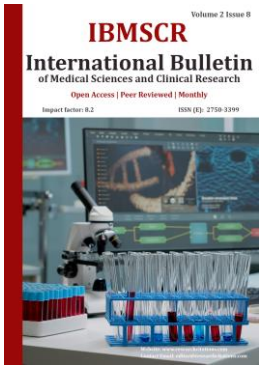

MAIN SIDE EFFECTS OF ANTITUMOR CHEMOTHERAPY

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Malignant neoplasms still remain one of the most important medical and socioeconomic problems in our and in most developed countries of the world. Everyone knows that chemotherapy is effective and, at the same time, a serious and toxic treatment for tumors. In this article, the reasons why drug chemotherapy drugs have a detrimental effect on tumor and normal cells of the organism of cancer patients are discussed. Two types of medicinal chemotherapy on which chemotherapy is based are described. The topic of targeted therapy is touched upon: positive and negative sides. The widespread side effects of antitumor chemotherapy are also described: myelosuppression, extravasation, nausea and vomiting, fatigue, alopecia (hair loss), mucositis, decreased fertility. The approximate terms of their manifestation and the measures that can / should be taken to slow or avoid them are given.
Keywords: oncology, chemotherapy, side effects.

Tumor cells are characterized by rapid growth and relatively rapid division. Anticancer drugs not only block these processes, but also cause irreversible damage and death of such cells. However, many normal cells also grow and divide rapidly. These include: bone marrow cells, mucous membrane of the oral cavity and gastrointestinal tract, reproductive system, hair follicles. Therefore, anticancer drugs cause damage to these normal cells, which is the cause of a number of complications associated with side effects of chemotherapy. In addition, anticancer agents are capable of damaging almost all normal structures with varying frequency. The term "tumor chemotherapy" in a broad sense reflects all types of drug treatment of malignant neoplasms associated with the influence of pharmacological agents directly on the tumor.

Currently, chemotherapy is based on the use of cytostatic and cytotoxic drugs. Cytotoxic drugs are aimed at the destruction of pathological tissues, and the main disadvantage of such drugs is their low selectivity in relation to cancer cells. Cytostatic drugs are more gentle. Their task is to stop cell division due to intoxication, disrupt vital activity and achieve tumor necrosis. Chemotherapy is usually given in cycles to allow the body to recover.

In recent years, in clinical practice, oncologists have begun to use drugs of a fundamentally new group - targeted drugs that have a safety profile different from cytotoxic therapy. In general, these drugs are relatively well tolerated, they inhibit hematopoiesis to a lesser extent, but they cause specific side effects, such as skin lesions, increased blood pressure and vascular changes, and cardiotoxic effects.

It must be remembered that patients often respond differently to the same treatment. Two patients of the same age, with a similar level of physical condition, may be given the same chemotherapy for the same type of cancer, but one may experience little to no problems while the other suffers from many side effects, and their treatment may be pretty successful.

Widespread side effects of cytostatic therapy.

Cytotoxic drugs interfere with the process of mitosis. They do not distinguish between a normal cell and a tumor cell. The use of chemotherapy is based on the principle of selectivity of action damage to a malignant tumor without serious damage to normal tissues and organs. Unfortunately, the balance between the antitumor effect and low toxicity in oncological practice is an exception; side effects and even death from drug complications are often recorded. Some side effects are more common, others less common. The most common side effects include bone marrow suppression, nausea and vomiting, fatigue, alopecia (hair loss), mucositis, decreased fertility, and the risk of developing secondary malignancies. Other toxic manifestations characteristic of specific drugs are also possible.

Myelosuppression (leukopenia, anemia, thrombocytopenia) - a decrease in the number of blood cells formed in the bone marrow. Normally, the effect of a chemotherapy dose on bone marrow cells is temporary. Changes appear a few days after treatment, reaching a peak by the 10th-14th day, then a return to the original state is observed over the next week. For example, anemia is usually fairly quickly controlled by blood transfusion or the use of drugs that affect erythropoiesis.

