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REVIEW ARTICLE

CANCER REHABILITATION.

PARTICULARLY WITH ASPECTS ON PHYSICAL IMPAIRMENTS

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Cancer can cause multiple impairments, activity limitations and participation restrictions. According to individual case findings and needs, rehabilitation treatment is varied. The review mainly focuses on specific problems. Because of functional deficits cancer patients suffer from persistent emotional and social distress and a reduced quality of life (QOL). QOL encompasses at least the four dimensions of physical, emotional, social and cognitive function, which may be positively influenced by physical exercise. Physical exercise also has been shown to prevent or minimise inactivity/disuse problems and to reduce fatigue. The management of sexuality dysfunction has to begin with a thorough history taking and a consequent sexuality counselling. The goals of rehabilitation procedures under palliative care are not only to control physical pain but also to help with mental, social and spiritual pain, together with other symptoms. Rehabilitation problems in head and neck cancer, sexuality, lung cancer, prostate cancer, breast cancer and lymphedema can be improved by rehabilitation. The review mainly focuses on impairment and activity limitation. Social, psychological and vocational aspects are left aside in this review.

Key words: cancer rehabilitation, QOL, inactivity syndrome, fatigue, sexuality, head and neck cancer, prostate cancer, breast cancer, lymphedema.

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INTRODUCTION

With advances in the medical treatment of persons with cancer, including the combined use of surgical intervention, radiation therapy, and chemotherapy, cancer survival rates (defined as a relative combined 5-year statistic) are now above 50%. As survival rates and survival time have increased, so have public attitudes and the willingness to discuss cancer and the needs of the patient. Increasingly, the thrust in cancer care is not simply on survival, but on cancer rehabilitation which aims to improve functional status and quality of life.

Cancer rehabilitation, as defined by Cromes (1), involves helping a person with cancer to help himself or herself to obtain maximum physical, social, psychological, and vocational functioning within the limits imposed by disease and its treatment. This definition supports the interdisciplinary team concept as an approach to cancer rehabilitation. Cancer rehabilitation is being provided primarily by oncology and rehabilitation medicine physicians. Additionally, the team is composed of social workers, psychologists, physical therapists, oncology nursing staff, and occupational therapists as a core team with a variety of other disciplines available for specific problems of the cancer patient.

Cancer can cause multiple impairments, activity limitations and participation restrictions. Common functional **impairments** include loss of motor control, cranial nerve deficits, cognitive and speech problems, swallowing problems, and sensory loss. Spinal cord tumors can cause neurological dysfunction including motor, sensory, bowel and bladder impairment similar to traumatic spinal cord injury. Other cancers are more localized in their impact, for instance, head and neck cancers, which can cause difficulties with speech or swallowing. **Rehabilitation problems** can be identified by the organ system involved. Within each system specific problems can be isolated. Problems can be viewed from functional perspectives as restricted activity of daily life, ambulation, mobility and transfer.

Cancer survivors frequently face functional and psychosocial problems. Ganz et al. (2) reported on 500 cancer patients who had been living with cancer for 1 year. 80% had ambulation difficulties. Activity limitations and vocational problems were found to be common in virtually all cancer sites (3). Activity of daily life (ADL) problems mainly occur in breast cancer, cancer of the respiratory system and cancer of the nervous system which can cause contractures, shortness of breath, paralysis and paresis. These problems result in difficulties with ambulation. Head and neck cancer produce communication problems. Nervous system cancer patients frequently suffer from speech and language problems. Recreational activities are restricted. Vocational problems are frequently encountered because of activity limitation.

Psychologic problems were present in virtually all cancer sites. The incidence of psychologic problems was greater when cancer was associated with an activity limitation. Of all people with nervous system cancers 78% had one or more psychologic

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problems (3). Adequate psychosocial support should be provided for those patients.

Because of its medical, psychosocial, cultural, and vocational implications, cancer can impact patients and interact with rehabilitation efforts in ways quite distinct from the "causes" that bring patients with otherwise similar functional deficits to the attention of rehabilitation professionals. At a minimum, these differences can include preparing for future functional difficulties that may result as metastatic disease advances, cancer pain, compromised immunity, significant fatigue and endurance problems, and the psychosocial impact of cancer. Owing to the potentially progressive nature of cancer, **rehabilitative goals** have been divided in **restorative, supportive, palliative and preventive**. Restorative care aims to return the individual to premorbid function with a minimum of functional impairment. Supportive efforts seek to reduce functional difficulties and compensate for permanent deficits, while palliative treatment, usually of the terminal patient, works to eliminate or reduce complications, especially pain. Preventive rehabilitation would include for example, preoperative education regarding maintenance of strength and range of motion in the upper extremity following breast surgery.

