung cancer: only 40 % of patients aged over 75 years were treated with radical chemoradiotherapy compared to 86 % of patients younger than 65 years.⁵ This situation has been confirmed in an analysis of relative risk survival in elderly cancer patients, which detected reductions in survival rates with increasing age for most cancer sites.⁶ Moreover, the under-representation of older patients in clinical trials makes treatment databases incomplete and makes it impossible to assess the potential for individualised treatment of older patients. This creates a number of difficulties when using evidence-based medicine recommendations and decision-making tools such as Adjuvant! Online, which are reliant on treatment results from large groups of patients which may not include seniors.

The individualisation of treatment is particularly important for patients aged 70–85 years, whose state of health can be very variable. There are no precise definitions of the stages of aging, and date of birth alone clearly cannot be regarded as a sufficient criterion. Some patients may undergo radical treatment with no modifications in therapeutic protocols; however, more vulnerable patients might only tolerate individualised palliative treatment or best supportive care. For some senior patients the situation is more complicated, as despite having a good performance status before treatment, their physiological reserves may be exhausted, homeostatic balance disturbed and their health deteriorate during treatment.

This group requires an individualised approach to both radical and palliative treatment because of physiological changes due to ageing and their co-morbidities and the interactions between medications used for treating them and any oncological treatment, especially cytostatics. The average number of medications taken by seniors with co-morbidities is six, most of which may potentially interact with anticancer drugs.⁷

This situation poses a challenge for the multidisciplinary team charged with planning treatment. Often, for logistical reasons, it is not possible to include a geriatrician in the team. Even having a geriatrician who is familiar with oncological issues in the team does not solve the problem, however, because the comprehensive geriatric assessment (CGA) – the clinically-validated gold standard for assessment of seniors^{8–11} – is time and manpower consuming, due to its complexity and multidimensionality,¹² bringing other logistical and financial problems.¹³ It seems advisable to include a preliminary credible screening of elderly patients by an oncologist,

followed by CGA for those patients who need it. Such a two-step evaluation is also recommended by the International Society of Geriatric Oncology (SIOG).¹⁴

Purpose of Screening Tools

As the essence of an appropriate evaluation of seniors' health lies in its multidimensionality, there are many screening tools that enable prompt evaluation of various health domains. Such screening divides patients into three groups: healthy and independent patients who can undergo standard treatment with outcomes similar to the rest of the population; patients with moderate impairment requiring slight modification of treatment protocols; and patients whose state of health is most likely to deteriorate, possibly resulting in death. The two latter groups derive benefit from comprehensive geriatric assessment and they should be provided with such an evaluation. Such a division also is in accordance with the widely known and widely used definition of frailty, which categorises patients as healthy, vulnerable or frail depending on the results of the geriatric evaluation.⁸

An overview of the most relevant tests in particular health status domains is presented below.

Functional Status

The instruments most frequently used to assess functional condition are the Katz basic activities of daily living (ADL) scale¹⁵ and the Lawton–Brody instrumental activities of daily living (IADL) scale.¹⁶ These tests analyse the person's functional performance both in the home – washing, getting dressed, moving around – and outside the home – finances, transportation, shopping, using telephone, etc. They also assess the person's degree of independence. It is recommended that these tests are repeated annually for cancer patients, because they detect gradual changes in daily functional performance not detected by standard performance status evaluation tests (e.g. Eastern Cooperative Oncology Group [ECOG] performance status) even in patients with a good status.

These tests have proved effective in everyday clinical practice. Milan-Callenti et al. demonstrated that need of assistance in ADL and IADL constitutes a predictor of mortality in the population of elderly cancer patients.¹⁷ Many other studies have shown that need of assistance in IADL correlates with poorer treatment outcomes in specific clinical situations, for instance, in lung cancer treated with cytostatics¹⁸ and during pre-surgical assessment.¹⁹

The Timed Up Go (TUG) test is used as a frailty marker. It measures the time taken in seconds for a person to get up, walk 10 feet, turn back, walk back and sit down.²⁰ The simplicity of the test encourages its inclusion into a minimal geriatric assessment process.

Biological and Physiological Status

Ageing triggers widespread changes in processes affecting both lifespan and the body's physiological reserves. Moreover, cancer itself negatively impacts an organism's biological status. An assessment of physiological status is therefore extremely important when planning tailored treatment for older patients.

