

Principles of postoperative breast cancer rehabilitation **Principii de reabilitare postoperatorie in neoplasmul mamar**

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Abstract

Breast cancer is the oncologic pathology with the highest incidence rate among women in Romania. These incidence rates have increased in most countries of the world over the last decades, most rapidly in developing countries, and are expected to increase even further. However, the mortality rate has stagnated at 60-70% over the past 20 years. Globally, this pathology ranks number 1 among the causes of cancer deaths in women and number 5 overall. It is compulsory that the malignancy of the pathology is established prior to treatment in order for discussions regarding the tests required for establishing the pretreatment and therapy alternatives to be possible. Similarly to other therapy options (surgery, chemotherapy, radiotherapy, hormone therapy, targeted therapy, etc.), medical rehabilitation plays an important role in establishing the patient's body function and quality of life.

Key words: breast cancer, medical rehabilitation, quality of life.

Rezumat

În România ca incidență, neoplasmul mamar reprezintă prima patologie oncologică feminină. Incidența a crescut în majoritatea țărilor din întreaga lume în ultimele decenii, creșterea cea mai rapidă fiind înregistrată în țările în curs de dezvoltare. Tendința este de continuă creștere, fără modificarea mortalității, care se menține constantă în ultimii 20 ani, la circa 60-70%. Această patologie reprezintă cea mai frecventă cauză de deces datorată cancerului, pentru sexul feminin, la nivel mondial și pe locul 5 pentru ambele sexe combinate. Stabilirea diagnosticului de malignitate este obligatorie înainte de începerea tratamentului, pentru a putea discuta cu pacienta investigațiile necesare stabilirii bilanțului preterapeutic și alternativele terapeutice existente. Reabilitarea medicală ocupă un loc important, alături de celelalte mijloace terapeutice (intervenția chirurgicală, chimioterapia, radioterapia, hormonoterapia, terapia țintită etc.), având rol asupra funcționalității întregului organism, dar și asupra calității vieții.

Cuvinte cheie: neoplasmul mamar, reabilitare medicală, calitatea vieții.

Introduction

Breast cancer is a major public health issue. However, it is usually diagnosed when already at an advanced stage.

The mortality rate can be lowered in developed countries through mammography screening so long as there is an infrastructure, funds and possibilities to allow the enforcement of specialty treatment. Such a program and good compliance with treatment can lower the mortality rate by up to 20% in women aged over 50 (Ferlay et al., 2010).

Epidemiology

The incidence of breast cancer

In Romania, the incidence of breast cancer has increased from 25/100,000 women in 1988 to 50.56/100,000 in 2006. In 1960, 6.9% of all malignant tumors in women resulted in breast cancer. The incidence rate increased to 13.5% by

1978 and to 22.61% by 1996. Thus, breast cancer became the main oncologic pathology in women (Ferlay et al., 2010; Anghel et al., 2009).

The incidence rate is lower in men than in women, the disease usually occurring around the age of 71. In men, the disease is usually diagnosed at a more advanced stage. In 42% of cases, diagnosis is made at stage III or IV (Giordano et al., 2004; Rossman et al., 2007; Contractor et al., 2008; Anderson et al., 2010).

The mortality rate increased from 11.2/100,000 in women in 1960 to 23.88/100,000 in 2006 and currently ranks number 1 among the causes of cancer deaths in women and number 5 overall. In Romania, it is the most frequently encountered malignant tumor in women with approximately 4,200 new cases and 2,500 deaths registered every year. The numbers are expected to increase even further, but it must be noted that the mortality rate has stagnated at 60-70% over the past 20 years (Ferlay et al.,

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2010; Anghel et al., 2009; Giordano et al., 2004; Rossman et al., 2007; Contractor et al., 2008; Anderson et al., 2010).

The course of treatment is established based on the stage of the disease and the associated defects and it can consist of one or a combination of the following methods: surgery, chemotherapy, radiotherapy, hormone therapy, targeted therapy, medical rehabilitation, etc.

Postoperative management

It is very important that the therapist makes contact with the patient shortly after surgery in order for the latter to acquire the self care steps as rapidly as possible.

