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Review

Questionnaires and instruments for a multidimensional assessment of the older cancer patient: What clinicians need to know?

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ABSTRACT

Due to the ageing of the population in the Western world, a significant increase in the number of older patients diagnosed with neoplastic diseases is observed. Hence, there is an emerging need for tools to efficiently evaluate older patients' functional and global status. These tools can allow treating oncologists to better select patients, to propose treatment modifications, implement supportive measures and develop interventions to decrease the risk of toxicity and in general better tailor the treatment plan on an individual level. Currently significant uncertainty exists about the optimal tools and strategy for geriatric assessment, but on the other hand there is more than enough evidence that (some form of) geriatric assessment detects many previously unrecognised problems, and allows directed intervention which can improve outcome and compliance of proposed treatments. In the present paper, we discuss the most commonly used and studied tools for the assessment of functional status of older cancer patients.

1. Introduction

Cancer accounts for more deaths than heart diseases in the Western world.[1] More than 60% of diagnosed cancer cases and more than 50% of cancer mortality are observed in people older than 60 years of age.[1] Furthermore, due to ageing of the Western countries' population, the number of older patients with cancer is expected to increase within the coming decades.[2]

Amongst older cancer patients of the same chronological age there is a wide heterogeneity in physical and psychological functioning. Ageing is a highly individualised process and all

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the changes involved in this process cannot be predicted just on the basis of chronological age. In routine clinical practice, the main characteristic of older cancer patients is heterogeneity. Some patients will tolerate chemotherapy as well as their younger counterparts, while others will experience severe toxicity, requiring treatment reduction, treatment delay or permanent discontinuation, and others might be in a situation, where the best treatment option is not to treat them with chemotherapy. Thus, a major issue confronted by oncologists treating older cancer patients is how to effectively select patients suitable for chemotherapy at all, and if yes, whether to treat with standard protocols (standard dose and interval) or with adapted regimens. As a consequence, it is clear that there is an emerging need for developing tools to better evaluate a patient's 'biological' or 'functional age' rather than chronological age.

Geriatric assessment is a well-established comprehensive approach for the evaluation of the older patient.[3] It includes the evaluation of several domains: functionality, mobility/risk of falls, cognition, depression, comorbidity, polypharmacy, social situation and geriatric syndromes. The value of this assessment for the geriatric patient has been demonstrated by several studies. A meta-analysis of 28 controlled trials which demonstrated that Comprehensive Geriatric Assessment (CGA) if linked to geriatric interventions reduced early re-hospitalisation and mortality in older patients through early identification and treatment of problems.[4]

Geriatricians, more than oncologists, are focused on the patient's ability of self care. They want to know the risk of early re-hospitalisation, the area and need for support, when patients return to their home after hospitalisation for acute medical problems or the need of institutionalised care, e.g. nursing homes. Based on the data generated in CGA, they make decisions on treatment and intervention.

The information oncologists want to receive from CGA is different. They want to know, whether the newly diagnosed cancer disease is limiting life expectancy of the patient or whether other comorbid diseases are determining the prognosis quad vitam. They want to know, whether the patient will experience major symptoms of the disease, causing deterioration of his health-related quality of life. Finally they want to know, whether the patient will tolerate treatment (chemotherapy, radiotherapy, surgery or multimodal treatment) without major toxicity and deterioration of health-related quality of life, and without inducing treatment-related mortality.

Specifically for cancer patients CGA has proven to be feasible[5,6] and the information obtained is additional to just chronological age and Performance Status (PS).[7] Additionally it detects more older cancer patients as being unfit for chemotherapy than physicians' judgement.[8] Several studies have proven its value as a predictive tool for changes of quality of life (QoL),[9] severe toxicity[10], early termination of treatment,[11,12] postoperative morbidity[13,14] and survival.[10] Results of CGA changed treatment plans in a group of patients with breast cancer.[15,16] According to CGA results, the patients are categorised into three groups for treatment decisions; (a) fit patients, (b) vulnerable patients and (c) frail patients. Patients in the first group are good candidates for almost every form of cancer treatment as they tolerate anti-cancer treatment as well as their younger counterparts with similar outcomes in terms of survival.[17–19] Patients in the last group are usually offered only best supportive care or only single-agent palliative chemotherapy, while for the second category of patients, which is the biggest and the most challenging, individualised approaches and specific clinical trials are recommended.[20] However, it should be noted that there are no prospective randomised trials demonstrating a survival or QoL benefit for CGA use in older cancer patients. The purpose of the present paper is to present the essential components of CGA, and to describe the most commonly used and studied tools to perform CGA.