Because of the different types of functional problems that can result from cancer, rehabilitation efforts are now evolving along multiple fronts including not only multidisciplinary institutional rehabilitation settings, but also acute care, subacute rehabilitation, outpatient-rehabilitation, and home health. Again, due to the potential for disease progression, successful outcomes depend upon timely recognition of functional problems and prompt referral for rehabilitation.

According to individual case findings and needs rehabilitation treatment is varied. Different rehabilitation programs categorised by specific problems will be presented. The review mainly focuses on impairment and activity limitation. Social, psychological and vocational aspects are left aside in this review.

QUALITY OF LIFE AND CANCER REHABILITATION

Quality of life (QOL) is defined as an individual's perceptions of his position in life, in the context of the culture and value systems in which he lives and in relation to his goals, expectations, standards and concerns (4). The term QOL and more specifically, Health Related QOL (HR-QOL) refers to a multidimensional concept which encompasses perception of both negative and positive aspects of at least the four dimensions of physical, emotional, social and cognitive function (5, 6). QOL questionnaires used as the testing method to assess QOL of cancer patients. Analysing this dates physicians can identify which aspects of the QOL are damaged. Knowing this he can prescribe specific rehabilitation procedures.

The main publications, in which cancer patients were surveyed for quality of survival, appeared in the middle of 60′s (7, 8), in the mid 70′s the majority of studies measuring the QOL after cancer therapy used the Karnofsky & Burchenal (9) scale. These scales measure the performance status, which correlates with tumor response and survival but do not provide quantitative information regarding other important aspects of QOL. QOL assessment has been used in research and clinical practice to characterize the burden created by cancer or its treatment, options, to demonstrate the effect of rehabilitation approaches and to make policy decisions (10). In the Eighties, the EORTC Study Group on QOL developed the EORTC QLQ-C36, which has been further refined, and designated EORTC QLQ-C30 (11). The EORTC QLQ-C30 is a 30-item multidimensional questionnaire, designed for heterogeneous groups of cancer patients (12–14).

Some research has focused on physical exercise in relation to well-being for all dimensions of QOL. Physical exercise may influence many dimensions of QOL (15, 16). Physical exercise also enhances the functional dimension of QOL (17). Exercise also has been shown to influence QOL by decreasing the incidence of nausea, weight gain, muscle wasting, and fatigue (18–22). Dependence on others for basics needs can intensify the psychological responses to disease and treatment of patients with cancer (19). By facilitating functional independence, exercise can affect the psychological dimension of QOL by inducing positive mood changes. Improvements in self-concept, self-esteem, confidence, self-image, sense of personal worth, control, and self-acceptance have been noted as results of regular exercise. Exercise also may decrease feelings of depression, tension, anxiety, anger, hostility, helplessness, and pessimism (18, 19, 23, 28). Exercise provides structured, purposeful activity and encourages interaction with others, thereby enhancing the social dimension of QOL (29). In addition, improvements in other QOL dimensions facilitated by regular physical exercise may provide individuals with increased energy and a clearer focus to tend to more spiritual issues (30, 31).

Cancer patients suffer considerable emotional and social distress with a significant number of patients suffering from persistent psychosocial problems. There is empirical evidence suggesting that group psychotherapy is effective in ameliorating psychological distress. There is compelling evidence that group intervention is effective in reducing mood disturbance and pain, and in improving QOL (32).

INACTIVITY/DISUSE SYNDROME

Because patients with cancer will often undergo multiple medical interventions and prolonged or repeated hospitalizations, they are vulnerable to an overall decrease in activity. Also referred to as the **Inactivity/Disuse Syndrome or the Immobility Syndrome**, deconditioning is the term used to describe the reduced functional capacity of bodily systems and it is considered a separate entity from the condition that led to the inactivity in the first place. The earliest and most frequent result of immobility/inactivity usually occurs in the musculoskeletal system. Contractures and limitations in range of motion can result in joints that are immobilized in a faulty position. Since

muscles at complete rest lose strength rapidly, generalized weakness has been identified as the second most common functional problem. Early intervention can prevent problems, as it is much easier to maintain strength and range of motion than to regain it.