The most commonly used predictors of treatment tolerance are assessments of liver, renal and bone marrow function. For example, anaemia is correlated with higher mortality in seniors²¹ and it has been shown that albumin levels are both an indicator of an organism's

reserves and an independent mortality risk factor.²² The degree of toxicity and tolerability of a planned cytotoxic treatment depends on renal function. Plasma creatinine levels and creatinine clearance rates are simple markers of renal function. High levels of interleukin-6 and D-dimers, independent of the presence of cancer, are markers of activated inflammatory and coagulation processes, and thus an indicator of frailty in older persons.²³ Considering all the above, the SIOG task force on CGA recommends integration of biochemical markers such as albumin, haemoglobin levels and creatinine clearance into an assessment of the tolerability of planned treatment in seniors.⁸

Co-morbidities

Co-morbidities and functional status should be assessed independently.²⁴ Co-morbid illnesses are more frequently present in elderly patients than in younger patients, and they have a negative impact on the effects of oncological treatment.^{25,26} A lot of research employs the Charlson Co-morbidity Index (CCI) as a screening test for co-morbidities. The test has proven clinical value; for example, it demonstrated that hypertension can intensify cardiomyopathy associated with trastuzumab and anthracycline treatment.^{27,28} In some situations the Cumulative Illness Rating Scale for Geriatrics (CIRG-G) is used to classify co-morbidities. The reliability of both tests is comparable.²⁹

Psychological State

Between 12 % and 20 % people aged over 65 years experience symptoms of depression.³⁰ Among the sequelae to depression are lack of appetite – which in turn leads to malnutrition – and poor compliance with treatment – because depressed patients are less motivated to undergo treatment. A frequently-used test for assessing depression is the Hospital Anxiety and Depression Scale (HADS).³¹ Other tests include the Geriatric Depression Scale (GDS), developed by Yesavage as a 30-item scale,³² and the distress thermometer, which is composed of simple questions, answers to which form the basis of which likelihood of depression can be determined.

Polypharmacy

This is directly linked to numbers of co-morbidities. The average number of medications taken by seniors is six and the trend is for this to increase.⁷ Often the number of drugs taken is too high, which can be significant in the context of oncological treatments because one therapy may intensify the toxicity of another and produce adverse drug reactions. The Beers list, which contains information on drugs which are potentially toxic for older patients,³³ and the Medication Appropriateness Index (MAI), may be useful measures of appropriate prescribing and optimal pharmacological treatment. Reducing the number of medications taken by the patient is often the first action of a geriatrician before initiating treatment for cancer.

Cognitive Function

A decrease in cognitive function is linked to the stages of ageing. Approximately one-third of elderly patients experience cognitive disorders, and dementia and delirium are the most frequently-reported dysfunctions in seniors with cognitive disorders. According to Plassman et al., dementia affects 25–48 % of patients aged over 80 years.³⁴ Dementia can result in decreased compliance with treatment regimens.³⁴ Additionally, anticancer treatment may worsen cognitive impairment.

Usually, the Mini Mental State Examination (MMSE) test is used to carry out a prompt assessment of cognitive function. In some cases the

Montreal Cognitive Assessment (MoCA) test³⁵ is also employed. This detects mild cognitive impairment missed by the MMSE test.³⁶ Another test applied in dementia screening is the Blessed Orientation-Memory-Concentration (BOMC) test. Delirium is underdiagnosed and is characterised by acute onset, agitation and memory and concentration impairment. It is assessed using the Confusion Assessment Method (CAM). This test was developed by Inouye³⁷ and was validated as a sensitive clinical tool by Monetti in a group of 110 patients.³⁸

Nutrition

For various reasons, nearly half of seniors are at risk of malnutrition, which can negatively affect treatment outcomes. A correlation was found between body mass index (BMI) and mortality³⁹ in a study that also assessed weight loss and the reduction of ingested food. In an analysis of 3,047 patients, ECOG found that weight loss before initiating chemotherapy has a negative impact on survival.⁴⁰ The patient’s nutritional state must be evaluated not only before but also during oncological treatment, since side effects such as nausea and mucositis may disrupt food intake and the loss of appetite and sense of taste, experienced, for example, after radiotherapy, often additionally results in food aversion. Tools such as the malnutrition screening tool (MST),⁴¹ malnutrition universal screening tool (MUST)⁴² and the nutrition risk screening (NRS) tool⁴³ are useful in assessing nutritional status. The most popular test is the mini nutritional assessment (MNA)⁴⁴ (or its Short Form [MNA-SF]).⁴⁵ All of these tests evaluate BMI, weight loss, use of a feeding tube and psychological problems.