Such surgical interventions are associated with short hospitalization times, so the therapist should make contact with the patient the following day and highlight the importance of preventing complications, disabilities and postoperative function limitations (lung complications, upper limb lymphedema, mobility impairment, etc.).

The patient must conduct physical exercise at a moderate pace, preserve their energy and avoid fatigue, especially if undergoing chemotherapy or radiotherapy.

The patient must conduct physical exercise at moderate intensities without experiencing pain at the level of the affected upper limb. The routine must be adjusted to the chemotherapy programs, an increase in pace being possible only after cessation of chemotherapy.

Postoperative complications that require rehabilitation techniques:

- Immediate or late blood flow or lung complications
- Upper limb lymphedema
- Upper extremity mobility impairment
- Defective posture alignment
- Reduced muscle strength and function of the upper extremity
- Fatigue and low physical endurance
- Emotional and social adaptation difficulties

Nursing plan - Methods used

1. Preparation of the patient for postoperative auto-management: Interdisciplinary education regarding all aspects of emotional and physical deterioration.

2. Prevention of postoperative lung complications and thromboembolism: Preoperative or postoperative preparation regarding deep breathing with special emphasis on maximum inspiratory flows and efficient coughing. Flexion exercises for the lower limb.

3. Prevention of lymphedema or postoperative minimization of this risk: Elevation of affected extremities on pillows (at a 30-degree angle) while the patient sits on a bed or chair. Application of bandages around the affected arm or application of elastic compression bandages. Elevation of affected arm. Exercises designed to increase the amplitude of movement. Avoidance of upper limb immobilization.

4. Reduction of the degree of lymphedema if or when it occurs: Daily use of the pneumatic compression pump followed by wrapping of the upper limb. Permanent elevation of the entire upper limb when the patient is at ease. Continuous wrapping of the upper limb in non-elastic or partially elastic compression bandages (whether the patient is active or at ease). Manual lymphatic drainage

massage. Daily routines for lymphedema reduction. Use of compression bandages after the routine for lymphedema reduction and stabilization. Careful nursing of the tegument.

5. Prevention of posture deformation: Preparation regarding the correct position in bed with the central and symmetrical positioning of the shoulders in relation to the trunk prior to surgery or on the same day. Posture acknowledgement training: Encouraging the patient to adopt a correct position in order to avoid an abnormal shoulder position. Posture exercises with a focus on scapular retraction exercises.

6. Prevention of blood pressure and cervical muscle contraction or retraction: Exercises designed to increase the amplitude of movement in the cervical area and relaxation. Shoulder elevation and rotation exercises. Soft massage at the level of the cervical muscles.

7. Prevention of joint stiffness in the upper extremity: Exercises designed to increase the amplitude of movement at the level of the shoulders, elbows and hands. The routine must be initiated as soon after surgery as possible. It can also be initiated in the presence of drainage tubes, but maximum attention is required. Once the incision has healed, stretching exercises can be conducted at shoulder level.

8. Recovery of muscle strength and upper limb function: Low-intensity isometric exercises at shoulder level initiated on postoperative day 1 or 2. Resistance exercises conducted with lightweights or partially elastic materials which act on the scapular or glenohumeral muscles. Scapular or glenohumeral stabilization through exercises conducted in orthostatic position, hands pressed against the wall or table. Use of affected limb for low-intensity daily activities.

9. Increase in effort tolerance, well-being and thus fatigue reduction: Low-intensity aerobic exercises such as aerobics or gait.

10. Provision of information regarding the patient's resources, provision of support from the family and their continuous education.

Precautions: The shoulder exercises must be conducted at an elevation angle of up to 90 degrees until after the removal of the drainage tubes. The stitches and incisions must be monitored carefully during exercise. The difficulty of exercises must be increased gradually and very slowly, especially if the patient undergoes adjuvant therapy (Silver, 2007; Harris et al., 2012).

Objectives of the medical rehabilitation program

- The correction of functional deficiencies signaled during ADL (activities of daily living) – driving, sleeping, child care, posture deformation correction.

