

From neuromuscular electrical stimulation and biofeedback-assisted exercise up to triathlon competitions—regular physical activity for cancer patients in Austria

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Abstract Individual rehabilitation concepts for cancer patients include specific nutrition programs, psychotherapy and many modalities from the field of physical medicine and rehabilitation. At the Medical University of Vienna, challenging and complex cases of cancer patients are presented and discussed with the goal to plan rehabilitation, within the worldwide first official tumour board for cancer rehabilitation. Regular physical activity is an active option which has been shown to be an important part in the treatment and rehabilitation of cancer patients. Exercise—individually prescribed—has been described to improve functional health of cancer patients with benefits for physical performance, mental health, quality of life, participation and—in some types of cancer—survival. However, not all cancer patients need the same form of regular physical activity. Nevertheless, most of cancer patients should start as soon as possible to be physically active, but under the supervision of specialized physicians and within their individual “right” setting.

Keywords Cancer · Rehabilitation · Tumour board · Physical activity · Exercise

Background

This presentation aims to describe the cancer rehabilitation concept of the outpatient clinic for oncologic rehabilitation of the Department of Physical Medicine and Rehabilitation (Medical University of Vienna, Austria), focusing on physical activity.

Individual cancer rehabilitation—experiences from our outpatient clinic

Rehabilitation concepts for cancer patients have to be individually tailored depending on their individual needs. They have to include specific nutrition programs, psychotherapy (so-called psychooncology) and different options and modalities from the field of physical medicine and rehabilitation, which may help these patients to improve their functional health, and independence in daily activities, and to maintain social participation. These individually tailored rehabilitation plans typically include medical exercise programs, neuromuscular electrical stimulation (as an passive option to exercise), nutrition, lymph massage, breathing therapy, physiotherapy, occupational therapy, breathing therapy, different forms of massage, electrotherapy and other physical modalities and also biofeedback and drug treatment for pain. Since 2010, we discuss challenging and complex cases of cancer patients within the worldwide first official tumour board for cancer rehabilitation in an acute hospital.

Typically, a tumour board represents an institutional multidisciplinary treatment planning approach for a specific cancer entity in which physicians of different medical specialties (oncologists, surgeons, radiotherapists, etc.) present, review and discuss challenging medical cases, e.g. the individual medical treatment options of patients suffering from cancer. At the end of this process, there is a statement (tumour board review—a multidisciplinary opinion) where the individual treatment plan is defined. Since its implementation in November 2010, the presented tumour board for cancer rehabilitation has been an untypical, but regular tumour board, such as the other existing tumour boards at the General Hospital of Vienna/Medical University of Vienna. This tumour board for cancer rehabilitation is guided by a psychiatrist who has an expertise in the field of cancer rehabilitation. Referring specialists from different medical

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specialities—all involved in the rehabilitation process of cancer patients—such as PM&R, dietology and nutrition, oncology, radiology, radiation oncology, surgery, cardiology and orthopedics are invited to attend this tumour board. Challenging and complex cases of cancer patients with the intention of outpatient or inpatient rehabilitation are presented and discussed with the goal to plan rehabilitation (but not to treat the cancer itself!). An individual rehabilitation concept depending on individual functional deficits and on medical conditions of cancer patients is defined, which has to be executed in this form. Sometimes, in cases of contraindications or in cases of important medical issues, patients are told to consult their oncologist once more, before starting rehabilitation. Most functional deficits of the discussed cancer patients are pain (musculoskeletal or cancer), decreased performance status (decrease in endurance capacity and muscular strength), weight loss (cachexia), but also weight gain, sensorimotor deficits and polyneuropathy, dyspnoea, lymphedema, cognitive deficits (“chemobrain”), incontinence, psychological distress and anxiety and neurological deficits such as movement disorders and walking disturbances with the risk of falls and fractures. The rehabilitation plans then do not only include medical exercise with the intention to improve endurance capacity and/or muscular strength, neuromuscular electrical stimulation (as an passive option to exercise), nutrition, lymph massage, breathing therapy, physiotherapy, occupational therapy, breathing therapy, different forms of massage, electrotherapy and other physical modalities, but also drug treatment for pain. This first worldwide existent tumour board for cancer rehabilitation in an acute hospital has been established to be a regular part of the rehabilitation process in challenging cases of cancer patients before and/or during their rehabilitation process. It has found good acceptance in its members and in patients as well, and it has become a very important interdisciplinary and multi-professional help to plan rehabilitation and supportive strategies in challenging cancer patients.

