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Exercise Promotion in Geriatric Oncology

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Abstract

Evidence of the benefits of exercise for people with cancer from diagnosis through survivorship is growing. However, most cancers occur in older adults and little exercise advice is available for making specific recommendations for older adults with cancer. Individualized exercise prescriptions are safe, feasible, and beneficial for the geriatric oncology population. Oncology providers must be equipped to discuss the short- and long-term benefits of exercise and assist older patients in obtaining appropriate exercise prescriptions. This review provides detailed information about professionals and their roles as it relates to functional assessment, intervention, and evaluation of the geriatric oncology population. This review addresses the importance of functional status assessment and appropriate referrals to other oncology professionals.

Keywords

Exercise promotion; Functional status; Geriatric oncology; Cancer survivorship; Oncology provider

Introduction

Physical and functional decline is an increasing problem in our aging population. There are 1.6 million projected new cancer cases with a large number among individuals of advanced age [1]. There are more than 14.5 million cancer survivors representing 4 % of the population, and this number will continue to rise with early detection and new therapies [2]. Chemotherapy and other cancer treatments increase the risk for poorer function and physical decrements in this population [3–13]. Being able to perform activities of daily living (ADLs) and instrumental activities of daily living (IADLs) is essential for the aging adult with cancer to function independently [3–13].

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Compliance with Ethical Standards

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

Conflict of Interest Peggy S. Burhenn, Ashley Leak Bryant, and Karen M. Mustian declare that they have no conflict of interest.

In 2010, the American College of Sports Medicine (ACSM) recommended that individuals with cancer and survivors of cancer achieve 150 min per week of moderate intensity aerobic activity [12]. The goal is to avoid inactivity and to encourage patients and survivors to return to their normal activities as quickly as possible [14••]. Benefits of exercise are well documented for individuals with several types of cancer. These benefits include improving physical function, decreasing fatigue, improving psychosocial well-being, and, ultimately, improving health-related quality of life [3, 4, 6, 7, 12, 13, 15–23, 24••, 25–34].

With the increasing number of survivors, it is important to assess and address ways to improve health-related quality of life and specific toxicities, including cancer-related fatigue and impaired physical function, that impair it [6, 35, 36••]. It is imperative to assist survivors in regaining and improving physical function, and reducing and preventing long-term effects of cancer and its treatments. This review will provide practical applications and recommendations for oncology clinicians caring for older adults with cancer who may be uncertain of how to assess risk, prescribe exercise for their patients, and refer patients to other professionals trained to assist with exercise prescription and implementation.

Challenges Faced by Oncology Providers

The oncology provider is faced with the challenge of assessing functional status in the older adult with cancer prior to making any exercise recommendations or referrals to another professional. The assessment of the functional status of the older adult can be evaluated by multiple disciplines in health care. Each discipline brings expertise to the evaluation of function. Although the assessment parameters may overlap, ultimately the recommended inventions based on this assessment serve to improve or delay decline in function. Each discipline, however, may provide a varied approach to the assessment and recommendations. A basic functional assessment which can be performed by oncology providers in the clinic includes the assessment of activities of daily living [37] (ADL), instrumental activities of daily living [38] (IADL), and a measure of gait such as the “timed up and go” [39] (TUG) test (Table 1).

An assessment of ADL consists of determining if the patient is independent in the basic activities of bathing, dressing, toileting, transferring, continence, and feeding [37]. The assessment of IADL adds the activities involving cleaning, housework, transportation, shopping, and money management [40]. It is important to query the patient about each ADL and IADL to determine if any deficit exists. It should not be assumed that a patient can perform these functions if they are able to get to the clinic. A simple measure of gait can add to the understanding of the patient’s functional level. A TUG is one test that is commonly used to measure walking speed. Instructions are outlined in Table 1. The TUG is useful as a repeated evaluation, much as blood pressure or pulse. When measured serially, it can reveal changes over time or newly identified alternations in function.

Abnormal results in ADL, IADL, or gait measures can signal a referral to a rehabilitation specialist, typically an occupational therapist (OT), a physical therapist (PT), a recreational therapist (RecT), or an exercise physiologist (EP). The roles and evaluations performed by these disciplines are outlined in Table 2. After a referral to a specialist, other measures of

function may be performed based on the specific discipline. These evaluations may further focus on mobility, cognition, sensations, ability to perform other roles, and need for modifications. A practicing oncology clinician may not have time nor experience to perform the detailed exam necessary to fully assess function and recommend an exercise prescription. Therefore, the oncologist relies on input from these other professionals to best care for the older adult with cancer.