2. Functional status

It has been reported that cancer has a negative impact on patients' functional status.[21] In oncology, assessment of functional status is based on the evaluation of Performance Status (PS), either measured via Karnofsky-performance Status (KPS),[22] or Eastern-Cooperative-Oncology-Group (ECOG) – PS[23] or WHO-PS while in the geriatrics, assessment of functional status includes evaluation of the patient's ability to perform activities of daily life (ADL) and instrumental activities of daily life (IADL).[24] ADL include activities that are essential for a patient to maintain independence in the home and include ability to bath and feed one's self, dress, maintain continence, use toilet and transfer. The basic scale used for ADL assessment is the Katz scale[25] or the Barthel scale.[26] This scale is a good prognostic factor for one-year mortality following hospital admission.[27] Another study revealed functional status as a stronger predictor of length of stay, mortality, and nursing home placement than principal admitting diagnosis.[28] ADL dependence is less strongly associated with outcome in the studies of older cancer patients, probably due to the low proportion of older cancer patients with ADL dependence participating to oncology clinical trials.[29] Additionally, older cancer survivors are more likely to report ADL dependence.[30] IADL are more advanced self-care activities that include the ability to prepare meals, do housework, use telephone, take medications, manage one's finances and use transportation means.[31] In cancer patients, IADL dependence has been associated with poorer survival in patients with lung cancer [12] and in patients with acute myeloid leukaemia,[32] risk of chemotherapy toxicity in patients with ovarian cancer[10] and postoperative complications.[14]

Discordance between direct functional assessment and questionnaire-based assessment has been reported.[33] For that reason, some tools for direct functional assessment were constructed. Commonly used tools include the 'Timed Up and Go' tool (measures speed during several functional manoeuvres, which include standing up, walking, turning and sitting down),[34] the '6-min walk test', which has been proposed as a single measurement tool of functional status for older patients[35] and the Tinetti test which has been widely used in the elderly to assess mobility, balance and gait.[36] ADL and IADL dependence were associated with poorer survival in a prospective study including oncological patients aged 70 years and older presented by Honecker and colleagues during previous ASCO meeting[37] and in haematological patients aged 70 years and older presented by Wedding et al. during previous ASH meeting.[38] Frequently used tools for assessment of functional status are presented in Table 1.

Table 1 – Instruments used for functional assessment.

Scale	
Activities of Daily Life (ADL) (Katz scale[25])	– ability to bath
	– feed one's self
	– dress
	– maintain continence
	– use toilet
	– transfer
Instrumental Activities of Daily Life (IADL)[31]	– prepare meals
	– do housework
	– use telephone
	– take medications
	– manage one's finances and
	– use transportation means
'Timed Up and Go'[34]	Measures speed during several functional manoeuvres, which include standing up, walking, turning and sitting down
'6-min walk test'[35]	Measures the distance walked during a 6-min time period

3. Comorbidity

Comorbidity is a frequent problem in older cancer patients and is a competing source for mortality in older cancer patients.[6] These comorbid medical conditions may often lead to death from causes other than cancer, thus nullifying any possible benefit of treatment. Comorbidity has a negative impact on survival in cancer patients[11,39–45] and on treatment tolerance,[46,47] although this observation has not been confirmed by other studies.[48] De Groot and colleagues reported in a systematic review 13 different methods to evaluate comorbidity,[49] but usually the number and the severity of comorbid diseases are evaluated with questionnaires such as Charlson Comorbidity Index (CCI),[50] the Cumulative Illness Rating Scale-Geriatric (CIRS-G)[51] and the Adult Comorbidity Evaluation (ACE-27)[41] (Table 2). Furthermore, comorbid diseases also lead to polypharmacy and increased use of medications which can lead to drug-drug interactions and increased treatment-related toxicity in the older cancer patients.[52,53] Most guidelines for drug treatment of chronic diseases in older patients do not reflect how to prioritise treatment in the situation of multiple chronic diseases.[54]

4. Cognition

Dementia is characterised by a progressive loss of thinking operations, such as loss of memory, the function of retraction and recognition for verbal and optical information and language fluency.[55] Two big epidemiologic studies prove that cognitive disturbances do influence the way of diagnosis and the treatment of older patients with cancer.[56,57] Old patients with cancer of large intestine and dementia had fewer chances to have a histological confirmation of their disease, to have curative surgical therapy and they were less likely to receive adjuvant treatment.[56] Similarly old patients with breast cancer and Alzheimer's disease were less likely to be given curative surgery and to receive chemotherapy and radiation,[57] while moreover their survival was considerably shorter.[58] Furthermore, the presence of dementia is associated with the negative impact on survival.[59,60]

Table 2 – Tools used for comorbidity assessment in older cancer patients.

