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PHYSICAL THERAPY INTERVENTIONS IN CHILDREN WITH CANCER

KANSERLİ ÇOCUK HASTALARDA FİZİKSEL AKTİVİTE GİRİŞİMLERİ

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ABSTRACT

Children with cancer experience severe adverse effects from cancer or as a sequela of cancer treatment. These side effects can affect major body systems such as musculoskeletal, cardiovascular and neurological systems and impact participation in daily living activities and thus quality of life. These sequelae are to be lessened with physical therapy, rehabilitation, or neuropsychological treatment according to the requirements of the patients. Thus, awareness of the rehabilitation needs of children with cancer is crucial to enhance a healthy life with quality. Recommendations concerning the quality of life among adults are included in the guidelines, but data including recommendations for children are limited.

Keywords: Paediatric, cancer, physical therapy, rehabilitation

ÖZ

Kanserli çocuklar, kanserin veya hastalığın tedavisinden kaynaklanan ciddi yan etkiler ve sekeller yaşamaktadır. Bu yan etkiler, en majör vücut sistemlerinden olan iskelet-kas, kalp ve solunum ile nörolojik sistemleri etkileyerek hastanın günlük yaşam aktivitelerini engellemekte ve hayat kalitesini bozmaktadır. Bu engellenmeler hastanın gerektirdiği her türlü fiziksel aktivite, rehabilitasyon ve nöropsikolojik tedaviler ile en aza indirilmeye çalışılmaktadır. Bu nedenle, kanserli çocuklarda rehabilitasyon ihtiyacının farkedilmesi kaliteli bir hayat için şarttır. Erişkinlerin hayat kalitesi için yapılan öneriler kılavuzlara dönüştürülmüş olmasına rağmen çocuk hastalar için öneriler halen kısıtlıdır.

Anahtar Kelimeler: Çocuk, kanser, fiziksel aktivite, rehabilitasyon

INTRODUCTION

Although progress in cancer treatments has resulted in increased survival rates in children, they have acute or chronic side effects. Two-thirds of children with cancer develop at least one chronic or long-term side effect after cancer treatment (1-3). The risk of long-term side effects is dependent on tumour-related factors (e.g.type of tumour, location within the body and extent of the cancer); treatment modality factors (e.g. extent and location of surgery, chemotherapy type and dosage, radiation therapy type, location and dosage); as well as patient-related factors (e.g. the child's age, gender, overall health at initial diagnosis of cancer; e.g any underlying chronic disease other than cancer, and neurological developmental age at the time of diagnosis) (3, 4).

Specific long-term adverse effects of cancer treatment on the musculoskeletal system include effects on muscle and soft tissues as well as on bone (1-5). The impact of surgery such as amputation or limb-salvage intervention may result in chronic pain, gait and balance dysfunction, and impact overall activity (1, 5). Mostly, children diagnosed with acute lymphoblastic leukaemia, bone tumours like osteosarcoma or Ewing sarcoma, central nervous system tumours and who have undergone stem cell transplantation have to cope with side effects involving the musculoskeletal system (1,3-5). Other than the musculoskeletal system, such cancer therapies, including chemotherapy and radiotherapy, lead to neurological system deficits, such as motor and sensorial nerve deficits, affecting the central and peripheral nervous systems (1, 3-5).

In patients with acute lymphoblastic leukaemia, (5-8), osteoporosis and avascular necrosis (5, 9-11), cardiotoxicity (12), and neurocognitive side effects such as peripheral neuropathy are the most common sequela (1, 3-6).

In patients with CNS tumours, complications depend on both the grade, size, and location of the tumour and also the type

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and extent of treatment modality (e.g. extent and location of surgery, chemotherapy type and dosage, radiation therapy type, location and dosage) and patient-related factors (5, 6, 13-15). Patients having craniospinal irradiation may experience neurocognitive deficits as well as spinal bony deformities. (5, 6, 16).