FATIGUE

Most cancer patients experience a loss of energy and an impairment of physical performance. Some authors estimate that this problem affects up to 70% of cancer patients during chemo- and radiotherapy or after surgery (23, 33). 30% of cancer survivors have been reported to experience a loss of energy for years after cessation of treatment (23). For many patients, fatigue is a severe and activity-limiting symptom. It has been found to negatively affect cancer patients' self-care and social activities (34). The consequences of fatigue are also reflected in its detrimental effect on patient's quality of life. In response to fatigue, patients are often advised to rest and to downregulate their level of daily activities. But since inactivity induces muscular catabolism, prolonged rest can actually help perpetuate fatigue. Therefore, cancer patients suffering from primary fatigue should not be advised to increase the amount of daily rest. Rather, they should be counselled to carry out aerobic exercise (35). Other interventions to reduce the degree of fatigue are stress management, nutritional management, energy conservation technique, activity/exercise program, diversional activity and rest/sleep patterns.

Aerobic exercise (AE) in the rehabilitation of cancer patients

Most cancer patients show limitations in activities of daily living, and in participation due to impaired physical performance, e.g. decreased endurance and decreased strength (31, 36, 37). Postulated etiologic mechanisms for impaired physical performance include reduced nutritional status, sleep disturbances, biochemical changes secondary to disease and aggressive treatment, reduced psychosocial and emotional state and reduced level of physical activity. Inactivity results in muscular catabolism, producing rapid loss of performance. Loss of physical performance, psychological distress, fatigue, weight gain and changes in body image are some of the long-term sequelae of cancer. AE as an additive treatment helps to attenuate these effects and thereby contribute to rehabilitation of cancer patients (17, 37, 39–43). AE has been shown to improve physical performance and reduce fatigue in cancer patients. Therefore it has positive effects on illness-related quality of life of cancer patients enhancing the patient's activity and improving his participation. Data from the literature underline the role of AE in cancer rehabilitation (44–48). Moreover, AE can reduce fatigue and global psychological distress in patients undergoing chemotherapy. Duration of neutropenia and thrombopenia after adjuvant chemotherapy are significantly shorter in the training group than in controls. Another positive effect observed was the significant reduction in analgetics in the training group. The hospital admission length was significantly shorter in the training group. Patients showed an increased activity level and reduced fatigue. Increased satisfaction in attaining increased activity levels leads to increased quality of life (16, 17, 39, 40, 42, 44–48). AE has been shown to increase several types of effector cells which play a role in natural immunity against cancer cells (49–54). In conclusion AE seems to be a very effective additive modality in the holistic treatment, but also in the prevention of cancer (32, 41, 44–48, 55–60).

CANCER AND SEXUALITY

Both the disease and the treatment strategies may lead to sexual dysfunction (62–70). The management of this impairment has to begin with a thorough history taking and a consequent sexuality counselling (71).

Female breast cancer patients often avoid sexual intercourse especially due to negative emotional effects, changes of female body image and fear of partner rejection. It has been shown that early resuming of sexual activity has positive effects on sexual function and sexual life of couples (69). Soreness, dryness, vaginal atrophy, hot flashes and decreased sexual desire may be results of antiestrogen treatment.

Patients with ovarian cancer after surgical removal of the ovaries show the same impairments and infertility. Advanced ovarian cancer results in total pelvic exenteration after which most women avoid sexual activity. Cervical cancer patients often show fibrosis, pain with penetration due to stenosis and decreased lubrification. Female cancer patients after pelvic surgery and/or radiation often avoid resumption of sexual intercourse (72, 73). This might be caused due to a fear of disease recurrence, but also due to the anatomical reasons mentioned above like stenosis or possible bleedings during intercourse. Sexual counselling includes vaginal dilators to prevent stenosis, artificial lubrification and the discussion about changes from customary sexual positions which might minimize sexual discomfort (73, 74).