Extravasation is the penetration of an anticancer drug into the subcutaneous tissue. When drugs with an abscessing effect enter the tissues, necrosis is possible. Irritant drugs cause inflammation and pain at the site of extravasation. Factors causing extravasation: thin brittle veins, violation of the technique of venipuncture, incorrect choice of venipuncture site, a special method of administration of the drug, superior vena cava syndrome, peripheral neuropathy, limited choice of veins due to lymph node dissection. According to the literature, with the introduction of drugs into a peripheral catheter, the probability of extravasation is 1-6%.

Nausea and vomiting can cause severe physiological and psychological discomfort, sometimes leading to refusal of treatment. In the last 20 years, new, more effective antiemetic regimens have emerged to alleviate these symptoms and improve the quality of life of patients receiving chemotherapy. The goal of treatment is to prevent nausea and vomiting during the three stages of chemotherapy: before treatment (premature), within 24 hours (acute) and 24 hours after the start of treatment (delayed). Nausea and vomiting can cause severe physiological and psychological discomfort, sometimes leading to refusal of treatment. In the last 20 years, new, more effective antiemetic regimens have emerged to alleviate these symptoms and improve the quality of life of patients receiving chemotherapy. The goal of treatment is to prevent nausea and vomiting during the three stages of chemotherapy: before treatment (premature), within 24 hours (acute) and 24 hours after the start of treatment (delayed).

Stomatitis and other signs of damage to the oral cavity (mucositis). Due to the intensity of growth and short lifespan, the cells of the oral mucosa are especially sensitive to chemotherapy and radiation. The likelihood of developing drug stomatitis depends on the dose and regimen of drug administration. Usually, stomatitis occurs a few days after taking the drugs and disappears within about a week.

Alopecia (hair loss). Many patients believe that chemotherapy always leads to baldness. Chemotherapy-induced hair loss is not life-threatening, but psychologically it is one of the most important and unpleasant side effects. Hair usually begins to fall out 2-3 weeks after chemotherapy, usually alopecia is temporary: hair growth resumes approximately 2-3

weeks after the end of treatment, but sometimes 4-5 months pass before the patient can remove the wig. New hair may differ from the fallen hair in thickness and color. Hair may also fall out on other parts of the body (eyebrows, eyelashes, armpits, pubis, etc.). The means of temporary hair preservation is the cooling of the scalp.

Diarrhea, constipation, malnutrition. The causes of diarrhea in cancer patients can be various: chemotherapy, radiation therapy, tumor localization, drugs, nutritional supplements, and neurological disorders. Chemotherapy causes osmotic diarrhea, in which actively dividing epithelial cells of the gastrointestinal tract are destroyed. And the main causes of constipation are exhaustion or immobility, as well as the use of narcotic analgesics. Often, some patients lose their appetite and sometimes become severely emaciated.

Fatigue or fatigue. Severe tiredness or fatigue is very common with chemotherapy. It is estimated that 4 out of 5 patients will feel tired for several days during treatment, about one in three will experience it constantly. Fatigue can be manifested not only by a complete lack of energy, but also disrupt processes such as memory, sleep, and sexual life. It can also lead to shortness of breath and loss of appetite. Fatigue usually appears during the first or second week of treatment and becomes more pronounced as treatment cycles continue. After the end of chemotherapy, the feeling of fatigue is gradually weakened, sometimes it takes several months for it to completely disappear. Relatively little scientific work has been done on the causes of chemotherapy-induced fatigue. Chemotherapy is definitely causes fatigue. But often there are other factors that lead to this condition. Among them: anemia, concomitant infection, depression or pain syndrome.

Decreased fertility. The risk of any effect on fertility is related to which drugs are used, at what doses and for how long. With some cytotoxic drugs, the risk of infertility is very high, while others are virtually non-existent. Alkylating agents are more likely than other drugs to cause infertility.

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