Children with bone tumours experience physical complications concerning muscles and bones according to chemotherapy or surgery; weakness, neuropathy, impaired balance, contractures among joints, and activity limitations (1, 3-6).

Physical therapy interventions may help affected children to repair and restore function and improve the quality of life not only in healthy children but also in children with cancer (1, 4-6).

CLINICAL AND RESEARCH CONSEQUENCES

Physical activity and rehabilitation programmes for children with cancer have shown benefits on both musculoskeletal and neurological and as well as cardiorespiratory systems and thus for improving quality of life (1, 3-6). Thus, early rehabilitation programmes that restore function are critical. Therefore, prevention and rehabilitation should be involved during the treatment plan for these patients even in the initial diagnostic phase (6). Rehabilitation should be integrated as a part of the palliative treatment of children with cancer since diagnosis, during chemotherapy, and after surgery with or without radiotherapy and should be maintained after completion of the therapies to lessen chronic side effects and improve the quality of life (1, 5, 6, 17).

In children with acute leukaemia, rehabilitation is feasible in all stages of the cancer even in the induction phase, and possibly the intensity of the physical activity should be modified according to the clinical condition of the patient both in the hospital and at home (6, 18). During the initial phases of treatment, patients may perform low- to moderate-intensity physical activity, including aerobic training and stretching and strengthening exercises (6, 19-22). During the maintenance phase of leukaemia treatment, more intensive physical activity and rehabilitation programme may be integrated (6, 19-22). However, no guideline so far has been established. In children with avascular necrosis, rehabilitation should focus on pain reduction and protection and improvement of functional impairments of the bones and joints (6, 23).

In children with CNS tumours, a careful evaluation of the patient is crucial to establish the appropriate time, the intensity and type of physical activity programme in the acute postoperative period. In the maintenance follow-up of these children, according to the clinical situation and improvement in the neurological deficits, the intensity and the modality of the rehabilitation programme can be modified (6, 14, 15, 24). The intensity and frequency parameters are the most challenging to define, especially for infants and those with neurological impairments.

In children with bone tumours who are candidates for surgery, low-to-moderate physical activity rehabilitation should begin before surgery to improve physical functioning and to reduce postsurgical complications. Post-surgical rehabilitation should be maintained until the individual has achieved maximum functioning (6, 25-27). Even after years, rehabilitation may restore minimal deficits in some patients. No guidelines but recommendations have been established (1, 3-6).

The physical activity and rehabilitation programme of the children with cancer should be managed by a multidisciplinary experienced team and modified according to the requirements of each individual patient. It is useful to develop a modified version of the FITT (Frequency, Intensity, Time, and Type) principles in children with cancer (6, 19, 22, 28-30). Patients and their caregivers should be integrated into the rehabilitation programme in every step and evaluation. The physical activities should be enjoyable and involve parents and siblings or even peers to improve compliance (6, 31). In recent years, numerous modalities, including mobile/tablet apps, video games, virtual reality, social media, and other web-based interventions, have been found to exist for the purpose of promoting physical activity and improving adherence among children, particularly in adolescents, in comparison to conventional exercises (1, 14, 15, 32, 33).

Healthy lifestyle behaviours and the integration of physical activity programmes into medical treatment regimens and posttreatment follow-up may also produce numerous health benefits such as improvement in cancer-related fatigue and sleep (33-36).

CONCLUSION

Evidence-based rehabilitation guidance for children with cancer is limited according to the current available literature. However, crucial points such as the awareness of early integration of rehabilitation programme even in the initial diagnosis of the cancer have already been established. This activity programme should not only be integrated to promote overall physical well-being but also to achieve psychosocial health in this population. Intensity, duration, and type of rehabilitation guidelines are still lacking and optimal activity programme according to each specific cancer type is not known; therefore, studies with large sample sizes should be planned for the establishment of guidelines for children with cancer.

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