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Research paper

Physical Performance Test and Karnofsky Performance Status are unable to identify elderly cancer patients requiring a Comprehensive Geriatric Assessment

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ABSTRACT

Background: Comprehensive geriatric assessment (CGA) is a multidimensional and interdisciplinary diagnostic process for medical and functional status (FS) used in elderly patients to evaluate health status. The Karnofsky Performance Scale (KPS) and Physical Performance Test (PPT) have been used as a measure of FS in older patients to screen heath status.
Objective: We designed this study to assess and compare the value of KPS and PPT as pre-screening tools for vulnerable elderly cancer patients using the CGA as a gold standard.
Methods: This is a prospective interventional study including cancer patients aged more than 70 years. Direct assessments were realized using a questionnaire composed of KPS, PPT and CGA, constructed by the authors after a review of the literature.
Results: One hundred patients were included (median age 76 years–extremes 70–89). KPS and PPT were found to be positively correlated (Pearson correlation coefficient $r = 0.680$, P value < 0.001) with each other and negatively correlated with CGA with the former having a higher absolute r value (-0.779 vs -0.654 respectively, $P < 0.05$). All two had poor discrimination capacities when identifying patients having ≥ 2 impairments on the CGA, by means of a ROC curves analysis (area under the curve (AUC) for KPS = 0.206 versus 0.198 for PPT, with a P value > 0.05 on pair-wise comparison).
Conclusion: Neither KPS nor PPT were found to be good pre-screening tools for vulnerable elderly cancer patients in the outpatient setting. The CGA remains the preferred method for assessing alterations in geriatric domains.

1. Introduction

Cancer in the elderly population is growing in frequency and needs a multidimensional and multidisciplinary approach for its management defined as geriatric oncology approach [1]. In fact, more than 60% of diagnosed cases and half of cancer mortality were observed in people aged more than 60 years having comorbidities interacting with cancer treatment and making management more complicated [2,3]. However, aging is a highly individualized process and cannot be predicted just on the basis of chronological age. This is why developing new tools to better evaluate a patient's "functional" rather than chronological age is an emerging need to guide treatment plan [4].

Comprehensive geriatric assessment (CGA) is a multidimensional and interdisciplinary diagnostic process focused on determining medical, psychological and functional capacity of an elderly patient [5]. A care plan guided by CGA has shown to prevent progression of disabilities and reduce unplanned hospitalizations and nursing home admissions [6]. Unfortunately, the CGA is time-consuming, leading to exhaustion of both the patient and physician, and is frequently abandoned [7]. An alternative would be the use of a two-step approach, with a less time and manpower consuming prescreening tool, which identifies patients requiring a CGA [8]. The Karnofsky Performance Scale (KPS), developed in 1948 [9], has been widely used in oncology as a measure of functional status (FS) and has been proved to predict cancer treatment outcome, survival and quality-of-life [10–12]. However, it does not seem to be as effective in old patients as in the other adult population [13]. On the other hand, the Physical Performance

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Test (PPT) has been developed by geriatricians specifically to assess the physical functioning of old subjects [14]. It has been validated as an independent predictor of death [14,15] institutionalization [16], and health problems [17]. Also, in a study done by Terret et al. [3] on 152 patients with a median age of 75 years, the PPT has been suggested to be a better tool than KPS for assessing functional status in elderly cancer patients. Nonetheless, the accuracy of PPT as a relevant screening tool for vulnerable patients in geriatric oncology in comparison with the CGA has not been validated yet [3].

We designed this study to assess and compare the value of KPS and PPT as pre-screening tools for vulnerable elderly cancer patients using the CGA as a gold standard.

2. Materials and methods

This is a prospective interventional study, which included all cancer patients aged more than 70 years, admitted to our university hospital from the first of February 2011 till the 31st of March 2012. Knowledge (spoken and written) of one of the three languages: Arabic, French or English was a must in order to perform the questionnaire. Were excluded from the study:

- subjects having a severe cognitive impairment defined as an MMSE-score less than 23, since they did not have the ability to answer the questionnaire and/or to perform the required tasks in the PPT;
- subjects having a KPS less than 60 as they were not considered fit to participate in clinical trials or to receive standard cancer treatment [3];
- subjects having any severe medical condition preventing them from performing the required physical tasks in the questionnaire.