Testicular cancer patients after orchiectomie and/or pelvic and abdominal radiation show long-term impairments like hormonal changes and loss of fertility. Therefore a thorough pretreatment sexual counselling has to include discussions of reproductive concerns. Especially the possibility of sperm banking is important. Further signs of pelvic radiation can be fatigue, diarrhea, urine and fecal incontinence and dermatological symptoms. All of them can lead to sexual dysfunction. Erectile dysfunction, painful and/or retrograde ejaculation may cause and/or be caused by loss of libido and changes in male body image and lead to sexual dysfunction (74). Erectile assisitive devices and surgical reconstruction of the penis may play an important role in the sexual rehabilitation programme.

Prostate cancer is the most common form of cancer diagnosed in older men. Radical prostatectomy, radiation and antiandrogen treatment as treatment modalities help to gain long survival times in cases of early detected prostate cancer, but often lead to sexual dysfunction. Surgical intervention may damage vascular

and nerve pathways with consecutive incontinence, impotence, retrograde and/or painful ejaculation or infertility. Ejaculatory dysfunction is a problem difficult to handle. The management of erectile dysfunction includes the application of topical intra-urethral therapies, oral medication, vacuum-assisted devices, intracavernosal injection therapy and penile prosthesis (75–88).

PALLIATIVE CARE

Palliative care is defined as "the combination of active and compassionate therapies intended to comfort and support individuals and families who are living with or dying from progressive life threatening illness, or who are bereaved" (89, 90). The goals of rehabilitation procedures under palliative care are not only to control physical pain but also to help with mental, social and spiritual pain, together with other symptoms. Furthermore palliative care is to help patients and family members as they deal with psychologic issues and family concern (91, 92). The purpose of the hospice and of palliative care is to place emphasis on care of each patient in such a way that a patient with terminal illness can live life in the best way possible until death (93).

MANAGEMENT OF THE SPECIFIC SYMPTOMS IN TERMINAL CANCER PATIENTS

Pain: Approximately 80% of patients with cancer experience pain before they die. In approximately 80% the pain is associated with a tumor, however it can also be related to the treatment, or may be unrelated to either the tumor or the treatment (94). Approximately half of patients receive inadequate analgesia (95, 96). Pharmacological treatment based on regular use of opioids is very effective in controlling pain in most patients (94, 97, 98). The World Health Organisation "analgesic ladder" has been used in many regions of the world in the implementation of programs to control cancer pain.

Cachexia-anorexia syndrome is characterised by progressive weight loss, lipolysis, loss of visceral and skeletal protein mass and profound anorexia. Almost all patients with cancer or AIDS experience this devastating disorder before they die (99). Cachexia was previously thought to be the result of the increase of energy demanded by the growing tumor mass. However, recent research (99) has demonstrated that it is primary due to major metabolic abnormalities, such as profound lipolysis and loss of skeletal and visceral proteins, both of which are caused by immune mediators (e.g., tumor necrosis factor and interleukin-6), and tumor byproducts (e.g., lipolytic hormone). This means that anorexia, an almost universal characteristic of cachexia, should be interpreted as the result of metabolic abnormalities rather than the main cause of cachexia (99, 100). The medicamental and nutrition treatment of this syndrome remains insufficient. Studies of aggressive nutritional support, including enteral and parenteral feeding, generally have shown only limited effects on the complications associated with surgery, radiotherapy and chemotherapy (101). Corticosteroids demonstrated a limited effect on symptoms such as appetite, food intake, sense and performance status (102).

Chronic nausea: Patients with terminal cancer frequently experience nausea for extended periods. The causes of nausea include: autonomic dysfunction, gastroparesis and opioids, which can cause nausea by direct central effects, as well as by aggravating delayed gastric emptying, vestibular stimulation and constipation (103). Attempts should be made to determine the underlying cause of chronic nausea and steps taken to relieve it, for example by treating metabolic abnormalities, providing aggressive bowel care or treating brain metastases.

Asthenia: is characterised by profound tiredness occurring after usual or minimal effort, accompanied by an unpleasant anticipatory sensation of generalised weakness. Asthenia is the most frequent symptom associated with advanced cancer (104, 13). The 3 main mechanisms associated with asthenia are direct tumor effects, tumor-induced by-products and accompanying factors, including anaemia, paraneoplastic syndromes and chronic infection. If specific causes can be identified, the correction will lead to a significant improvement. General nonpharmacologic measures such as adapting the activities of daily living, physiotherapy and occupational therapy will help match clinical function and symptom status with the expectations of patients and their families (104).

