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Life After Breast Cancer: How Lymphedema Affects the Quality of Life in Women

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Introduction

According to data from the World Health Organization, more than 10 million new cases of breast cancer (BC) are diagnosed each year. This type of cancer ranks as the leading malignancy among women, accounting for up to 16% of all cancer cases. For every 100 women diagnosed with breast cancer, there is 1 man. In Europe, over 370,000 new cases are registered annually, with approximately 130,000 women succumbing to this disease. The highest mortality rates from breast cancer are observed in the United Kingdom, Denmark, and France, while countries such as India, Ethiopia, China, and Mongolia report significantly lower rates [1].

The analysis of breast cancer incidence in Russia for 2023 indicates that breast cancer (BC) remains the leading oncological disease, accounting for 19.1% of all cases of malignant neoplasms. Approximately 5 out of 1,000 residents of the country have or have had this diagnosis. In 2023, there were 74,008 new cases of breast cancer registered. Of these, 32.5% are classified as stage I, 42.7% as stage II, 17% as stage III, and 7.4% as stage IV.

Science and physicians have made significant advancements in the treatment of breast cancer at all stages; however, patients continue to face unresolved issues related to the aftermath of surgical treatment. Various challenges arise during the treatment process, and in our article, we share our experience in addressing a surgical complication such as lymphedema.

Lymphedema (Lymphostasis) is a chronic progressive condition characterized by the accumulation of protein-rich fluid in the interstitial space, associated with impaired lymphatic system function. This condition typically leads to chronic inflammatory processes, reactive fibrosis in the affected area, and excessive development of subcutaneous adipose tissue. Lymphedema of the upper extremity, which occurs following radical treatment for breast cancer, currently affects approximately 40% of patients within 8-10 years post-surgery, including axillary lymphadenectomy. When this surgery is performed in conjunction with radiation therapy, the risk of developing lymphostasis ranges from 22.5% to 60%. Various methods for the prevention and treatment of this complication are currently available.

Diagnosis of Lymphedema
Physical Examination

During the physical examination for lymphedema, clinicians assess the affected limb for signs such as swelling, skin changes, and tissue texture. The examination may include measuring limb circumference, evaluating the range of motion, and checking for the presence of pitting edema. Additionally, the clinician may perform a thorough assessment of the patient's medical history and any previous surgeries or treatments that could contribute to lymphatic dysfunction.

Anthropometric Measurements

Measurement of Limb Circumference is conducted at seven anatomical points: Wrist, Lower third of the forearm, Middle third of the forearm, Upper third of the forearm, Lower third of the upper arm, Middle third of the upper arm, Upper third of the upper arm.

Instrumental Diagnosis

Instrumental Diagnosis of Lymphostasis plays a crucial role in identifying and assessing the condition of the lymphatic system. It includes various methods such as ultrasound examination of the soft tissues of the upper extremity, indocyanine green (ICG) lymphography, and magnetic resonance (MR) lymphography.

During the ultrasound examination of soft tissues, fibrotic changes in the affected limb are evaluated, along with duplex scanning of the subclavian and axillary vessels.

During ICG Lymphography, the transport function of the lymphatic system is evaluated, identifying blockages and the development of collateral lymphatic flow. This method aids in detecting preserved lymphatic pathways for the formation of lymphovenous anastomosis (LVA) and determining indications for lymph node transplantation.

MR Lymphography is a promising method that allows for high-quality visualization of deep lymphatic pathways, lymph nodes, and vessels. It aids in assessing the condition of soft tissues, performing differential diagnosis between primary and secondary lymphedema, and determining indications for liposuction.

Stages of Lymphedema

There are numerous classification systems for lymphedema. The International Society of Lymphology (ISL) has implemented a classification based on the clinical presentation [2]. According to this classification, lymphedema is divided into four stages. Stage 0 (or IA) refers to a latent or subclinical state, where swelling is not apparent despite impaired lymphatic drainage and changes in subjective symptoms. Stage I is characterized by fluid accumulation that decreases with limb elevation. Stage II shows that limb elevation does not lead to a reduction in swelling. Stage III is characterized by lymphostatic “elephantiasis” with the development of trophic skin changes.

The scientific committee of MD Anderson Cancer Center has proposed a practical staging system for lymphedema based on the results of lymphography using indocyanine green (ICG) [2]. This system divides lymphedema into four stages based on the nature of skin drainage and the number of visualized lymphatic vessels. Stage I is characterized by minimal, heterogeneous skin drainage with a large number of patent lymphatic vessels. Stage II features segmental skin drainage with a moderate number of patent lymphatic vessels. Stage III presents extensive skin drainage encompassing the entire arm, with a small number of patent lymphatic vessels. Stage IV shows pronounced skin drainage covering the entire arm and extending to the dorsal side of the hand, with no patent lymphatic vessels present. This system allows for a more accurate assessment of the condition of the lymphatic system and the selection of appropriate treatment. Treatment of Lymphedema.

Conservative Treatment

The gold standard in the therapy of lymphedema is Complex Physical Decongestive Therapy (CPDT), also known as Complex Decongestive Therapy (CDT). This method consists of a series of interventions that include several key components and two phases of treatment. The first phase aims to maximize the reduction of limb volume. During this period, skin care is provided, manual lymphatic drainage (MLD) therapy is performed, multilayer bandaging is applied, and specific exercises are carried out. This phase lasts from four to six weeks [3].

The second phase of treatment focuses on maintaining the results achieved in the first phase. This phase begins immediately after the completion of the first phase and includes wearing compression garments, performing specific exercises, providing skin care, and conducting manual lymphatic drainage (MLD) therapy for additional support [4-18].

Surgical Treatment

Surgical treatment of lymphedema includes various methods aimed at restoring normal lymphatic flow and reducing swelling.

