

USE OF *CATRANTHUS ROSEUS* IN THE TREATMENT OF ONCOLOGICAL DISEASES

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One of the most actively developing areas of medicine is biological cancer therapy – the high-tech methods of treatment, including effects on the natural protective mechanisms of the patient or the administration of the natural origin substances. Moreover, an increased interest in natural therapy is observed today not only in cancer patients, but also in practicing doctors, and in researchers. Objective observations and studies show numerous cases of successful application of medicinal plants for the treatment of cancer patients. Oncologists still believe that it is impossible to defeat an oncological disease with the help of just one herbal treatment (and other natural remedies). However, at the same time, they recognize that it would be wrong to abandon the colossal pharmacological potential offered by phytotherapy in the treatment of cancer. Regardless of the stage and form of the oncological disease, phytotherapy has a sufficient arsenal of means that can adequately supplement the etiopathogenetic, syndromic and symptomatic treatment of patients, which increases the quality of their life and prolongs it [2, 5, 6]. One such remedy is *Cathartthus roseus*, a perennial evergreen half-shrub that belongs to a small family of herbaceous plants of the genus *Cathartthus*. *Cathartthus roseus* since ancient times has been used in traditional medicine as a medicine. In Ayurveda, the extract of roots and shoots was used to treat malaria and diabetes. Ancient Chinese healers were also familiar with the healing properties of the *Cathartthus roseus*. They knew that the extract of the *Cathartthus* can stop the cancer.

The native land of the plant is the island of Madagascar, but it managed to be naturalized in many subtropical and tropical regions of the world. The cataract rose

grows in India and Indochina, on the island of Java, in the Philippines, Cuba, the island of St. Mauritius. The *Cathartthus* was grown in Western Transcaucasia, and then in Southern Kazakhstan and the Kuban [2, 4].

Procurement of raw materials. The *Cathartthus roseus* medicinal raw material is the entire aboveground part of the plant, but the product for obtaining plant preparations is a leaf of *Cathartthus roseus*. Raw materials should be harvested between the end of August and mid-September, at this time the *Cathartthus* is in the phase of mass flowering and ripening of seeds and the content of alkaloids in the plant is higher. The aerial part of the plant is mowed and dried in industrial dryers at a temperature of 50-60 °C, and then threshed to separate the coarse stems. Ready raw materials should be stored no longer than three years, since further the herb of the *Cathartthus roseus* loses its healing properties [1].

Chemical composition. *Cathartthus roseus* contains more than 80 different indole alkaloids, but only a few of them are of scientific interest related to one of the two groups: the first includes the alkaloids ajmalicine, lochnerine, serpentine and others, close in therapeutic effect to the alkaloids of *Rauvolfia serpentina*, the second includes the alkaloids with antitumor activity, the mechanism of action related to mitotic toxins vinblastine, vincristine, etc. The aerial part of the plant is rich in micro and macro elements, among which are potassium, calcium, ferrum, magnesium and zinc [1].

Pharmacological properties. The healing properties of *Cathartthus roseus* are caused, first of all, by the presence in the plant of plant-derived cytostatics vinblastine and vincristine. Both alkaloids are classical mitotic poisons, that is, toxic substances that act on cells in the M-phase of the cell cycle, mitosis, which disrupt cellular polymerization. This leads to denaturation of the protein that forms the basis of microtubules, which form the "skeleton" of the cell and participate in the organization of the mitotic spindle – tubulin. In the absence of the mitotic spindle, the chromosomes can not move into the nuclei of the daughter cells, cell division stops and it dies. Vincaalkaloids can also alter the metabolism of amino acids, cAMP, glutathione, the activity of calmodulin-dependent Ca^{2+} transport

ATPase, cellular respiration, biosynthesis of nucleic acids and lipids. The vincaalkaloids also include semisynthetic derivatives of vinblastine – the vindesine and the vinorelbine.