Dyspnea: has been defined as an uncomfortable awareness of breathing. (105). It is an unpleasant subjective sensation and cannot be verified by any physical abnormality. Abnormalities in the blood gases (detected by the lung chemoreceptors) or stimulation of lung mechanoreceptors cause patients with cancer to experience dyspnea. A number of researches have found great variability in the expression of dyspnea in patients with similar levels of functional abnormalities. Therefore, the goal of treatment should be to improve the patient's subjective sensation rather than trying to modify any abnormality in blood gases or pulmonary function. There are 3 main types of therapy used to manage symptoms of dyspnea: oxygen therapy, drug therapy and counselling.

Modifying activity level and using bathroom aids, portable oxygen and wheelchairs will increase the autonomy of patients with dyspnea. The risk of choking can elicit major psychological reaction from the patient and the family. It is therefore important to anticipate and prepare for the possibility of respiration failure. Drugs for managing the symptoms of dyspnea should be made available and instruction for their administration provided. It is important for relatives and staff members to assess dyspnea only by asking patients how short of breath they feel, rather than by estimating it on the basis of the degree of tachypnea or the use of respiratory muscles. The goal should be to reduce the symptoms that contribute to the patient's sensation of dyspnea, rather than to relieve the objective variables that accompany this disorder.

REHABILITATION OF PATIENTS SUFFERING FROM HEAD AND NECK CANCER

Head and neck cancer strikes at some of the most basic human functions, including verbal communication, social interaction, eating, and breathing. Three topics currently important in head and neck surgery are voice-conserving surgical treatment of laryngeal cancer, the role of modified radical neck dissection in the treatment of cervical metastases and reconstruction and rehabilitation of the head and neck cancer patient.

Radiotherapy used in the management of head and neck tumors, especially in the nasopharynx, often includes the temporal bone and the brain stem in the treatment (106). As a result radiation may be associated with hearing loss and/or vestibular disorders in some patients (107–111). In complete deafness functional rehabilitation is only possible with a cochlear implant or (theoretically) with brain stem implants.

Following surgery and/or radiation head and neck lymphedema may lead to deformities of the face and neck. Early rehabilitation consists of sequential manual lymphatic drainage (MLD) of the head and neck region, physiotherapy for the shoulder girdle, the mimic muscles, and respiratory system and compression garments for the head and neck area to preserve and optimize the effects of MLD (112).

Cancer of the larynx

Cancer of the larynx treated by total laryngectomy results in loss of speech, entailing a major deficit in communication. Speech training becomes the most pressing need in rehabilitation, either through the development of esophageal speech, tracheosophageal speech or with the use of an artificial larynx. Esophageal speech is a preferred method, for it is much more satisfactory than a prosthetic appliance insofar as articulation, intelligibility, and phonation are concerned, and it can be successfully taught in the majority of cases. In the immediate postoperative period and until he has learned to talk, the patient should communicate by writing and signs and thus avoid development of bad communication habits, facial grimacing and whispering. The importance of correct instruction cannot be overemphasized. Only a trained speech therapist should undertake this training. Patients communicating primarily by tablet writing experience the highest amount of limitation in their interaction with other people (113). These patients are at high risk of developing social isolation and would almost certainly benefit from additional consultation with a speech pathologist and the head and neck surgeon to discuss more effective methods of a laryngeal communication (electrolarynx, additional instruction in esophageal speech, or consideration of the patient for a secondary tracheoesophageal puncture) (114). Most patients can be expected to achieve speech using tracheoesophageal puncture following total laryngectomy (115).

Social service and vocational training play large rehabilitation roles. Training for change in occupation may be necessary, especially if previous employment required verbal communication or exposure to fumes, dusts, or underwater work. The patient and the family require instruction in the care of the stoma, and general hygienic care.

Studies to address QOL and issues in patients with laryngectomy gave evidence that the patient's perception of change in overall QOL after treatment differs from the physician's perspective of change in overall QOL (116, 117). It was shown that voice impairment is not the most important or the only dimension affecting QOL after treatment for laryngeal cancer. In fact, general health and vitality were not correlated with voice impairment (118).