- In the short run, a significant reduction of the motor area of the shoulder can be identified after a period of 2-3 months after mastectomy (Goselink et al., 2003). In the long run, a reduction of the motor area of the shoulder can occur in 28% of cases 1 year after mastectomy (Blomqvist et al., 2004). Also, a significant decrease in muscle strength required for shoulder flexion and abduction can be identified 15 months after mastectomy (Blomqvist et al., 2004).

A recent prospective study has revealed the importance of postoperative clinical assessment and careful monitoring for the identification and treatment of UQD (upper quarter dysfunction). A clinical assessment of the ROM (range of motion), muscle strength in both upper limbs, volume and circumference is recommended in 94 patients recently diagnosed with breast cancer (stages I-III) prior to surgery and 1, 3, 6 and 12 months after surgery. All participants in the study underwent a physical exercise and medical education program. The clinical assessment conducted within 1 month after surgery revealed that the ROM, muscle strength and function had decreased significantly after surgery. However, most of the patients who followed this program achieved the reference (preoperative) values within 1 year (Springer et al., 2010).

Clinical guideline recommendations for the upper limb

The function of both upper limbs must be evaluated prior to surgery in order to have a point of comparison. Kinetotherapy must be initiated on postoperative day 1. A mild routine should be conducted starting with postoperative week 1. Active exercises can be initiated 1 week after surgery, once the drainage tubes have been removed. It is recommended that they be continued for a period of 6-8 weeks until the full range of motion of the upper limb has been restored. The patient must be trained to massage the scarred area herself. The postoperative clinical assessment should be regulated within a year after surgery (Harris et al., 2012).

Progressive resistance exercises can be conducted using lightweights (0.5-1 kg) between postoperative weeks 4 and 6. It is important to provide careful nursing, proper hygiene of the upper limb, and avoid trauma in order to minimize the risk of infection and lymphedema.

It is important for the patient to maintain an optimal level of activity after surgery, initiate a resistance exercise routine and conduct average-intensity exercises for 30 minutes on a number of days per week. This routine should also include kinetotherapy and occupational therapy. The physical routine must be established according to the patient's gender, age and type of cancer, among others. Also, the intensity and duration of the exercises should be set low initially and then increased gradually.

Studies have also revealed that physical exercise lowers the risk of femoral neck fracture, probably by lowering the risk of falls. However, it has a low effect in terms of mineral bone density preservation. The routine must be conducted on a daily basis with at least 30 minutes of moderate physical activity included. Tai chi, physical therapy and dancing are considered good options to improve balance and prevent falls.

A nutritionist must be consulted for weight management.

Injections, vaccines and venous punctures in the upper limb homolateral to the axillary dissection are contraindicated (Harris et al., 2012).

Electrotherapy: LASER (light amplification by stimulated emission of radiation) treatment, electric stimulation, microwaves and thermotherapy are not recommended during this period. This is not because of

proven side effects but because of the insufficiency of clinical data to support their use. Ultrasound therapy is also contraindicated in the proximity of areas presenting with possible metastases in patients with a breast cancer history (Harris et al., 2012).

Hydrotherapy is a comprehensive approach to physical exercise in water designed to increase strength, flexibility, resistance, blood flow and muscle relaxation. Studies have demonstrated that physical activity is mainly associated with an improved quality of life at both physical and functional levels. A combination between physical activity and cognitive-behavioral therapy can determine a significant improvement in the patient's quality of life. The results of the physical exercise programs become visible within a short period of time after the initiation of the program. In the long run, better results can be obtained by combining physical exercise and psychological therapy. A comparative study demonstrated the long-term benefits of physical exercise on the well-being of breast cancer patients as well as the beneficial effects of a program that combines physical exercise and cognitive-behavioral therapy (May et al., 2009). Two different studies emphasized the importance of long-term physical exercise in improving the quality of life of breast cancer patients. The studies conducted by Milne et al. (2008) revealed a significant improvement in the quality of life of the participants after following a 12-week program consisting of combined aerobic and resistance exercises. Daley et al. (2007) highlighted the beneficial effect of an 8-week program involving regular physical exercise on breast cancer patients. A significant improvement in their overall mobility could be noticed upon every assessment.