Let's consider some of them:

Lymphaticovenular anastomosis (LVA), also known as lymphovenous shunt, is a surgical procedure in which an anastomosis is created between overloaded lymphatic vessels located above the site of lymphatic obstruction and adjacent venules [19]. Research has shown that lymphaticovenular anastomosis (LVA) is more effective in the early stages of lymphedema. This is attributed to the absence of functional changes in the lymphatic ducts, which are often observed in the later stages of the condition [20-22].

One of the main advantages of this procedure is the low risk of postoperative complications. Typically, patients can be discharged

from the clinic on the day of the surgery or after one day of observation. In some medical centers, the procedure is performed under local anesthesia.

Disadvantages of the procedure include the technical complexity of handling vessels and creating the anastomosis, as their caliber can be as small as 0.2 mm. Additionally, specialized super-microsurgical instruments and high-resolution optical microscopes are required to perform the surgery [23].

Lymph Node Transplantation

The procedure involves the transplantation of tissue complexes containing lymphatic vessels and nodes, which are extracted from a donor site and transferred to the affected limb as free tissue transfer. A meta-analysis compared the outcomes of lymph node transplantation and lymphaticovenular anastomosis (LVA) in cases of limb lymphedema [24, 25]. The results indicated that while both procedures were effective in the short term, patients undergoing lymph node transplantation exhibited significant long-term improvements, including a high likelihood of discontinuing the use of compression garments. The primary drawback of lymph node transfer is the risk of iatrogenic secondary lymphedema at the donor sites. One method developed to prevent this complication involves the use of reverse mapping to identify and protect the lymph nodes that predominantly drain the limb, with the aim of preserving them during the harvesting of inguinal or lateral thoracic lymph nodes [26].

Liposuction

Excessive fat accumulation and fibrotic changes in tissues are among the pathological manifestations of chronic lymphedema. Liposuction is widely used as a reduction method to remove hypertrophied subcutaneous adipose tissue from the affected limb. This technique is considered less invasive compared to other reduction procedures. However, liposuction does not improve the condition of the lymphatic system; therefore, patients need to wear compression garments for life to prevent recurrence [27].

These surgical methods can significantly improve the quality of life for patients with lymphedema by reducing the manifestations of the disease and restoring normal limb function. Despite the high prevalence of lymphedema among women who have undergone breast cancer treatment, the management of this complication is often not covered by mandatory health insurance. This creates additional financial difficulties for patients who require specialized treatment and rehabilitation. It is also important to note that conservative and surgical treatments for lymphedema are performed by different specialists in various medical institutions. This leads to increased time between treatment stages and reduces patient compliance with therapy.

Aim of the Study

The aim of our study was to evaluate the changes in quality of life of patients following the treatment of lymphedema, as well as to assess the effectiveness of the conservative and surgical treatment phases within a single department to reduce the time between these stages.

Materials and Methods

From 2021 to 2023, at the Department of “Tumors of the Female Reproductive System” of the Central Clinical Hospital of the Russian Railways Medicine, 310 patients undergoing surgical treatment for breast cancer were examined, revealing 60 cases of upper limb lymphedema stages I-IV. Among these, 40 patients reported complaints of pulling pain, a sense of fullness, and

heaviness in the upper limb. Diagnosis was conducted using physical examination, volumetric measurements, indocyanine green (ICG) lymphography, and magnetic resonance (MR) lymphography. At the department, patients underwent courses of comprehensive physical anti-edema therapy (CPAT) administered by specially trained medical staff, with diagnosis and therapy effectiveness monitored by a staff lymphologist. As part of the CPAT, manual lymphatic drainage massage and bandaging with specialized low-stretch bandages and additional compression garments were performed. The average number of CPAT sessions ranged from 7 to 10. After completing the CPAT sessions, patients were referred for surgical treatment involving the creation of lymphovenous anastomoses or liposuction of the upper limb.

Results

At the department, treatment for lymphedema stages I-IV was conducted for 30 patients. After completing the procedures, patients subjectively reported significant improvements in overall well-being, reduced heaviness, and decreased swelling in the affected limb, as well as restored motor function.

Volumetric measurements indicated that the average difference in volume between the healthy arm and the arm with lymphedema before the procedures was 5-6 cm; after the procedures, this difference decreased to 1-2 cm or disappeared completely. ICG lymphography showed restoration of the linear pathway of lymphatic flow, with no diffuse spread of contrast observed.

Patients with no edema component and I-II stage lymphedema according to ICG lymphography (n=15) underwent lymphovenous anastomosis (LVA). Patients with pronounced fibrotic components and III-IV stage lymphedema according to ICG lymphography (n=2) underwent liposuction of the limb. Thirteen individuals declined the surgical treatment phase. In the LVA group, no postoperative complications were observed. In the liposuction group, postoperative seromas were noted, which resolved within 2-3 days post-surgery. All patients wore flat-knit compression garments following the surgical intervention.

Conclusions

The administration of comprehensive physical anti-edema therapy (CPAT) sessions in patients with upper limb lymphedema stages I-IV improves quality of life indicators and reduces the incidence of postoperative complications during the surgical treatment phase of lymphedema.

Comprehensive physical anti-edema therapy (CPAT) is considered the “gold standard” for the treatment of lymphedema, leading to significant improvements in patients’ quality of life. This method does not impose a high economic burden, as it requires only specially trained medical personnel and specific bandages. The high effectiveness of CPAT, along with the lack of alternative conservative treatments for lymphedema, underscores the necessity of its integration into medical standards for the care of patients with lymphedema. Mastering this technique in surgical hospitals enhances the understanding of the mechanisms underlying lymphedema development and allows for timely preventive measures, including specialized surgical interventions, the use of compression garments, and patient education.

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