Radical neck dissection

Neck dissection is a valuable method for treating cervical metastasis from cancer of the head and neck. One of the most common complications of neck dissection is injury to the spinal accessory nerve (SAN). Injury of the SAN results in atrophy of the trapezius muscle and shoulder dysfunction. There are 3 main types of neck dissection procedures for head and neck cancer. In modified radical neck dissection, the SAN is preserved and dissected free from the jugular foramen to the trapezius muscle. In selective neck dissection, however, the SAN is dissected free only from the jugular foramen to the posterior edge of the sternocleidomastoid muscle. Classic radical neck dissection causes the SAN to be severed, causing denervation of the trapezius muscle.

Radical neck dissection results in both cosmetic defect and disability in the shoulder on the operated side, secondary to section of the accessory nerve (119). The patient develops varying degrees of trapezius muscle paralysis with a dropped painful shoulder and a winging of the scapula, depending on the amount of primary innervation carried to the trapezius by the accessory nerve. Treatment requires support of the arm and shoulder initially with a sling, to prevent overstretching of the trapezius and an exercise program to include strengthening and conscious utilization of the rhomboids and levator scapulae for training in movements to facilitate abduction of the arm at the shoulder. A certain number of patients with direct innervation of the upper trapezius by cervical roots will retain function lost by the others. During the healing electrical muscle stimulation may be beneficial (119). These patients should also be taught to support the shoulder and upper arm when seated on a chair arm or pillow, in order to prevent stretching of the trapezius.

Preservation of the SAN, accompanied by rehabilitation, may lessen the development of shoulder disability after neck dissection (120).

REHABILITATION OF PATIENTS SUFFERING FROM LUNG CANCER

With aggressive, multidisciplinary care, physicians now are able to extend the lives of people with lung cancer. Therefore rehabilitation is an important part of the multidisciplinary approach in the treatment of lung cancer to improve quality of life of lung cancer patients (88, 121–125). Surgical treatment (lobectomy, pneumectomy) of lung cancer leads to the symptom

of breathlessness. To counteract this impairment, rehabilitation programmes with instructions in breathing techniques and pulmonary hygiene are important (124, 126, 127). Patients should be trained in techniques of maximal chest expansion, coughing, pursed-lip diaphragmatic breathing and in segmental breathing exercises. Central and peripheral neurological deficits may result due to local tumor progression, bone metastasis, brain metastasis, paraneoplasia and metabolic decompensation. In most cases the diagnosis of a progressive lung cancer and of neurological symptoms occur simultaneously (128–130). Impaired physical performance, muscle weakness, deconditioning and fatigue are indications for aerobic exercise and strengthening programmes. Strategies against episodes of pain can be physical modalities like the application of heat and cold and of electricity and drug treatment. To improve the activities of daily living adaptative aids are available. Neurological deficits like cognitive deficits and an impairment of the ability to communicate need a comprehensive rehabilitation programme with a neuropsychological approach. Peripheral neuropathy can be treated with special neurophysiological exercises and orthoses. In cases where bone metastases led to spinal cord injury patients should receive adapted orthoses and devices and a wheelchair (65, 67, 71).

REHABILITATION OF PATIENTS SUFFERING FROM PROSTATE CANCER

Prostate cancer is the most common form of cancer diagnosed in older men. Radical prostatectomy, radiation and antiandrogen treatment help to gain long survival times in cases of early detected prostate cancer. Impaired physical performance, psychological distress, fatigue, weight gain, urinary incontinence, sexual dysfunction, and changes in male body image are long-term sequelae of prostate cancer. Rehabilitation has the goal to improve physical and emotional functions which leads to a better participation in daily life.

To improve participation in the activities of daily living strengthening and endurance exercises should be performed. In cases of bladder or bowel involvement special training and information programs help the patients. Urinary incontinence is a common long-term complication after radical prostatectomy. Spontaneous recovery of normal urinary control after surgery can take 1–2 years. Pelvic-floor re-education should be considered as a first-line option in curing incontinence after radical prostatectomy. Whether temporary or permanent, mild or more severe, post-prostatectomy incontinence can be treated effectively and improved by pelvic muscle rehabilitation (131, 132).