Pain management: The main objective is to identify the cause and treat it whenever possible. The top priority of any treatment is to achieve full pain management within a short period of time. The second priority is to prevent its recurrence. Patients must be informed about pain management and their active role within this type of management. At the same time, the treatment should be selected according to the associated defects, the response to treatment, etc. The development of a comprehensive, effective pain management plan presupposes the education and involvement of the patient and family, along with an interdisciplinary team approach.

Pain management can be achieved through both pharmacological and non-pharmacological methods. These include bed, bath and walking supports, positioning training, energy conservation, activity pacing, TENS (transcutaneous electrical nerve stimulation), DDC (diadynamic current), acupuncture or acupressure (Harris et al., 2012).

Chemotherapy can trigger the development of peripheral neuropathies. According to various studies, TENS, acupuncture, kinetotherapy, occupational therapy, therapeutic interventions and medical education can all be used in these cases (Harris et al., 2012).

Chemotherapy can lead to cardiotoxicity, which is one of the possible side effects. This causes modifications in the kinetotherapy program by reducing the patient's effort tolerance.

Assessment and diagnosis of the upper limb lymphedema

An early diagnosis is compulsory. To this end, measurements are made at the level of both upper limbs prior to and after surgery.

The circumference is measured in four points: the metacarpophalangeal joint, the radiocarpal joint, 10 cm distal to the lateral epicondyle and 12 cm proximal to the lateral epicondyle.

Physicians should indicate any weight problem, edema or sensation of constriction present at the level of the affected upper limb. Any difference exceeding 2 cm in the above mentioned points can justify the initiation of specific treatment once the possibility of the development of other diseases has been excluded. These can include axillary tumors, brachial plexus tumors, bloodstream infections or venous thrombosis.

The compression devices must be worn throughout the entire day every day.

Compression bandages should be worn during exercise. This presupposes a systematic application of short-stretch bandages with various types of padding. Complex physical therapy, manual lymphatic drainage, compression and massage therapy are associated with volume reductions. A randomized trial has demonstrated that pneumatic compression pumps are increasingly preferred to no treatment. Further randomized trials are required to determine whether pneumatic compression provides additional benefits over compression garments alone (Harris et al., 2012).

The treatment option recommended for lymphedema is complete decongestive therapy, also known as complex decongestive physiotherapy and complex physical therapy. There is some evidence that compression therapy and manual lymphatic drainage can help with this condition, but further studies are needed. There is no current evidence to support the use of medical therapies, including diuretics, benzopyrones or selenium compounds. It is also recommended that patients be encouraged to consider practical advice regarding skin care, exercise and body weight.

Immediate attention to signs of infection and prompt initiation of antibiotic therapy are critical to the prevention of sepsis. The risk of infection must be reduced in order for the risks of lymphedema development or exacerbation to decrease as well. Conservative surgical and radiation treatment should be used to lower the risk of secondary lymphedema (Harris et al., 2012).

Axillary dissection minimization, the prevention of infection and avoidance of overweight also play a role in the prevention of lymphedema.

Recent (randomized and controlled) trials have demonstrated that upper limb exercises do not influence the occurrence or increase in volume of lymphedemas (Sagen et al., 2009). The intense activity of the upper limb affected after surgery or axillary dissection does not appear to have any influence on their development or occurrence (Aaronson et al., 2010; Daley et al., 2006; Milne et al., 2008; May et al., 2009; Bavaria, 2006).