Scale	
Charlson Comorbidity Index (CCI)[50]	A weighted index that takes into account the number and the seriousness of comorbid disease; a score > 5 is considered high and is usually associated with poor prognosis
Cumulative Illness Rating Scale-Geriatric (CIRS-G)[51]	Classifies comorbidities by organ systems (13 or 14 according to the version) and grades each condition from 0 (no problem) to 4 (severely incapacitating or life-threatening condition)
The Adult Comorbidity Evaluation (ACE-27)[41]	Measures the severity of comorbidity based on 26 disease systems; each condition is graded with a 3-category severity system (mild, moderate, severe)

Cognitive function has obviously significant impact on the patient's compliance with treatment. Patients with memory impairment will have problems to understand and follow treatment instructions.

Several tools have been developed for the assessment of dementia (Table 3). These include the Mini Mental State Examination,[61] the Blessed Dementia Rating Scale,[62] the Short Portable Mental Status Questionnaire[63] and the Dementia Detection Test.[64] Other screening cognitive tools are the Mini-Cog instrument[65] and the 'Clock Drawing Test'.[66] All these tools are screening tools and an abnormal test does not diagnose dementia, but requires further evaluation. Further studies are required for defining the most optimal scale for a particular patient and a particular end-point (e.g. survival, toxicity, quality of life).

5. Psychological status

Another important issue when evaluating an older cancer patient is the presence or not of depression. Up to 50% of older patients have been found to have some depressive symptoms[7,16] and the depression has been associated with poorer survival.[67] In a similar way, symptoms of depression were associated with poorer progression-free survival, overall survival and toxicity in older women with ovarian cancer treated

Table 3 – Tools for assessment of cognitive status.

Scale	
Mini Mental State Examination[61]	Questions are grouped into seven categories, each representing a different cognitive domain or function (orientation to time, orientation to place, repetition of words, attention, calculation, recall of words, language and visual construction). It has a maximum score of 30 points. (Patients with scores lower than 23 points are considered as dementia suspects).
Blessed Dementia Rating Scale[62]	It assesses patient's changes in three domains: in performance of day-to-day activities, in habits and in personality, interests, drive One point is scored for each question with higher scores representing more severe problem. A score of 15 or higher represents a moderate to severe functional impairment
Short Portable Mental Status Questionnaire[63]	10-Item questionnaire that assesses orientation, memory, attention, calculation and language
Mini-Cog instrument[65]	Combination of two simple cognitive tasks (three-item word memory and clock drawing)

Table 4 – The Geriatric Depression Scale.

Geriatric Depression Scale (GDS)
Evaluation of risk of depression. Several versions available (GDS 30, 15, 4 item) Interpretation of results: Scoring system for the GDS 15-item – Range 0–15 – Interpretation scores • 0–5: no depression • 6–15: possible depression

Table 5 – Nutrition assessment.

Mini-Nutritional Assessment Questionnaire
Exists in 2 parts: a screening part and a more extensive part in case screening were positive. – Scoring for the screening part: – Range 0–14 – Interpretation score – 12 or more: no risk – 11 or less: risk of malnutrition Scoring for the global score: (1) Degree score < 17: malnourished (2) Degrees score > 17 and ⩽ 23,5: at risk of malnutrition (3) Degrees score ⩾ 24: well-nourished, with a maximum of 30 points

with platinum-based regimens,[10] while in patients with colorectal cancer the depression was associated with higher 30-d postoperative morbidity.[14] Additionally, depression has an impact on the treatment administered to patients. A large study of 24,696 older breast cancer patients in the Surveillance, Epidemiology and End Results (SEER)–Medicare database (ages 67–90 years) revealed that less-than-definitive treatment was offered to women with a recent diagnosis of depression and these women also experienced worse survival.[68] The most widely used tools for depression assessment in the older cancer patients are the Geriatric Depression Scale (GDS)[69] (Table 4) and the Beck Depression Inventory (BDI)[70] and for demented patients the Cornell Scale for Depression (CSDD).[71]

