PM R 9 (2017) S415-S428

www.pmrjournal.org

Contemporary Issues in Cancer Rehabilitation

A Focused Review of Safety Considerations in Cancer Rehabilitation

Susan Maltser, DO, Adrian Cristian, MD, MHCM, Julie K. Silver, MD, G. Stephen Morris, PT, PhD, Nicole L. Stout, DPT, FAPTA

Abstract

Cancer and its treatments introduce various adverse effects that may affect survivors' physical, cognitive and psychological functioning. Frequently both tolerance to activity and exercise are affected as well. Rehabilitation providers should have substantive knowledge about the effect of cancer progression and common side effects associated with antineoplastic treatment to safely integrate rehabilitation interventions. Rehabilitation may mitigate loss of function and disability; however, these patients are among the most medically complex that providers treat. This report provides a focused review that synthesizes the current evidence regarding disease progression and oncology-directed treatment side effects within the context of safety considerations for rehabilitation interventions throughout the continuum of cancer care. Descriptive information regarding the evidence for precautions and contraindications is provided so that rehabilitation providers can promote a safe plan of rehabilitation care. It is incumbent upon but also challenging for rehabilitation providers to stay up to date on the many advances in cancer treatment, and there are many gaps in the literature regarding safety issues. Although further research is needed to inform care, this review provides clinicians with a framework to assess patients with the goal of safely initiating rehabilitation interventions.

Introduction

Cancer- and oncology-directed treatments introduce a variety of side effects that can adversely affect multiple body systems during and after disease treatment [1]. Each disease treatment modality (eg, surgery, chemotherapy, radiation) may individually or collectively introduce risk for a host of potential safety issues. In addition, a complex array of biopsychosocial factors such as an individual's pre-existing comorbidities, polypharmacy, and other lifestyle factors also affect and amplify risk for adverse side effects during treatment.

It is incumbent upon rehabilitation providers to be knowledgeable about safety issues related to the disease or progression of the cancer as well as side effects and serious adverse events associated with antineoplastic therapies that may have an impact on care. Early identification and management of emerging adverse events may affect morbidity and survival [2]. The purpose of this report is to provide a focused narrative review of the current literature regarding safety with rehabilitation interventions for individuals with cancer with consideration for the disease process, side effects of disease treatment, and associated precautions and contraindications.

Pretreatment Risk Assessment

Pretreatment risk assessment helps to identify potential safety problems and to establish a patient's baseline physical and functional status. Understanding the disease and treatment trajectory provides an opportunity to assess the potential risk for problems that may affect rehabilitation interventions. Before initiating antineoplastic therapies, an extensive medical workup is undertaken to diagnose, stage, and determine a treatment plan for the disease. Baseline imaging, laboratory, and other testing provides insight into various markers and system functions. In addition to a comprehensive medical history to identify existing comorbidities and medication regimens, assessing functional measures is important in predicting mortality and disease-free

1934-1482/$ - see front matter
http://dx.doi.org/10.1016/j.pmrj.2017.08.403

survival and prognosticating functional decline. An ideal construct for rehabilitation professionals is to obtain a comprehensive functional assessment before the initiation of any cancer-directed intervention, as this may optimize performance outcomes during and after treatment [3] and will help identify early functional status decline [4].

Various models of pretreatment assessment and planning have been investigated and typically involve an interdisciplinary team-based approach. These include the prospective surveillance model, multimodal prehabilitation, and enhanced perioperative surgical recovery programs [5].

Safety Considerations With Antineoplastic Treatment Adverse Effects

During active oncology-directed treatment, various modalities are sequentially and sometimes concurrently delivered. Rehabilitation providers must be aware of postsurgical precautions and contraindications regarding movement and activity restrictions so that a plan of care can be developed that facilitates tissue healing, prevents restrictions in function, and optimizes functional status. These precautions, however, should be balanced with evidence-based mobilization and postoperative activity recommendations, and should be informed by surgical precautions and guidance. Mobility and exercise participation in the acute postoperative stage of treatment may reduce the risk of adverse events [6,7], affect overall length of stay [8], and reduce readmissions and complications in various cancer populations [6,9].

Chemotherapeutic interventions typically include multidrug therapies administered cyclically over a standardized period of time. Chemotherapy side effects contribute to multisystem dysfunction and have considerable influence on the safe administration of a rehabilitation plan of care. Table 1 identifies common chemotherapy, immunotherapy, and hormonal drugs and side effects (www.cancer.gov) that may be particularly relevant to rehabilitation specialists.

Hematological Compromise

Myelosuppression is a common side effect associated with nearly all chemotherapy and immunosuppressive agents, particularly corticosteroids, and thus presents significant implications for rehabilitation interventions. Hematologic compromise can result in cytopenias that increase risk of infection, compromise metabolic function, and alter physiological responses to exercise in severe circumstances. Table 2 provides an overview of laboratory values and safety thresholds for consideration by the rehabilitation provider.

The cancer population, as a cohort, has a higher rate of transfer to acute care hospital during inpatient rehabilitation, and it is important to identify the risk factors for transfer [10]. In a study by Guo et al of 98 individuals with cancer undergoing inpatient rehabilitation, hemoglobin levels and absolute neutrophil and platelet counts at the time of admission were not associated with acute care transfers [11]. In another study by Fu et al, 143 lymphoma patients undergoing inpatient rehabilitation, male gender, creatinine >1.3, and hematopoietic stem cell transplantation were associated with a higher rate of transfer to acute service hospitals [12].

Anemia is a frequent complication of cancer and cancer treatment including chemotherapy and radiation [13]. Worsening anemia reduces exercise tolerance and endurance, leading to symptoms of fatigue, dizziness, and hemodynamic instability [14]. Although aerobic capacity is improved with higher hemoglobin levels, it is unclear whether there is a level of hemoglobin below which functional outcomes are compromised [14]. Caution should be used in prescribing progressive resistive and moderate- to high-intensity aerobic exercise in individuals with severe anemia (hemoglobin ≤ 8 g/dL) [15,16]. Low-intensity exercise may be beneficial to promoting improvements in blood counts. Rehabilitation professionals should monitor hemodynamic, functional, and exertional status as well as patient symptoms such as chest pain, lightheadedness, and inappropriate dyspnea [17].

Thrombocytopenia occurs with myelosuppression therapies and affects red blood cell counts. Individuals with platelet counts of $<10{,}000$ cells/μL are at significant risk for spontaneous hemorrhage and, as per current guidelines, will receive prophylactic transfusions [18]. Those with counts of $<20{,}000$ cells/μL are at increased risk, and special consideration for rehabilitation intervention should be considered; generally, activity is restricted to walking and activities of daily living [19]. Individuals with counts of $>20{,}000$ cells/μL can complete light exercise with close symptom monitoring. In general, this includes maintaining blood pressures below 170/100 mm Hg and screening the patient for symptoms of bleeding, including bruising and bleeding around the gums [20]. Those with counts of $>30{,}000$ cells/μL can engage in moderate exercise and light resistive exercise within tolerance [19].

Chemotherapy-induced neutropenia (absolute neutrophil count <500 mm^3/L) typically occurs 3-7 days after administration of chemotherapy. Neutropenia predisposes patients to infection. Typical signs and symptoms of infection are often absent in neutropenia, and fever remains the earliest sign of occult infection. Primary sites of infection are the gastrointestinal tract, sinuses, lungs, and skin [21]. Clinicians should practice hand hygiene with antimicrobial products during every patient encounter. The use of barrier precautions such as gowns, gloves, and masks are usually unnecessary, as patients are more likely to get infected with their own