An informed consent was signed by the participants. The study was approved by the research ethics board of the school of medicine of the Saint Joseph University in Beirut, Lebanon.

A questionnaire was constructed, edited, validated and approved by the authors after an exhaustive review of the literature and the recommendations of the three major references in oncology: the International Society of Geriatric Oncology (SIOG), the National Comprehensive Cancer Network (NCCN) and of the American Society of Clinical Oncology (ASCO). It is composed of three main parts: the Karnofsky Performance Status (KPS) (Appendix 1), the Physical Performance Test (PPT) (Appendix 2) and the Comprehensive Geriatric Assessment (GCA). This later can be composed of any number of reliable instruments assessing different aspects of health. Table 1 summarizes the CGA components that have been used in this study. A brief explanation of each component is described below.

2.1. Functional status

The Katz Activities of Daily Living (ADLs) Index is composed of the necessary skills for basic living. It measures self-reported dependence or non-dependence in six domains: bathing, transfer, dressing, continence, toileting and feeding [18]. The Lawton's Instrumental Activities of Daily Living (IADLs) Index is composed of the skills required for living independently in the community. It measures degree of dependence in eight domains: shopping, using the telephone, managing medications, housekeeping, laundry, transportation, ability to manage finances, and preparing meals [19].

2.2. Cognitive status

It is assessed by the Mini-mental Status Examination (MMSE), which investigates orientation, short-term memory, calculation, attention, recall, language and constructional praxis function [20]. A score ≤ 24 points out of 30 suggests cognitive impairment [21].

2.3. Affective status

The geriatric depression scale (GDS) is used to assess psychological status. It is a self-report assessment on 15 items with good psychometric properties and is validated as a screening tool for depression. It measures emotional factors present in

Table 1
Comprehensive Geriatric Assessment components (a total of 83 questions/items) defining 11 impairments.

Geriatric domain of assessment	Tool/scale (number of questions or items)	Vulnerability thresholds (each box equal to one impairment)	Source Ref.
Functional status			
Activities of daily living (ADL)	Katz index of independence (6)	Dependence in >1 domain	[18]
Instrumental activities of daily living (IADL)	Lawton scale (8)	Complete dependence in >1 domain	[19]
Cognitive status	Mini-mental Status Examination (MMSE) (30)	≤24[a]	[20,21]
Affective status	Geriatric Depression Scale (GDS) (15)	>5	[22]
Nutritional status	Mini-Nutritional Assessment (MNA) (6)	<12	[23]
Comorbidities	Adult Comorbidity Evaluation score-27 (ACE-27)[b] (11)	>1	[24]
Medical conditions specific to elderly patients			
Risk of falls	Timed Up and Go Score (TUG) and history of fall within last 12 months (2)	TUG > 14.5 s and/or history of fall ≥1	[25,26]
Poly-pharmacy and drug interaction	Two steps question: "Does the patient have more than 3 drugs? If yes, does the patient have more than two drugs from the same drug class?" (1)	"Yes" on the two questions	[27,28]
Hearing and vision	Two questions: "How is your hearing?" "How is your eyesight?" (2)	"Poor/totally deaf" and/or "poor/totally blind"	[29]
Urinary incontinence	Two steps question: "During the last 12 months have you ever lost urine and got wet? If yes, have you lost urine on at least six separate days?" (1)	"Yes" on the two questions	[30]
Pain if present	Verbal Numeric Pain Scale (VPN) (1)	>3	[31]

[a] In this study, patients with MMSE < 23 were excluded thus vulnerability threshold for MMSE would be a score of 23 or 24.
[b] The initial test contains 12 domains but in our study the domain related to malignancy was excluded.