A recent study conducted by Torres Lacomba et al.

compared the benefits of medical rehabilitation associated with medical education initiated between postoperative days 3 and 5 and those of medical education alone. The medical rehabilitation techniques included manual lymphatic drainage, stretching exercises, resistance exercises and the treatment of axillary web syndrome (AWS), in the event of its occurrence. The study revealed a tight connection between the axillary web syndrome, the increased risk of lymphedema and the possibility to prevent it through the early initiation of recovery therapy. Research is still being conducted at present to identify the therapy components that can treat postoperative complications and the benefits of manual therapy in the immediate postoperative period (Torres-Lacomba et al., 2010). As regards the specific treatments against breast cancer lymphedema, physical exercise and complete decongestive therapy (CDT) determine a significant increase in the patient's quality of life. For years, patients exposed to a high risk of lymphedema have been advised to avoid vigorous exercise. Five level I and II trials refute this contention. Importantly, no studies have focused on new therapies such as micro-lymphatic bypass and lymph node transfer despite the increasingly frequent application of these procedures. In conclusion, breast cancer-related lymphedema (BCRL) has a significant impact on the health-related quality of life (HRQOL) of breast cancer survivors and it is an important consideration with the axillary lymph node dissection (ALND) in patients with early-stage breast cancer. Although research on lymphedema has gained momentum recently, additional level I and II studies are required. These studies will help promote therapeutic innovation, provide support for newly developed treatment options such as microsurgical bypass or lymph node transfer and shape health care policy (Pusic et al., 2012).

The quality of life is determined by the individuals' perception of their social status within the context of the cultural values they live by and their dependency on their own needs, standards and aspirations (OMS, 1998).

Revicki & Kaplan (1993) propose a utility-based definition. According to it, the quality of life reflects the preferences for certain health states which allow improvements in the morbidity and mortality rates and it is expressed through a single ponderal index - years of life standardized according to the quality of life.

Instruments for measuring the quality of life:

- Functional Assessment of Cancer Treatment (FACT)
- Cancer Rehabilitation Evaluation System (CARES)
- Visual Analog Scale Global Quality of Life (VASQOL)
- Sickness Impact Profile (SIP)
- Nottingham Health Profile (NHR)
- Medical Outcomes Study Short Form 36 (SF-36)
- European Organization for Research and Treatment of Cancer (EORTC) modular questionnaire
- Rotterdam Symptom Checklist (RSCL)

Physical medicine and rehabilitation programs improve the quality of life by reducing fatigue, increasing physical functionality and improving pain or dyspnea.

How does pain affect the quality of life?

- By affecting the appetite, sleep and other physical

functions

- By affecting the memory and concentration skills
- By affecting the work capacity
- By reducing the sexual appetite or creating other barriers in private life
- By aggravating the daily chores (e.g. house chores, child care)
- By limiting the social activities and commitments
- By causing reductions in the family revenue
- By altering the patient's spiritual nature (fear of death)
- By causing the patient to lose their autonomy
- By isolating the patient within the family, at their workplace and in social contexts (May et al., 2009).

The cancer-specific instruments include the Functional Assessment of Chronic Illness Therapy-Spiritual Well Being Scale (FACIT-SP), the Quality of Life-Cancer Survivor (QOL-CS), the Ferrans and Powers' Quality of Life Index-Cancer Version (QLI-CV), the Quality of Life in Adult Cancer Survivors Scale (QLACS), the Cancer Rehabilitation Evaluation System Cancer-Short Form (CARES-SF), the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30), the Assessment of Cancer Therapy-General (FACT-G) and the Body Image and Relationships Scale (BIRS). The breast cancer-specific instruments mostly used along with cancer-specific instruments include the European Organization for Research and Treatment of Cancer-Breast Module (EORTC QLQ-BR23) and the Functional Assessment of Cancer Therapy-Breast (FACT-B). The instruments must have good psychometric characteristics. These include precision, validity, but also sensitivity, which plays an important role in the alteration of the quality of life over time. This can undergo modifications from one year to another, depending on the patient's perceptions, expectations and health status. The generic instruments provide insight into the complete spectrum of the disease and are useful not only in comparing the QOL (quality of life) changes across different populations (for example, patients undergoing breast cancer treatment, patients with metastatic breast cancer and breast cancer survivors), but also across different diseases (for example, comparing BCS –breast cancer survivors – with ovarian or cervical cancer survivors). The survival rate and duration have increased due to the medical progress achieved, but the toxicity and side effects of specific treatments have persisted and affected the quality of life of patients.

