

Exercise and Cancer-Related Fatigue

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Many survivors of cancer struggle with ongoing issues related to their cancer treatment. The most frequently reported symptom by cancer survivors is cancer related fatigue (CRF) which has been reported to affect 60 – 90% of cancer survivors (Ahlberg et al, 2003). There are several factors that distinguish CRF from fatigue reported by the general population. CRF is characterised as: 1) severe and distressing, 2) persistent, 3) not consistently alleviated by sleep or rest, 4) not in proportion to recent activity (i.e. fatigue experienced is beyond that what would be expected for a given activity), and 5) interferes with daily activities and social functioning (Berger, 2010). Symptoms of CRF can: 1) be present at diagnosis as a symptom of cancer, 2) develop during cancer treatment, or 3) develop following treatment as a late effect. In many cancer survivors, CRF persists for months or years following completion of cancer treatment.

The causes of CRF are not entirely clear. For this reason, CRF is hypothesized to be a complex multidimensional issue and best addressed by a multi-disciplinary team (e.g., oncologist, nurse, dietician, psychologist, exercise physiologist, physical and occupational therapist). A ten point visual analogue scale (VAS) is often used to measure CRF (i.e., 1 being no fatigue to 10 being worst fatigue imaginable). The

National Comprehensive Cancer Network categorizes levels of fatigue as: 1) mild (VAS score 1-3), 2) moderate (VAS score 4-6), and 3) severe (VAS score 7-10; Berger, 2010).

What is the role of Exercise for CRF?

There is compelling evidence from meta-analyses supporting exercise as an effective intervention to improve symptoms of CRF in cancer survivors, with larger benefits seen when exercise interventions are carried out in the post cancer treatment time period (Cramp & Daniel, 2008; Speck et al, 2010). The majority of research to date, however, has been done in breast cancer survivors and fatigue is often not the primary outcome of interest. The National Comprehensive Cancer Network (NCCN) recommends ‘activity enhancement’ for the treatment of CRF. These guidelines recommend intervention to optimize the individual’s level of activity with consideration of the following cautions:

- Bone metastases
- Immunosuppression/ neutropenia
- Thrombocytopenia
- Anemia
- Fever or infection
- Limitations secondary to metastases or comorbidities
- Late effects of cancer treatment
- Safety issues (e.g., risk of falls)

Considerations for Exercise Prescription

Exercise can be used as an intervention prior to, during, or following treatment to prevent and alleviate CRF. Important considerations during screening that will help determine the most appropriate program for a given cancer survivor include: 1) type of cancer, 2) timing of exercise program in relation to treatment (e.g. during treatment or following treatment), 3) fatigue level (for guidance see McNeely & Courneya, 2010), 4) current fitness level, and 5) medical history. These factors in combination will dictate the appropriate mode, intensity, volume, and rate of progression of exercise training. Complex cases require careful consideration and medical clearance, advice, and in some cases medical supervision is necessary (e.g. severe fatigue, bone metastasis, multiple comorbidities; For additional information see McNeely & Courneya, 2010; Schmitz et al., 2010).

Aerobic Exercise Training

Deconditioning and inactivity during and following treatment is often reported by cancer survivors, and characterized by a loss of cardiorespiratory fitness. Decreases in cardiorespiratory fitness can precipitate and exacerbate CRF (Alhlberg, 2003). Cardiorespiratory fitness has been shown to be a strong predictor of CRF (Evans, 2007), and to mediate the relationship between exercise and CRF (Courneya, 2009). While the rationale for performing aerobic exercise training is clear, survivors with CRF might be unable to complete continuous aerobic exercise training. Interval training has been suggested as one approach that can be used to maximize improvements in cardiorespiratory fitness while minimizing the impact of training on CRF (Courneya, 2009). Along the same lines, those with moderate CRF might need to break up aerobic

training into smaller bouts throughout the day, (e.g. 3 bouts of ten minutes versus 30 continuous minutes).

Resistance Exercise Training

Inactivity, deconditioning, sarcopenia, as well as factors related to the cancer itself can result in decreased muscular strength and endurance in cancer survivors. With these decreases, functional reserve is reduced resulting in early CRF and increased effort to perform activities of daily living (McNeely & Courneya, 2010). Increasing functional capacity and reserve through progressive resistance training has been found to be an effective method to manage CRF, with potential to reduce symptoms in the long-term (Segal, 2009). For patients with moderate CRF, the program should begin with lighter loads and higher repetitions. Recovery time between sets and exercises may need to be increased to provide adequate time for recovery during training (e.g. 3 minutes between exercises, or 2 minutes between sets; McNeely et al, 2006). Gradually reducing recovery time between sets and exercises can be used as a variable for progression. When early onset muscular fatigue is an issue, survivors may need to break training into bouts throughout the day to experience some benefit without exacerbating CRF. It is possible that in highly deconditioned survivors, or those with moderate CRF, resistance training alone for the first 6-to-12 weeks may best precede any formal aerobic training. In patients with severe CRF, medical supervision and/ or referral to physical therapy should be considered.

Monitoring & Educating Survivors

Understandably, many survivors with significant CRF may be reluctant to begin an exercise intervention. For many survivors exercise to reduce fatigue may sound counterintuitive; therefore, patients need to be educated on the known benefits of exercise for CRF. It is important to emphasize the need to begin an exercise program at an appropriate level and progress slowly to avoid exacerbations of CRF. Exercise should be performed on days and during times throughout the day when fatigue is lowest. Survivors should be provided with appropriate strategies for days or times of increased fatigue (e.g., reducing intensity or volume). Survivors should be encouraged to self-monitor fatigue levels before, during, and following exercise training sessions, as well as 24 and 48 hours following training. Effective and open communication is needed to ensure that appropriate program modifications can be made quickly to avoid exacerbations in fatigue, or exhaustion.

Conclusion

CRF is a common and debilitating symptom for many cancer survivors. Appropriately prescribed exercise can be an effective method to prevent, alleviate, and manage CRF. Exercise specialists are well positioned to work collaboratively with other health professionals to help cancer survivors manage symptoms of CRF.

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