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Pearls of optimizing nutrition and physical performance of older adults undergoing cancer therapy

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ABSTRACT

As the global population continues to age, the prevalence of cancer is increasing, with more than half of new cancer diagnoses occurring in those aged 65 years and older. As a result of improved oncological care, a greater number of older patients undergo treatment, either chemoradiotherapy or surgery or both. The older oncology patient is not part of a homogenous group; chronological age poorly describes the health status of an individual. Comprehensive geriatric assessment (CGA) identifies domains, assessed by a multidisciplinary team, that should be considered to guide appropriate oncological treatment decisions. This paper will focus on two aspects of the CGA: the assessment of nutrition and functional status of the older patient with cancer. Optimization of both diet and physical activity may help patients improve their tolerance to oncological treatments and health-related quality of life (HRQOL). Beginning with definitions of frailty, sarcopenia, cachexia, and malnutrition, this paper will suggest standardized screening, diagnostic and interventional procedures to identify and treat these conditions in the older oncology patient.

1. Introduction

As the global population continues to age, the prevalence of cancer is increasing, with more than half of new cancer diagnoses occurring in those aged 65 years and older [1]. As a result of improved oncological care, a greater number of older patients undergo treatment, either chemoradiotherapy, surgery or both [2,3]. The older patient with cancer is not part of a homogenous group; chronological age poorly describes the health status of an individual. Comprehensive geriatric assessment (CGA) identifies domains, assessed by a multidisciplinary team, that should be considered to guide appropriate oncological treatment decisions. These domains include functional status, comorbidities, cognition, mental health status, fatigue, social status and support, nutrition, and presence of geriatric syndromes [4]. This paper will focus on two aspects of the CGA: the assessment of nutrition and functional status of the older patient with cancer. Optimization of both diet and physical activity may help patients improve their tolerance to oncological treatments and health-related quality of life (HRQOL). Beginning with definitions of frailty, sarcopenia, cachexia and malnutrition, this paper will suggest standardized screening, diagnostic and interventional procedures to identify and treat these conditions in the older patient with cancer.

2. Definitions

Deficits such as frailty, sarcopenia, cachexia and malnutrition can lead to poor treatment tolerance in the older patient with cancer; identifying these deficits is necessary to implement possible interventions (Fig. 1). Agreement on definitions of frailty, sarcopenia, cachexia, and malnutrition remain elusive, however they are necessary for the identification of proper screening and diagnostic tools.

2.1. Frailty

In a recent systematic review of 21 studies including over 61,000 community-dwelling older participants, the prevalence of frailty was 10.7% (95% confidence interval = 10.5–10.9; 21) with greater prevalence

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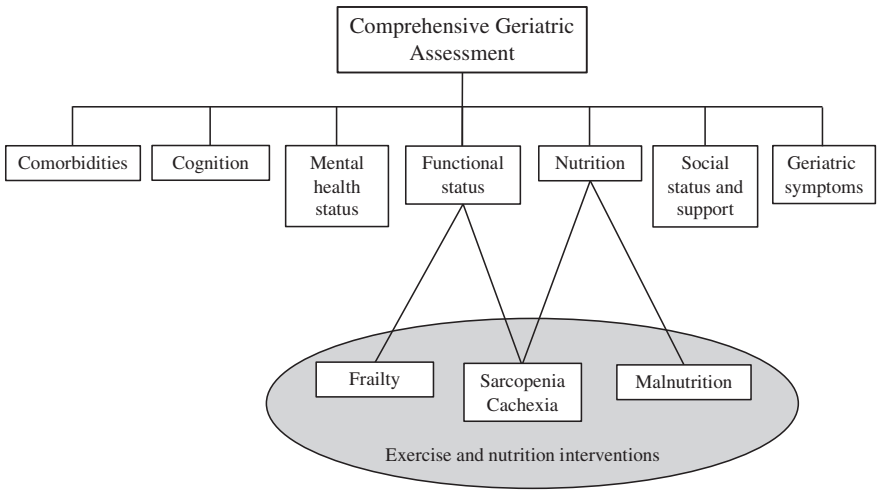

Fig. 1. Deficits in nutrition and functional status that may respond to exercise and dietary interventions.

with increasing age and among females [5]. Of greater concern for the older adult with cancer, Handforth et al. [6] reported that more than half of almost 3000 geriatric patients with cancer were either pre-frail or frail and were at significantly increased risk of mortality, postoperative complications, and chemotherapy intolerance. At present, consensus on a definition of frailty has not been achieved. Proposed definitions of frailty define it as a pathophysiological continuum that begins with increased vulnerability to stressors as a result of decreased physiologic reserves, leading to the dysregulation of multiple physiologic systems [7], and an increased risk of adverse outcomes such as falls, delirium, and disability [8]. Physical frailty has been defined as "a medical syndrome with multiple causes and contributors that is characterized by diminished strength, endurance, and reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death." [9].

