Complementary and Alternative Therapies in Oncology

Exercise in Prevention and Management of Cancer

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Opinion statement
Regular and vigorous physical exercise has been scientifically established as providing strong preventative medicine against cancer with the potential to reduce incidence by 40%. The effect is strongest for breast and colorectal cancer; however, evidence is accumulating for the protective influence on prostate cancer, although predominantly for more advanced disease and in older men. Following cancer diagnosis, exercise prescription can have very positive benefits for improving surgical outcomes, reducing symptom experience, managing side effects of radiation and chemotherapy, improving psychological health, maintaining physical function, and reducing fat gain and muscle and bone loss. There is now irrefutable evidence from large prospective studies that regular exercise postdiagnosis will actually increase survivorship by 50%–60% with the strongest evidence currently for breast and colorectal cancers. In our work with prostate cancer patients, we have found that exercise can limit or even reverse some of the androgen deprivation therapy (ADT) adverse effects by increasing muscle mass, functional performance, and cardiorespiratory fitness without elevating testosterone levels. Hormone therapies for breast and prostate cancer can result in alarmingly increased risk of cardiovascular disease, obesity, type 2 diabetes, osteoporosis, and sarcopenia. Increasingly, patients are questioning the benefit of some cancer treatments as the risk of morbidity and mortality from other chronic diseases begins to outweigh the initial cancer diagnosis. Over three decades of research in exercise science and many hundreds of RCTs demonstrate the efficacy of appropriate physical activity for preventing and managing these secondary diseases. Based on this evidence it is now clear to us that exercise is a critical adjuvant therapy in the management of many cancers and will greatly enhance the therapeutic effects of traditional radiation and pharmaceutical treatments by increasing tolerance, reducing side effects, and lowering risk of chronic diseases, even those not aggravated by cancer treatment. While patients and their clinicians deal with their cancer, other chronic disease mechanisms continue unabated. Anxiety, depression, poor nutritional choices, and a counterproductive rest strategy will accelerate these processes, while a well-designed exercise program adhered to by the patient and supported by the medical and exercise professionals will effectively control and even reverse these diseases and disabilities. In the wide range of cancer populations that we work with, both young and old and with curative and palliative intent, our overwhelming experience is that exercise is first well tolerated, and benefits the patient.
psychologically and physically. While some of our patients are on individual, home-based programs, we find that small group exercise sessions with close supervision by Exercise Physiologists (EP) provides a more motivating setting and the social interaction is critical for adherence and retention as well as greater psychological benefits such as reduced anxiety and depression and enhanced social connectedness. While managing many hundreds of cancer patients over the last 6 years, our clinic has not experienced any instances of the exercise hindering patient recovery or treatment purpose, nor have any significant injuries occurred. However, it is critical that the exercise prescription and management be tailored to the individual patient and that they are monitored by appropriately trained and professionally accredited exercise specialists. For those patients at low exercise risk and without significant musculoskeletal issues, community-based physical activity is of excellent benefit where the emphasis should be on adherence, affordability, convenience, and enjoyment.

Introduction

Physical exercise is essential to maintaining human health and is now recognized by the American College of Sports Medicine and the American Heart Association as medicine (see http://www.exerciseismedicine.org) for both the prevention and management of chronic disease, injury, and other illnesses. Booth et al. [1••] present extensive evidence that the modern sedentary lifestyle adopted by the majority of the population in most developed nations is incompatible with the human genome, and this results in the wide array of chronic diseases which now account for most of the World’s health burden [2]. With regard to cancer, regular physical activity has a protective effect with the strongest evidence for breast [3] and colorectal cancer [4] but less convincing data for prostate cancer [5].

Postcancer diagnosis, exercise is now considered an important adjuvant therapy to reduce symptom experience, ameliorate side effects of radiation and pharmaceutical therapies, improve psychological, wellness and increase survivorship. Of particular importance is the prevention and management of other often more life threatening chronic diseases such as cardiovascular disease and type 2 diabetes which are increasingly being observed as outcomes of cancer therapy [6, 7••]. Further, reduced fitness and muscle and bone mass, and increased body fat are frequently observed in people with cancer in part resulting from reduced physical activity, poor nutrition, and depression. The majority of our research has been in men with prostate cancer receiving androgen deprivation therapy (ADT) and so we will present some of these findings; however, much of this work applies to all cancers.

Defining exercise

• The field of exercise science is now quite mature with a very large volume of research literature ranging from elite sports performance, maintenance of health, to management of disease and disability. In terms of physiological effects there are several parallels between exercise and drug therapy. Concepts of mode, dosage, and duration apply, and as with drug prescription, the effects on the human body vary markedly with different exercise regimes. Before continuing with this review we will define some key terms.

• Broadly exercise mode can be divided into two categories. Aerobic or cardiorespiratory exercise (Fig. 1) involves large muscle groups performing continuous or intermittent activity over an extended period of time. Most prominent effects are on the cardiovascular and respiratory systems increasing their capacity and improving blood lipid profile. Anabolic or resistance exercise (Fig. 2) involves performing sets of repeated movements against a resistance during which neuromuscular fatigue occurs within 6–12 repetitions. Most prominent effects are on the neural and muscular systems but marked changes also occur to the endocrine and skeletal systems. In the noncancer older