Ideally, when intervention is warranted, a referral is made to a professional to improve or maintain function. Some patients are home bound and may not be able to commute to the clinic for repeated therapy visits. For these patients, home health care is available for a skilled need such as nursing and physical or occupational therapy, and a referral can be made to a local home care provider for follow up. Home health care offers a wide range of health care services that can be given in the home for an illness or injury. Home health care is usually less expensive, more convenient, and just as effective as care provided in a hospital or skilled nursing facility [41]. For the older adult patient with cancer, this option may offer a way to undergo needed therapy at home.

There is ample evidence, as described above, for oncology patients without a deficit in functional status to perform exercise. A referral for exercise recommendations is preferred when possible. However, some patients may want to avoid the time for additional appointments, the cost for additional providers and visits, or prefer an independent program. In these cases, if the provider's evaluation is that exercise can be safely performed by the patient, an exercise prescription can be given to the patient by the oncology provider. A recent study in older adults with cancer and the utilization of PT/OT showed that few were referred for these services [42•]. Patients with complications, such as bone metastases or history of falls, should be evaluated more fully by a specialist prior to initiating an exercise prescription.

Healthcare professionals working in exercise oncology are an excellent referral resource for older patients to receive appropriate supportive care throughout the entire cancer treatment trajectory. Exercise participation and adherence throughout cancer treatment and recovery are significantly increased if physicians are involved in making recommendations and referring patients to qualified exercise professionals [43–45]. Unfortunately, most older patients with cancer report they do not discuss exercise with their oncologist or primary care providers throughout their cancer treatment and recovery [43–45]. Despite this, research shows that patients of all ages want their providers to initiate discussions about exercise and make appropriate referrals [45]. Patients want to receive information on exercise early on and throughout treatment and survivorship [46•]. Given the benefits of exercise, routine discussions about exercise between providers and geriatric oncology patients along with appropriate referrals to a qualified exercise physiologist could significantly improve prognosis, recovery, and multiple domains of quality of life for older individuals [3–13].

The Five-A Model provides a simple and easy to follow framework to aid oncology providers in assessing risk and referring their older patients with cancer for exercise testing, counseling, and prescription services (see Fig. 1). It is important for oncologists to ask their older patients whether they currently exercise or not and, subsequently to discuss how to

safely begin or continue an exercise program during and after treatment. As part of this discussion, it is essential to identify and address potential contraindications (e.g., orthopedic, cardiopulmonary, oncologic) that might affect exercise safety and tolerance [47]. Contraindications do not mean that a older patient or survivor cannot exercise at all; they simply require specific modifications to the exercise regimen so that the individual can exercise safely and still achieve the desired mental and physical health benefits [47]. The majority of older patients with cancer will be able to safely initiate or continue an exercise program [47].

Although active exercisers or those at low to moderate risk, based on the ACSM guidelines, are not required to obtain medical clearance to continue or begin a low to moderate exercise program, most older oncology patients and survivors will need and will benefit from further medical assessment. This should extend beyond the oncology team because the exercise risk of the older patient will be likely be moderate to high [47]. Further medical assessments by oncologists, surgeons, cardiologists, orthopedists, and neurologists among others may be necessary in order to obtain information required by exercise physiologists to safely and appropriately prescribe exercise. This is especially true in older oncology patients because of the need to account for cancer-specific, cardiovascular, pulmonary, metabolic, orthopedic, neurologic, and other comorbidities [47].

It is important that these additional medical evaluations be conducted even prior to the initiation of any baseline exercise testing which precedes developing an exercise prescription and, subsequent exercise participation [47]. It is recommended that exercise testing, exercise prescription, and exercise monitoring be done by qualified exercise professionals and, when needed, additional qualified medical professionals, for all cancer patients and survivors. This is especially true for older individuals (1) at moderate risk beginning or continuing vigorous exercise and (2) at high risk commencing or continuing any level of exercise [47].

The ACSM has published Exercise Guidelines for Cancer Survivors, Exercise Guidelines for Older Adults, and Guidelines for Exercise Testing and Prescription. Collectively, these guidelines provide evidence-based recommendations for designing safe and effective (1) fitness and functional testing protocols, (2) exercise prescriptions, and (3) exercise implementation and maintenance plans for older patients and survivors of cancer [14••, 47]. For older patients and survivors, the ACSM guidelines recommend activities that gradually increase over time until they are able to achieve the following: (1) 150 min (moderate intensity) or 75 min (vigorous intensity) aerobic exercise per week, (2) 20–30 min of strength training for all major muscle groups 2 to 3 times per week, and (3) regular stretching daily [14••, 48–50]. It is suggested that older patients with limited mobility due to comorbid conditions should still be engaged in exercise, even at low and slower levels, to maintain their function and it reduces physical and psychological late effects of treatment [14••, 49, 50].