Studies have highlighted the stringent need to emphasize and monitor the prolonged side effects of the neoplasm itself and specific treatment associated with it in order to find patient-centered solutions. Ferrel et al. have demonstrated that the psychological, social, physical and spiritual aspects of the quality of life are essential for understanding the long-term effects of the impact of breast cancer diagnosis and treatment (Chopra & Kamal, 2012; Stanton et al., 2005; Crespi et al., 2008).

Physical concerns such as sexuality and menopausal symptoms impact both psychological and social aspects of the QOL. Social concerns including self-perception changes and physical concerns negatively impact the patients' psychological well-being. Spiritual well-being

helps to improve their physical, psychological and social well-being by providing them with the strength they need to cope with the negative effects of breast cancer and its treatment (Kiecolt-Glaser, 2014; Phillips & McAuley, 2014).

Fatigue, pain, insomnia, depression, anxiety and fear of recurrence persist as preoccupations among patients and can affect their activities of daily living as well as social life.

The results of studies have varied depending on the demographic and medical variables. For example, Hispanic women experience a higher degree of insecurity as compared to that experienced by other women in other ethnic groups (Stover et al., 2014). The results have also varied depending on the type of treatment selected. Thus, lymphedema is a complication frequently associated with mastectomies, whereas fatigue and pain are frequently encountered in patients undergoing chemotherapy (Chopra & Kamal, 2012; Stanton et al., 2005; Crespi et al., 2008).

Another analysis was conducted to identify and examine the published studies on the health-related quality of life in patients presenting with breast cancer-related lymphedema. 8 of the 39 publications that met the inclusion criteria provided level I evidence and 14 of them provided level II evidence. The majority of the studies revealed a decrease in the quality of life in patients with lymphedema, with the body image and physical, psychological and social functions being the most affected. It was also observed that the patient's age, body weight and race are variables that play an essential role in their clinical decision-making process and education. With early-stage breast cancer patients fighting the decision whether to undergo the dissection of axillary lymphatic ganglions, it is important that they are aware of the risk of lymphedema as well as of the impact the procedure will have on their quality of life. For example, overweight women are exposed to a higher risk of lymphedema and their quality of life is also due to be affected to a greater extent (Pusic et al., 2012).

Conclusions

1. It has been demonstrated that medical rehabilitation does not affect the evolution of breast cancer and takes into consideration the TNM (tumor, lymph nodes, metastasis) classification. Its main objectives include pain management – frequently neuropathic or secondary to chemotherapy or post-mastectomy, improved scapulohumeral mobility, improved muscle strength, lymphedema reduction, ADL resumption, etc. A relevant number of studies were conducted between 2001 and 2011 to identify general principles regarding the rehabilitation of patients diagnosed with breast cancer. One of the basic principles addresses the rehabilitation of the upper limb. As regards electrotherapy, it has been demonstrated that low-frequency currents like DDC (diadynamic current) or TENS (transcutaneous electrical nerve stimulation) can be used. The contraindications result from the absence of clinical studies rather than any proven side effects of electrotherapy. Hydrogymnastics is not contraindicated. However, sauna and thermotherapy are not recommended. Underwater showers and compressed air baths can be recommended, while peloids are recommended for distant

involvement (e.g. knee, hip involvement).

2. Physical medicine and rehabilitation programs improve the quality of life by reducing fatigue, increasing physical functionality and improving pain or dyspnea.

3. Numerous recent studies have demonstrated the major utility of kinetotherapy and the need to initiate it as soon after surgery as possible. According to a large body of evidence published in recent years, including randomized trials and systematic reviews, there is an urgent need to update the guidelines on upper extremity musculoskeletal impairments and lymphedema. Furthermore, additional research is needed to provide an evidence base for developing rehabilitation guidelines on the management of other impairments identified with the prospective surveillance model, e.g. arthralgia.

4. To conclude: "Learning to live with cancer is an art, not a science. Each person must find her own way, in her own style. What is important to realize is that a way can be found regardless of the circumstances and prospects." Jane Brody

Conflicts of interests

There are no conflicts of interest.

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