6. Nutritional status

In the general geriatric population, low Body Mass Index (BMI) is associated with an increased risk of mortality.[72,73] Nutrition is a major issue in cancer patients and nutritional decline in these patients may result from both disease course and its treatment.[74] Malnutrition in cancer has a negative prognosis, and it has an impact on both response to anti-cancer treatment and patient overall survival and influences Health-Related Quality of Life (HRQoL).[75] Nutritional status is a predictor of long-term survival in non-small cell lung cancer (NSCLC) patients treated with lobectomy,[76] while nutrition intervention has been shown to improve outcomes in NSCLC patients treated with chemotherapy.[77] Routine screening of patients to identify risk of malnutrition has been recommended by many national, international and specialist organisations.[78] The most commonly used screening tool for nutritional status is the Mini-Nutritional Assessment (MNA) questionnaire; it is a non-invasive and validated questionnaire to evaluate nutritional status in elderly people (Table 5), classified in three groups: malnourished, at risk of malnutrition and well-nourished.[79]

7. Two-step approach for geriatric assessment (selection of patients with screening test)

A major concern is the feasibility of implementing CGA in every day's clinical practice. The CGA approach combines a variety of assessments and questionnaires and it is a time and man-power-consuming procedure, not reimbursed by health systems, explaining why it is often not used in routine clinical practice. Because of these difficulties in the use of CGA in every day's clinical practice, several shorter screening tools have been developed. These screening tools are used to select patients with impairment who need further multidisciplinary evaluation. However, none of these screening tools has been prospectively validated using full-CGA as gold-standard.

In routine clinical practice, it is probably much more cost-effective and practical to use a simple screening test in all cancer patients aged 70 years or more. This allows to identify the proportion of patients who are fit and where complete CGA would not identify relevant age-related problems. This allows focusing the efforts on the smaller group (those with a positive screening) where the yield of geriatric assessment will be much larger.

The vulnerable elders survey-13 (VES-13) is a self-administered questionnaire that consists of 12 items for functional capacity, physical status and patient's perception of his health and one question for age.[80] In a pilot study, VES-13 accurately identified elderly prostate cancer patients who were defined as having impairment by CGA.

The G8 questionnaire is a very simple screening tool, which includes seven Mini-Nutritional Assessment items and age (<80, 80–85, >85), for a total score ranging from 0 (poor score) to 17 (good score).[81] In an exploratory study of 364 cancer patients older than 70, with a cut-off score of 14, G8 had 90% sensitivity and 60% specificity. This cut-off is now prospectively being validated in a large Nation-wide French study (Oncodage).

Overcash and colleagues developed an abbreviated CGA with only 15 items.[82] These 15 items include three questions about ADLs, four questions about IADLs, four questions from the MMSE and four questions from the GDS. Correlations ranged from 0.84 to 0.96 for the entire CGA and the abbreviated CGA. Röhrig and colleagues confirmed the same items of ADL and IADL as sensitive for screening[83] Huria and colleagues developed a brief, self-administered cancer-specific tool which assesses the following domains: functional status, comorbidity, cognition, psychological status, social functioning and support and nutritional status.[5] This tool is now being validated in the context of clinical trials by Cancer and Leukaemia Group B (CALGB).

8. Conclusions

Retrospective evidence supports the fact that the CGA-based approach can predict morbidity and mortality in older cancer patients, detects previously unknown problems that can influence treatment decision and allows directed interventions towards the detected problems that can improve quality of life, compliance and outcome. Therefore, some form of geriatric assessment is warranted in all senior cancer patients, and this has also been advised by SIOG (International Society of Geriatric Oncology).[84] However, several questions remain to be answered. The concrete impact of CGA in selecting cancer patients suitable for chemotherapy and in guiding interventions to improve outcome and quality of life in older cancer patients must be tested in prospective clinical trials. Furthermore, the best form of CGA for cancer patients remains to be defined. Which patients should be assessed, which domains and which tools should be used. Are screening tools established enough to omit full geriatric assessment in patients with a low risk on screening test? Anyhow, we personally believe at present that it is better to do some form of imperfect geriatric assessment than to do no assessment at all! (as now often is the case in routine practice). Recently a workshop was held under the auspices of EORTC with the participation of 23 oncology and ageing specialists throughout Europe, and five representatives from EORTC. Main topics discussed were blockage for clinical trial development in older patients, clinical trials end-points and geriatric assessment. There was a consensus for use of a minimal dataset data collection in the older with the use of G8, IADL, social situation and Charlson Comorbidity Index. Several groups are addressing these issues in clinical trials and a uniform approach should be implemented across different institutions that will allow a common language and reproducible assessments in various settings.

Conflict of interest statement

None declared.

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