Social Functioning

The assessment of patients’ social and economic situation is often ignored. However, it should be borne in mind that the costs of oncological treatment may become a financial barrier for a patient both in terms of access to both optimal treatment and support. Lonely patients are not only at the highest risk of late cancer diagnosis but also experience worse outcomes for radical treatment. Moreover, unsatisfactory financial and social support can lead to psychological problems such as depression and distress, which, in turn, adversely affect both treatment outcomes and satisfaction with outcomes. Thus social workers sensitive to the needs and situation of elderly patients should always be involved in their care in order to identify their needs and address problems that they may experience. Tests used to assess social conditions and measure access to financial assistance and emotional support are the Medical Outcomes Study Social Activity Limitations Measure (MOS),⁴⁶ the Medical Outcomes Study Social Support Survey: Emotional/Information and Tangible Subscales and Seeman and Berkamn’s Social Ties, which includes four questions concerning family life and close contact with friends and relatives as well as affiliation to a church or other group.

Frailty

The definition of frailty was proposed by Fried.⁴⁷ Frailty is a biological syndrome of decreased reserve and resistance to stressors, causing vulnerability to adverse outcomes. Fried et al. designed an index of frailty which includes five components: weight loss, exhaustion, physical activity, walk time and grip strength. The tool was validated in a sample of 5,317 patients aged over 65 years. Patients are placed in one of three categories – frail, pre-frail and frail – based on the results of the test. This helps to plan treatment so that unpredictable reactions to stress are taken into consideration, especially for the pre-frail group. This group should be subjected to a wider geriatric assessment. The Canadian Study of Health and Ageing (CSHA) allows

Table 1: Screening Tools and Health Status Domain Tested

Screening Tool	Health Status Tests
Minimal Geriatric Assessment (MGA)	Eight modules: dementia; depression; dependence; malnutrition and BMI; co-morbidities; polypharmacy; environment; haemoglobin and creatinine level; and creatinine clearance
Abbreviated Comprehensive Geriatric Assessment (aCGA)	15 items including IADL, ADL, MMSE, GDS
Lach’s screening test	IADL, ADL, hearing, vision, incontinence, nutritional and mental status, depression, social environment
Test Vulnerable Elders Survey 13 (VES-13)	Age, self-assessment of health, ADL, IADL
The Groningen Frailty Index (GFI)	Mobility, vision, hearing, nutrition, co-morbidities, cognition, psychosocial, physical fitness, performance status
The G8	CIRS-G, ADL, IADL, MMSE, MNA, GDS-15 and TUG
The Senior Adult Oncology Program (SAOP) screening	Functional, psychological and cognitive status, nutrition, polypharmacy, and social and quality of life
Chemotherapy Risk Assessment Scale for High age patients (CRASH)	IADL, MNA, MMS
Pre-Operative Assessment of Cancer in the Elderly (PACE)	Elements of CGA, Brief Fatigue Inventory (BFI), Performance Status American Society of Anesthesiologists physical status examination system (ASA)

ADL = Activities of Daily Living; ASA = American Society of Anaesthesiologists; BFI = Big Five Inventory; BMI = body mass index; CGA = Children’s Global Assessment scale; CIRS-G = Cumulative Illness Rating Scale for Geriatrics; GDS = Geriatric Depression Rating Scale; GDS-15 = 15-item GDS; IADL = Instrumental Activities of Daily Living; MMSE = Mini Mental State Examination; MNA = Mini Nutritional Assessment scale; TUG = timed up and go.

for a similar classification of patients. It additionally recognises frailty as a predictor of survival.⁴⁸

Tests Used in Health Status Pre-screening in Seniors Undergoing Oncological Therapy