Tailored and individualized exercise prescription plans are important for all individuals. Exercise prescriptions including both aerobic and anaerobic exercise are safe, effective, and appropriate for older oncology patients and survivors. The goal is to achieve a moderately intense level of activity which results in 55–75 % of maximum heart rate [51]. Patients and

survivors may get overwhelmed with the amount of exercise recommended in a day. One suggestion is to increase the amount of activity during the day with short bouts of aerobic exercise (3–10 min each) to build up to 30 min a day. Rest breaks are encouraged to reduce toxicities and side effects [12]. Patients with advanced disease or metastasis can safely perform and tolerate low intensity exercise such as walking [15, 18, 19, 24••, 25, 27]. Yoga and Tai Chi Chuan are also low intensity and effective in reducing toxicities and side effects in this population [21–23, 26, 28, 31].

Conclusions

Regular exercise during and after treatment has been shown to have physical and psychological benefits [4, 6, 13], including reduction in symptom severity. For older adults with cancer to maintain or improve their function, providers in the oncologic setting must be equipped to discuss the short- and long-term benefits of exercise. Additional longitudinal studies are needed in the older adult with cancer population in a variety of settings including the community and hospital. Resources that oncology providers can share with their patients include (1) the American Cancer Society Guidelines on Nutrition and Physical Activity for Cancer Prevention (www.cancer.org); (2) American Geriatrics Society (AGS) Healthy Aging Go4 Life program (www.healthinaging.org); (3) Physical Activity Tips for Survivors at the American Society of Clinical Oncology site (www.cancer.net); and (4) National Cancer Institute Physical Activity and Cancer (www.cancer.gov).

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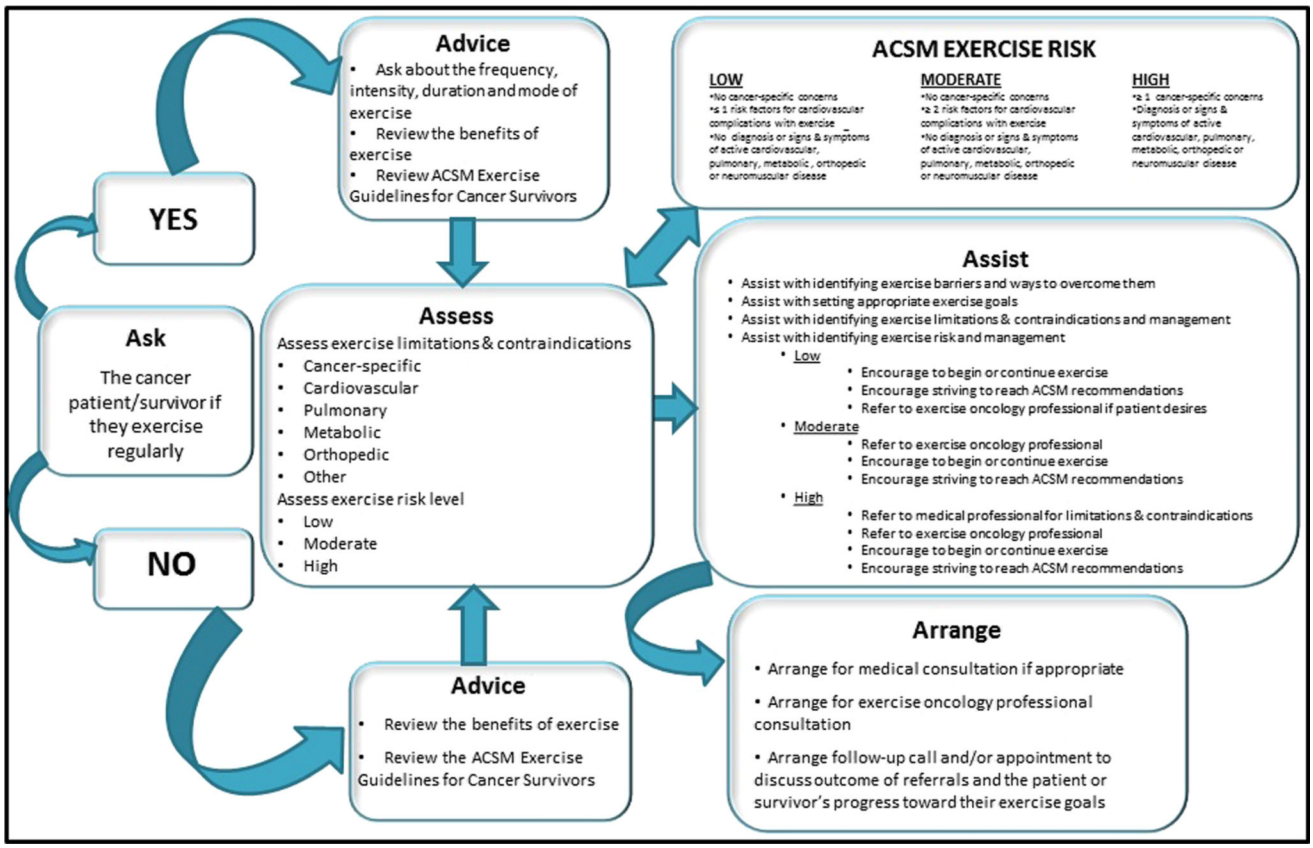

