



The Effectiveness of Chemotherapy in the Treatment of Patients with Breast Cancer

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Abstract: Chemotherapy is one of the main treatments for breast cancer. It involves the introduction into the body of drugs that destroy cancer cells and block their growth. In the first three stages, the technique is used in combination with a radical operation. At the fourth stage, radical operations are not performed, and chemotherapy becomes one of the main methods for controlling the tumor and its metastases.

Keywords: Chemotherapy, surgery, breast cancer, treatment efficacy, drug doses, metastasis patterns, drugs.

Relevance of the topic: Chemotherapy is not always needed. It is necessary for neoplasms without hormone receptors, with luminal and non-luminal HER-2 positive, luminal HER-2 negative tumors. Argument in favor of chemotherapy: age up to 35 years. The therapy is always used after surgery. Usually only anthracyclines are used.

Chemotherapy is almost always given after surgery. Sometimes it is started even before the operation, if there are several tumors, the tumor node exceeds 3.5-5 cm in diameter (the size relative to the mammary gland is taken into account). Neoadjuvant therapy is preferred in aggressive histological types of cancer and in patients younger than 35 years of age. Combined regimens are used: mainly anthracyclines and taxanes.

In stage III cancer, chemotherapy is needed for all patients both before and after surgery. The scheme is selected individually. Considering the response to treatment, a correction of the scheme is possible. For stage IV cancer, palliative chemotherapy is used. It inhibits the growth of certain tumor nodes, increases life expectancy and improves its quality by reducing symptoms. Usually, in stage IV cancer, chemotherapy is more gentle: doctors can prescribe only 1-2 drugs. With severe cancer intoxication and insufficiency of the function of internal organs, poor tolerance of therapy, doctors use reduced doses of drugs. Sometimes chemotherapy is not used at all, as in the last stage of cancer, hormonal and targeted therapy often provides better results.

Purpose of the study: Development of an optimal scheme for preoperative therapy of patients with breast cancer, evaluation of new prognostic factors in this category of patients.

The implementation of this goal required the solution of the following specific **research tasks**:

- to substantiate the need for preoperative chemotherapy in patients with breast cancer;

- to conduct a comparative assessment and determine the most effective combinations of preoperative therapy for breast cancer patients according to the criterion of 3 and 5-year overall and relapse-free survival;
- to evaluate the effectiveness of various combinations of chemotherapy drugs during preoperative chemotherapy for breast cancer;
- to analyze the timing of the development of metastases, the risk and structure of metastasis in patients with breast cancer, depending on the various options for preoperative therapy;
- to study the prognostic value of micrometastases in the bone marrow and the level of fibrinogen in breast cancer.

Scientific novelty of the research. As a result of the study, it was established and scientifically substantiated for the first time that preoperative chemotherapy as part of the complex treatment of patients with breast cancer significantly reduces the risk of metastases, thereby improving 3- and 5-year overall and disease-free survival rates. There was no advantage of anthracycline-containing regimens in the preoperative regimen in this category of patients according to the criterion of a five-year overall and relapse-free survival. It has been established that bone marrow micrometastases and elevated serum fibrinogen levels are unfavorable prognosis factors that worsen the course of the disease. It is proposed to use in clinical practice the determination of the level of serum fibrinogen and micrometastases in the bone marrow to select a rational tactics for the treatment of patients with breast cancer.

When talking about the successes of modern oncology, first of all, they mean the increasing effectiveness of drug treatment of breast cancer. In none of the oncological diseases, so many drugs are used as in breast cancer, most of the drugs are not new, well studied, but today they are used taking into account the individual characteristics of the cancer cells of a sick woman.

In breast cancer, the main criterion that allows a targeted choice of the optimal treatment option - chemotherapy (CT) or hormonal drugs, is the morphological characteristics of the tumor, and specifically the content in the cells of receptors that interact with drugs.

In a breast cancer conglomerate, the percentage of cells containing sex hormone receptors and HER2 is determined, as well as the Ki67 index predicting a high division frequency. All of these cellular characteristics define the molecular biological subtype of cancer in the gland and directly guide the choice of only chemotherapy or hormone therapy, or their consistent use. The absence of hormone receptors in breast tumor cells does not promise significant benefits from taking hormones, so chemotherapy is chosen.

The size of the tumor node in the mammary gland and the number of lymph nodes affected by metastases next to it are also taken into account, as well as the spread of cancer cells outside the tumor, into the vessels of the gland. Great attention is paid to the degree of cell aggressiveness, all together these characteristics, referred to as "prognostic factors" of the disease, determine the aggravation of drug treatment, that is, the intensity of chemotherapy courses and, in part, the choice of drugs.

Drug treatment for breast cancer is always carried out. Chemotherapy is abstained from only after a radical operation on the mammary gland, if, according to the results of histology, the nodule in the gland was less than 5 millimeters and there were no cancer cells in the lymph nodes, but even with a favorable combination of receptors, it makes sense in prophylactic hormone therapy not to prevent relapse - it is not expected, but to exclude the development of a tumor in another gland.

Anticancer drugs - cytostatics, hormones and targeted drugs have different mechanisms of action, but the overall result is the killing of a cancer cell. Chemo drugs disrupt the enzymes necessary for biochemical reactions, break the DNA chain, interfere with the process of cell division - each group of

cytostatics has several different mechanisms of cancer cell damage, and not all of them have been found out, the main thing is that a suicide program or apoptosis is launched in a damaged cancer cell. Hormonal drugs also bring the cancer cell to apoptosis, but they act not directly, but through endocrine receptors located on the cell membrane, which significantly reduces their toxicity.