Many of these tests are used separately in everyday clinical practice and clinical trials.^{49,50} Each of the presented tests has proved its clinical value in the detection of frailty as well as enabling screening of patients to facilitate optimal treatment choice. However, geriatric assessment is complex, even in the case of the minimal preliminary assessment of health, it is, therefore, necessary to apply a set of selected tests which will provide a reliable and quick answer to the question: ‘Which patients should undergo detailed CGA assessment?’⁵¹ Such a set of tests – a screening tool that could be used by oncologists within the framework of the multidisciplinary team – should be easy and quick to use. It also ought to identify major problems that cannot be detected by physical examination and, finally, have a high negative predictive value in order to exclude the possibility of vulnerability.⁵²⁻⁵⁵ The most useful instruments to have been developed and widely-tested are listed in *Table 1* and briefly described below.

Minimal Geriatric Assessment (MGA)

Aparicio used the MGA before conducting full CGA on a sample of 21 patients aged over 75 years undergoing treatment for digestive cancer.⁵⁶ MGA contains eight simplified modules that evaluate functional, cognitive, psychological, nutrition and social status, as well as co-morbidities, polypharmacy, haemoglobin and creatinine levels and

creatinine clearance rates. The results of the test were used to modify oncological treatment with MDT in 47 % of patients. CGA, conducted afterwards, did not change the treatment strategy, only supportive care.⁵⁶ This test seems to be a useful screening tool, however, it still requires further research on a larger group of patients. The results of two validation studies (the OLD and ONCODAGE studies) are awaited.

Abbreviated Comprehensive Geriatric Assessment

This test includes the 15 most predictive items of CGA. It was designed as a tool for assessing whether a patient should be subjected to full ADL, IADL or MMSE tests.⁵⁷ It is in essence an optimised full CGA test.⁵³ Its sensitivity varies for different parts of the test, being highest for IADL and ADL, lower for GDS (69 %) and lowest for cognitive function (23 %).⁵³

Lach's Screening Test

This test assesses the physical state, vision, nutrition, mental status, depression, urinary incontinence, IADL, ADL, domestic and social environment of the patient.⁵⁸

Vulnerable Elders Survey 13

This is a self-administered test that consists of one item concerning age and 12 items assessing health. Its clear cut-off point makes it a very practical test. This tool was clinically validated on a sample of older patients with prostate cancer.⁵⁹ In assessments of this test, Kellen showed the it had a sensitivity of 61 % and a negative predictive value of 48 %, similar to results obtained by Mohile et al.⁵⁹ Falci, on the other hand, demonstrated significant inconsistencies between VES-13 and CGA.⁶⁰

The Groningen Frailty Index

This tool assesses disturbances in the physical, cognitive, social and psychological domains. Similar to VES-13, it is based on a clearly defined cut-off point. Nevertheless, in studies its sensitivity and negative predictive value have been found to be relatively low – 39 % and 40 %, respectively.⁵³

The Senior Adult Oncology Program Screening

A second version of this tool was developed at the Moffit Cancer Center (Tampa, FL) as a screening tool for assessing function, psychological, social and cognitive status, as well as nutrition, polypharmacy and quality of life. The test was clinically validated and compared to CGA. Its sensitivity is fair.⁶¹ Questionnaires have been translated into French and Spanish.

The G8

This tool consists of eight items with a defined threshold level for which the sensitivity is 90 %. It is easy and quick to use and includes the CIRS-G, ADL, IADL, MMSE, MNA, GDS-15 and TUG tests. It is currently the subject of a French multicentre trial, ONCODAGE, which aims to compare VES-13, G8 and CGA. The preliminary results presented by Suberyan at the American Society of Clinical Oncology (ASCO) meeting in Chicago IL in June 2011 were encouraging.⁶²

Tools Dedicated to Risk Assessment

The following tools facilitate therapeutic decision making by measuring the risk of serious complications after a chosen treatment is initiated.