Each treatment for prostate cancer increases the prevalence of sexual problems (see section “Cancer and sexuality”). Sexual rehabilitation is a vital component of the overall care of the prostate cancer patient and contributes significantly to the subsequent quality of life. Despite the development of and refinements in the anatomic approach to radical prostatectomy, there will continue to be a large pool of patients with impaired erectile function after surgery. Although cancer control is always of primary importance, potency is often a consideration of great concern to patients when deciding between the various treatment options for clinically localized prostate cancer. Preoperative counseling informs the patient that erectile dysfunction can be successfully managed in most cases with therapy tailored to the goals and expectations of both the patient and the partner. The sequelae of some treatments for cancer, by virtue of their systemic action, adversely affect three aspects of male sexuality: desire, physical function, and cytokinetic gonadal processes. Hormonal therapy has an impact on the central mechanisms mediating sexual desire and arousability. Therefore, with most treatment methods, only approximately 20% of men remain sexually functional. Newer antiandrogenic drugs interfere less with sexual function, but their long-term ability to control prostate cancer is still under investigation. Sexual rehabilitation should be addressed by the primary care team (see section “Cancer and sexuality”) (70, 71). Ejaculatory dysfunction, another possible impairment resulting from treatment of prostate cancer, is difficult to handle with (see section “Cancer and sexuality”).

REHABILITATION OF PATIENTS WITH BREAST CANCER

The restricted arm motion and lymphedema are two of the most common complications in the breast cancer patients. Likely time of occurrence of pain in the place of operation and muscle spasms are quite common. Early rehabilitation plays an important role in preserving function and returning the patient to her previous level of activity. A direct relation between physical therapy and good shoulder motion has been reported (133). Arm mobilisation typically begins on the first or second postoperative day, with joint rotation to tolerance but restricted abduction and flexion to 40 degrees. By day 4, flexion is gradually advanced to 45 degrees and increased by 10 to 15 degrees per day if tolerated. Abduction is held at 45 degrees until the drains are removed and adapted to the patient’s tolerance (134). A specifically designed exercise program for postoperative patients has been published by Gaskin TA, et al. (135). The patient undergoing mastectomy is usually provided with a temporary dracon filled prosthesis. It is simply pinned to an undergarment and may be used even if the patient is not comfortable wearing a bra. After the incision is healed, a definitive breast prosthesis can be fitted at 3 to 6 weeks postoperatively. Patients who want breast reconstruction often have a tissue expander placed initially before the definitive reconstruction.

LYMPHEDEMA

Lymphedema is defined as an abnormal collection of excessive tissue proteins, edema, chronic inflammation, and fibrosis (136). Lymphedema is one of the most distressing and unpleasant sequelae for the patients after breast cancer surgery. The assumption that untreated lymphedema gradually increases in

amount and grade with time has been documented by Casley-Smith, et al. (137). Systemic components of lymphedema can be indicated by an increase of red cell aggregation (138). By itself lymphedema can also lead to lymphangiosarcoma (139). During the era of the radical mastectomy the incidence of lymphoedema was reported between 6,7 and 62,5% (140). With the adoption of more conservative approaches in the management of breast cancer the risk of lymphedema appears to have decreased (141).

CONSERVATIVE THERAPY OF LYMPHEDEMA

Conservative therapy of lympedema involves a two-stage treatment program (142, 143). The first phase consists of skin care, manual lymphedema treatment (MLT), remedial exercises and compression applied with multi-layered bandage wrapping. The bandaging achieves high tissue pressures during exercise but low pressures at rest (144). Simple elevation of a lymphedematous limb reduces swelling. Patients should be instructed to avoid heat, cold, local compression or excessive exercise of the affected arm. A specific exercise program performed once a day is aimed at augmenting muscular contraction, enhancing lymphatic flow and joint mobility, strengthening the limb and reducing the muscle atrophy. Phase 2 (initiated immediately after phase 1) aims to conserve and optimize the results obtained in phase 1. It consists of compression by low-stretch elastic stockings or sleeves, skin care, remedial exercises, and repeated manual lymphedema treatment as necessary. The basic principle of manual lymphedema treatment is that the therapist initiates manual manipulation in the area free of edema bordering proximal to the lymphostatic region, which is treated subsequently in a centrifugal fashion (i.e., most proximal first and distal thereafter). A prescription for low-stretch garments (custom made with specific measurement as needed) worn during the day to preserve the results of manual lymphedema treatment is essential. In principle, the highest compression level (usually 40–60 mmHg) tolerated by the patient is likely to be the most beneficial (145). Compliance is essential in maintaining subsequent lymphedema reduction following conservative therapy (146, 147).

Psychological support and quality of life improvement program is an integral component of any treatment of lymphedema (148).

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