High sensitivity to drugs and, as a result, a decrease in the frequency of metastasis and local recurrences in the gland, can significantly increase life expectancy even with a common disease - the basis for almost 100% of the use of drug treatment in breast cancer.

Treatment is always focused on a specific goal, so immediately after breast surgery it is necessary to minimize the likelihood of cancer returning, if it is impossible to remove a large breast tumor, it is desirable to bring the local process to an operable state, in the metastatic stage of the disease, it is important to reduce the manifestations of the disease and prolong the life of a woman.

Depending on the purpose, chemotherapy is divided into:

- prophylactic or adjuvant, when after surgery on the gland, cancer cells circulating in the blood or somewhere already settled are destroyed, which in a large percentage of cases prevents the development of metastases;
- neoadjuvant or preoperative, the purpose of which is not only the destruction of cells scattered in the body, but also the reduction of primary cancer in the mammary gland;
- therapeutic - with metastases that have developed after removal of the gland or an initially inoperable process of stage 4.

The effect of chemotherapy is assessed by the amount of tumor reduction that lasted at least a month after the course, as a rule, a follow-up examination to evaluate the result is carried out after 2-3 short courses:

- the objective effect can be complete with the absence of a visually detectable tumor, or partial with a significant regression of the total volume of neoplasms;
- stabilization - suspension of the growth of malignant nodes;
- progression - an increase in tumor foci during treatment.

When assessing the regression of bone metastases of breast cancer, the duration of treatment must be taken into account, because the bone tissue at the site of the destroyed tumor grows very slowly, often it takes at least six months to realize the effect of chemotherapy.

Chemotherapy is carried out exclusively with morphological - histological confirmation of the diagnosis of cancer. Treatment planning begins only after determining the molecular biological subtype of the gland tumor using immunohistochemical (IHC) analysis of a tiny piece of tumor tissue.

Before each course of chemotherapy, in order to avoid fatal consequences for the body, a general clinical and biochemical blood test is mandatory. When chemotherapy is extended for several days, before each administration of a cytostatic, tests are also done, sometimes they are limited to a general clinical or leukocyte formula.

Preoperative chemotherapy is not limited to one course, world standards prescribe at least 6-8 cycles, and with a very good effect, more can be done. The operation is prescribed no later than 8 weeks after the last injection of a cytostatic.

If, due to toxicity, it was not possible to do all the planned chemotherapy, prophylactic chemotherapy is performed after the operation, but not in full, but exactly as much as was not done before surgery.

With full preoperative treatment, there is no need for adjuvant chemotherapy. Only in cases of HER2-positive or triple-negative tumor residues detected in the removed breast tissue, prophylactic courses after complete neoadjuvant chemotherapy are not excluded, but other cytostatics are included in the regimen.

Conclusion.

The stage of breast cancer determines the duration of drug treatment and the need to add chemotherapy after surgical removal of the breast, even with a high level of hormone receptors in cancer cells and almost guaranteed benefits of hormone therapy. For example, in breast cancers with high levels of estrogen receptor (ER+) and more than 20% of cells with progesterone receptors (RP+), without HER2 and with Ki67 less than 20% - which is called the "luminal A subtype", a good response to one is predicted. only hormonal pills. Nevertheless, with a large neoplasm in the gland, which promises a high probability of recurrence of the disease - more than 5 cm and more than 4 axillary lymph nodes affected by metastases, chemotherapy cannot be dispensed with, though it can be limited to four courses.

Adverse reactions are a given of chemotherapy, since they are determined by the mechanism of action and the goal of treatment - killing cells. Cytostatics and targeted drugs, with a known selectivity of the point of application of therapeutic power - a certain cellular structure (DNA, enzyme, and so on), cannot choose only malignant cells from a variety of cells. All fast-living and actively dividing tissues fall under the "distribution" of apoptosis, and in the body such vitally active are not only cancerous, but also ordinary blood cells, sex glands, hair follicles and skin with mucous membranes. Everything that needs to be updated quickly dies first: breast cancer, blood leukocytes, epithelium.

Almost all schemes have emetogenicity - emetic potential, therefore, preparation for chemotherapy includes the early administration of antiemetics, for some drugs premedication is provided - taking drugs on the eve of the cycle to prevent severe allergic reactions during administration.

The result of treatment is not associated with the severity of toxic reactions, and complete regression of cancer is possible with good tolerance, and painful treatment without visible results. In our Clinic, prior to the start of chemotherapy, the sensitivity of the tumor to a particular drug is determined, selecting the most effective combination of drugs. Of course, over time, cancer cells will stop responding to the cytostatics used, but the analysis can be done again if it is possible to get a piece of the tumor for research.

Damage to myocardial, kidney and liver cells by cytostatics gradually accumulates - a cumulative effect, so some drugs are simply abandoned over time, switching to combinations that do not affect previously damaged chemotherapy organs.

Most cytostatics lead to hair loss - alopecia, which is morally difficult for a woman. Psychological discomfort negatively affects the tolerability of treatment, undermines self-confidence and a favorable outcome of therapy. In our clinic, a special Orbis cooling helmet helps to cope with this problem, preserving healthy hair follicles by reducing the concentration of cytostatic in the scalp. The procedure is quite comfortable and, most importantly, it changes the attitude to the treatment process itself.

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