One of the most important functional deficits of cancer patients is decreased physical performance (endurance capacity, muscular strength) with impaired functions, activities and participation. Physical activity and regular exercise have been shown to increase physical performance and quality of life of cancer patients. Furthermore, regular moderate physical activity has been described to be preventive against cancer and also to increase cancer-specific and overall survival in some cancer types.

Physical activity of cancer patients typically and in most cases is represented by aerobic exercise. Experiences from our outpatient clinic show that female breast cancer patients can benefit from aerobic exercise during adjuvant chemotherapy in a central hospital.

Regular physical activity of cancer patients can include the application of neuromuscular electrical stimulation (in

form of a “passive training”), biofeedback-assisted exercises, aerobic exercise, strength exercise and even sports and competitions, for example, marathon running and triathlon (Ironman). Yes, there are really cancer patients who are willing to perform sports with regular participation in competitions! Of whom, the case of a patient suffering from prostate cancer who performed a triathlon (Ironman) within 14 h and 35 min has been observed. Even patients suffering from metastatic bone disease can reach excellent endurance capacities up to 150 % and maintain independency from others' help. Furthermore, cancer patients suffering from very severe concomitant diseases (myocardial infarction, stroke, peripheral vascular disease, amputation) are also able to perform supervised aerobic exercise—and to benefit. Patients suffering from metastatic cancer under very modern and effective oncologic treatment (Sunitinib), which can be dangerous due to its cardio toxicity, are also able to perform supervised active aerobic exercise and to reach excellent endurance capacities.

To increase muscular strength, cancer patients are able to perform strength training, even in cases of metastatic bone disease. Nevertheless, to avoid pathological fractures, some patients suffering from advanced widespread multiple myeloma are only able to increase their muscular strength by using biofeedback-assisted exercise.

Nevertheless, it has to be mentioned that our high-risk patients are exercising not only under supervision of specialized physicians, but also with the “back-up” of a central hospital (Department of Emergency Medicine). This setting seems to be very important in cases of high-risk patients! In all cases of patients who are included in exercise programs, it is very important to have up-to-date knowledge about cancer, cancer treatment and cancer complications and of co-morbidities (such as cardiovascular diseases) and of medication of these patients, and an interdisciplinary (oncologist, cardiologist, dietologist, etc.) approach is very important. Medical history and clinical examination, different laboratory parameters, ECG, echocardiograph findings, exercise testing, spirometry, radiographic findings and bone scans are needed for planning individual exercise programs.

For those patients who are not allowed to perform active exercise, neuromuscular electrical stimulation (NMES) is an option. NMES, initiated and executed with appropriate care, has been shown to serve as a useful supportive means of treatment in some patients with advanced cancer and metastatic disease, especially in cases of metastatic involvement of the brain and of the skeletal system with the risk of seizures and pathological fractures where in some cases volitional training is not allowed. In these cases, NMES is performed with the intention not only to prevent loss of skeletal muscle mass, but also to increase muscular strength and endurance capacity in some patients suffering from very advanced cancer who want to increase their (social) participation. Cancer patients suffering from metastatic brain

disease or brain tumours (glioblastoma) have been shown not only to benefit from regular active exercise, but also from NMES.

Conclusion

Individual rehabilitation concepts for cancer patients include specific nutrition programs, “psychooncology” and different active options and passive modalities from the field of physical medicine and rehabilitation, which aim improve functional health, independence and participation in cancer patients. Regular physical activity as an active option has been shown to be an important part in the treatment and rehabilitation of cancer patients. Exercise—individually prescribed—has been described to improve functional health of

cancer patients with benefits for physical performance, mental health, quality of life and—in some types of cancer—survival. However, not all cancer patients need the same form of regular physical activity. Nevertheless, most of cancer patients should start as soon as possible to be physically active, but under the supervision of specialized physicians and within their individual “right” setting. This setting should be planned according their individual (medical) risk factors and according their individual goals, to find the right way for the individual cancer patient.

Conflict of interest I certify that any financial interests such as employment, stock ownership, honoraria, paid expert testimony, as well as any personal relationships, academic competition and intellectual passion which may inappropriately influence my actions have been included within my manuscript.