Chemotherapy Risk Assessment Scale for High Age Patients

This scale is the most commonly used and is designed to assess a patient before chemotherapy. It includes IADL, MNA and MMS tests

and identifies four groups at risk of hematologic and other severe toxicities.⁶³

Pre-operative Assessment of Cancer in the Elderly

This tool measures the usefulness of a geriatric evaluation before a surgery and assesses the risk of serious surgical complications 30 days after a cancer surgery. PACE contains elements of CGA, the brief fatigue inventory (BFI), performance status (PS) and the American Society of Anesthesiologists (ASA) physical status examination system. Although a prospective study with 460 patients has already been conducted, the tool has not yet been clinically validated.¹⁹

Discussion

A CGA, as recommended by SIOG, remains a gold standard in the evaluation of the health of seniors. It can identify many problems which are not detected in the everyday assessments conducted by oncologists who normally use performance status scales such as the Karnofski Performance Status (KPS) and ECOG to assess the patient's state of health. A CGA allows for a reliable evaluation of benefits and risks of standard treatment and the selection or modification of cancer treatments according to the findings in the domains assessed.⁶⁴ The multidimensional nature of this test requires human resources, meaning that, frequently, a full CGA is logistically impossible. This has helped establish a trend for using screening geriatric assessment tools that can identify those patients who require full CGA in the process of treatment strategy planning. This allows for optimisation of oncological care, individualisation of treatment approach and identification of real needs in seniors. This two-stage approach to the assessment of older patients is recommended by SIOG.

An interesting approach towards optimisation of geriatric evaluation was presented by Ingram et al. This group prepared a set of tools and self-assessment questionnaires for senior patients based on the Older American Resources and Services (OARS) Program. The study demonstrated that CGA might be reliable even when patients assess themselves,⁶⁵ although tools exclusively based on self-assessment may be biased, as any health evaluation conducted by patients themselves is subjective. Their advantage, on the other hand, is the ease and speed with which they can be carried out.

The selection of the most sensitive tools for use in geriatric health status screening is still the subject of discussion. The literature provides various sets of tests from different domains with sensitivity and predictive values comparable to those of CGA.⁶⁶ These results of different analyzed tests vary among the researchers. One reason for this might be differences in the research populations due to the exclusion of the oldest and most seriously ill patients from certain research groups. This, in turn, highlights the underrepresentation of seniors in clinical research as well as the lack of large databases covering standard treatment of the elderly. The European Organisation for Research and Treatment of Cancer (EORTC) Elderly Task Force (ETF) group attempted to analyse and elaborate on treatment recommendations for non-small-cell lung cancer.⁶⁷ Databases similar to those analysed by EORTC would enable the use of bioinformatics tools both to assess the risk of complications typical of old age, and to predict treatment outcomes, and thus would support the process of therapy decision-making.

Therapy in seniors needs to be individualised, as several factors may influence treatment outcomes and toxicity in these patients, but in

order to develop such an individualised treatment approach, properly designed, dedicated clinical trials are required. The EORTC ETF Group recently published the results of a workshop on clinical trials methodology in older individuals diagnosed with solid tumors. In their conclusion, the authors presented recommendations regarding endpoints of trials designed for seniors and arrived at a consensus on a recommended set of screening tools, including minimum dataset (MinDS), to use as a baseline geriatric assessment in clinical trials. The MinDS includes the G8, IADL and CCI questionnaires as well as a social situation assessment.⁶⁸ The authors recommended these instruments because of their simplicity, comprehensiveness and satisfactory results in clinical validation studies.⁶² Moreover, CCI and IADL predict mortality, are well known and widely used, and have been accepted and validated in many studies. Also there is no doubt that all aspects of a patient's social situation influence the treatment of older patients.⁶⁸ Other questions that still need to be answered are: when and how often in the course of treatment should assessment and re-assessment be carried out? How should treatment be modified on the basis of the

results of geriatric assessment tests? Will patients experience notable benefits that will translate into commonly-used endpoints such as overall survival or quality of life?

Geronto-oncological assessment is not only an important aspect of treatment strategy planning, it can also identify many seemingly insignificant problems, which can be easily eliminated, e.g. dental problems leading to malnutrition or lack of social and psychological support. Moreover, other ailments of old age, such as poor vision and hearing, urinary incontinence and gait and balance impairment³⁰ – which may impede everyday activity causing withdrawal, reluctance to go out and, in effect, social isolation – cannot be ignored. A holistic approach to the treatment and support of elderly patients should be given appropriate consideration. Screening tools, such as those presented in this review, can help clinicians not only to identify seniors' needs in terms of treatment adaptation and individualisation, but also to optimise the use of human and financial resources without jeopardising the main goal: best treatment and care. ■

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