2.2. Sarcopenia

Unanimity on defining sarcopenia has not been achieved. The European Working Group on Sarcopenia in Older People (EWGSOP) [10] defines it as, "a syndrome characterized by progressive and generalized loss of skeletal muscle mass and strength with a risk of adverse outcomes such as physical disability, poor quality of life and death." The EWGSOP recommends using the presence of low muscle mass in addition to either low muscle strength or performance for the diagnosis of sarcopenia. Other consensus statements include only muscle mass and function as the criteria used to define sarcopenia [11,12]. Low muscle mass is emerging as an important prognostic factor for cancer treatment tolerance and overall survival, however there is no standardized approach to measure muscle mass, neither is there a consensus to define a cutoff [13].

2.3. Cachexia

In the elderly cancer population, one of the most important syndromes is cancer cachexia (CC). Cachexia is derived from the Greek words kakos (bad) and hexis (condition) and is defined, according to the European Society for Clinical Nutrition and Metabolism (ESPEN) guidelines on parenteral nutrition [14] as, "a complex syndrome characterized by a chronic, progressive, involuntary weight loss which is poorly or only partially responsive to the common nutritional support and it is often associated with anorexia, early satiation, and asthenia. It is usually attributable to two main components: a decreased nutrient intake (which may be simply due a crucial involvement of the gastrointestinal tract by the tumor or by cytokines or similar anorexia-inducing mediators) and metabolic alterations due to the activation of systemic pro-inflammatory processes." It is important to note that although weight loss is common in both CC and malnutrition (Fig. 2), not all patients with cancer who experience weight loss are cachectic.

Approximately half of the patients presenting for treatment will have significant weight loss, increasing to >75% of patients with cancer who are terminally ill. Whereas patients with breast cancer have a lower incidence of weight loss (~50%), other cancers such as lung, colorectal, prostate, pancreatic, gastric, lymphoma, ovarian, and esophageal have >75% incidence rate [15]. The CC syndrome often includes symptoms such as asthenia and anorexia and directly impairs the patients' ability to respond to tumor-directed treatments and rehabilitation [16]. The CC signs and symptoms also may affect HRQOL and survival in advanced, far-advanced and terminal patients with cancer. Asthenia, pain, and anorexia are reported among the most prevalent and troublesome symptoms in this patient population [17]. Independent correlations with survival for clinical and biological markers of CC were confirmed by primary studies in patients with advanced cancer [18,19] and secondary studies in patients with far-advanced and terminal cancer [20]. Finally, CC is considered the cause of death in almost one out of five patients with advanced cancer.

2.4. Malnutrition

Malnutrition is related to adverse outcomes in active cancer treatments, including toxicity to chemotherapy agents [27] and poor surgical outcomes [28], and is an independent factor in predicting survival [29,30]. Despite this, an internationally agreed upon definition of malnutrition has also not been determined. ESPEN [21] defines malnutrition as follows: 1) the patient fulfills the criteria of being at risk of malnutrition by a validated screening tool, 2) the patient has a body

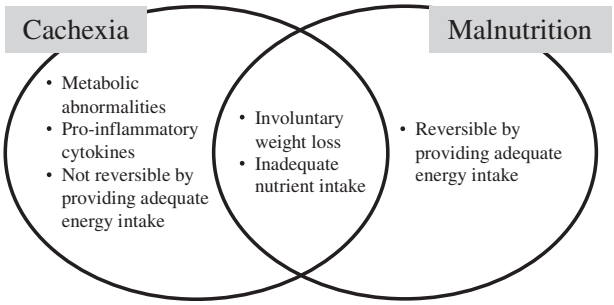

Fig. 2. Cachexia versus malnutrition.

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