Fig. 1.

Exercise oncology risk assessment and referral for the older patient

Table 1

Basic functional status assessment parameters

Activities of daily living (ADL) [37]	**Instrumental activities of daily living (IADL) [38, 40]**	**Timed up and go (TUG) [39, 52]**
Assess for independence in the following areas: • Bathing • Dressing • Toileting • Transferring • Continence • Feeding	Assess for independence in the following areas: • Ability to use the telephone • Shopping • Food preparation • Housekeeping • Laundry • Transportation (either driving or taking public transit/taxi) • Responsibility for own medications (correct dose at correct time) • Ability to handle finances (paying bills, banking)	Assess gait using the TUG test: • Time (in seconds) it takes for a patient to stand up from a chair, walk 10 ft straight ahead, turn around, and return to the chair and sit down. • Patient may use an assistive device and another person can stand nearby, but should not have the assistance of the other person
Score of 6 (patient independent) Score of 5–0 (patient dependent consider evaluation for area of dependence, such as physical therapy)	Dependence in any area consider further evaluation with occupational therapy	Normal TUG score <13 s, higher scores, or elevations in scores over time suggest need for intervention [53]

Table 2

Professionals involved in functional assessment and intervention

Professionals	Definition of role	Evaluation
Occupational therapists (OT)	Help individuals with knowledge, skills, and attitudes necessary to perform life tasks, participation in life roles, and quality of life Includes assistance with roles, at home, school, and community life and address physical, psychological, and cognitive aspects of their well-being through engagement in these roles [54].	• ADL/IADL • Role in community (work, school) • Sensation • Adaptive equipment • Home modifications • Vision/hearing support • Distress • Cognition • Quality of life • Sexuality • Lymphedema
Physical therapists (PT)	Help individuals to maintain, restore, and improve movement, activity, or functioning, and promote optimal ability to enhance health, well-being, and quality of life. They prevent, minimize, or eliminate impairments of body functions and structures, activity limitations, and participation restrictions [55].	• Home environment • Equipment needs • Pain • Sensation • Range of motion • Strength • Endurance • Mobility • Balance • Fall risk • Incontinence
Recreational therapists (RecT)	Help psychological and physical health, recovery, and well-being by utilizing recreation and other activity-based interventions to address illness and/or disabling conditions. Help to restore, remediate, and rehabilitate function and independence in life activities, to promote health and wellness or reduce or eliminate activity limitations and restrictions to participation in life situations [56].	• Social, cognitive, physical, and leisure needs • Recreational modalities individualized to the person by their interests and lifestyle
Exercise physiologists (EP)	Provide risk assessments for functional and fitness assessments across a wide variety of functional domains. Acquires patient-reported assessments and performs biological, clinical, and free-living assessments across a wide variety of functional and fitness domains, including but not limited to, mental health, readiness for behavioral change, cardiorespiratory, musculoskeletal, and neurological. Provides exercise prescriptions to address mental and physical health outcomes according to specific patient needs [47, 57].	• Assessment of mental health, cardiorespiratory, musculoskeletal, neurological, and other systems via patient-reported, biological, clinical, and free-living assessments • Example assessments include, but are not limited to, stress, anxiety, depression, motivation, readiness to change, self-efficacy, lactate threshold, immune function, SNPs, gene expression, VO2 max, LVEF, cardiac output, maximal voluntary contraction, twitch force, maximal strength, power output, total work, balance, total energy expenditure, body composition, and range of motion among others

Professionals	Definition of role	Evaluation
		• Provides exercise prescriptions to address mental and physical health outcomes
Registered nurse (RN)	Functional assessment is a key component of a nursing geriatric assessment [40]	• ADL/IADL • Timed up and go, gait speed • History of falls • Living situation

SNPs single-nuclelotide polymorphisms, *VO2 max* maximal oxygen consumption, *LVEF* left ventricular ejection fraction