Scientists believe that in the mechanism of action of natural and semi-synthetic alkaloids of *Cathartthus roseus* there are some differences due to differences in their chemical structure, interaction with different parts of the tubulin molecule and various interactions with proteins associated with microtubules. These proteins can change the nature of the interaction of alkaloids with tubulin microtubules, which as a result determines some of the nuances in the effect of alkaloids of the *Cathartthus roseus*. Thus, under conditions in vitro, vinblastine, vincristine, and vinorelbine have approximately similar activity against tubulin assembly into microtubules, however vinorelbine has no specific effect to induce the formation of the spirals. In an experimental comparative study, the effects of vinblastine, vincristine, and vinorelbine on the microtubules of the mitotic spindle and microtubule of axons in mouse embryos at an early stage of neuronal development showed that vinorelbine acts more selectively on the microtubules of the mitotic spindle. Natural vincaalkaloids (vincristine, vinblastine) are used to treat rapidly proliferating neoplasms. One of the widely used vincaalkaloids – vincristine is used mainly in combined chemotherapy of acute leukemia, lymphogranulomatosis, as well as other tumorous diseases (intravenously administered once a week). Neurotoxic action of vincristine can be manifested by a violation of the neuromuscular transmission, neurological complications, including paresthesia, motor disorders, prolapse of tendon reflexes, intestinal paresis with the appearance of constipation, up to the paralytic ileus. Unlike vincristine, vinblastin alkaloid is a less neurotoxic drug, but causes myelosuppression, has a pronounced irritant effect with a risk of phlebitis, necrosis (with extravasal ingestion) [2, 5, 6].

Therapeutic effect. Vinblastine (rozevin) is used in the treatment of lymphomas, it is especially effective in the treatment of Hodgkin's disease (lymphogranulomatosis) in the third and fourth stages, Kaposi's sarcoma, Letterter-

Siva disease, chorion carcinoma resistant to other chemotherapeutic drugs, neuroblastoma, hormone-resistant, inoperable cancer mammary gland, severe forms of fungal mycosis, myeloma, germinogenic testicular and ovarian tumors; cancer of the kidney, bladder, nasopharynx, lung. Medicines in which the active ingredient is vinblastine are contraindicated in pregnant and lactating patients with leukopenia, depressed bone marrow function, and with infectious diseases. Carefully appoint them to the elderly. In addition to special chemotherapy programs, vinblastine is not prescribed and against the background of drugs that damage the organs of hematopoiesis, radiation therapy. In case of an overdose it is possible to reduce the leukocytes in the blood, defeat peripheral nerves, convulsions, in severe cases – coma. Therefore, during treatment with vinblastine drugs, continuous monitoring, monitoring of the peripheral blood pattern is necessary in order to schedule symptomatic therapy in time, and in severe cases, to perform blood transfusion, since vinblastine does not have a specific antidote and hemodialysis is ineffective.

Preparations based on vincristine are prescribed for acute leukemia, various sarcomas, lymphogranulomatosis, Williams tumor, neuroblastoma, small cell lung cancer, uterine and breast cancer, germicogenic ovarian and testicular tumors, as well as gynecological tumors and acute lymphoblastic leukemia in children. Contraindication to the use of vincristine is also pregnancy and feeding, infectious and neurodystrophic diseases. With intrathecal administration, a lethal outcome is possible. Throughout the treatment should check the content of uric acid in the plasma and to prevent acute urate nephropathy provide adequate diuresis. With resistance to vincristine, children with lymphatic leukemia are prescribed vindesine. Also they are treated with malignant tumors of the digestive tract, melanomas, blast crisis and, with ineffectiveness of surgical and hormonal intervention, breast cancer. Contraindications to reception are bacterial infections, thrombocytopenia and granulocytopenia, demyelinating form of the syndrome of Charcot-Marie-Toot.

Vinorelbine is shown with resistance to hormone therapy, prostate cancer, breast cancer and non-small cell lung cancer. It is contraindicated in pregnancy and breastfeeding, infectious diseases, severe oppression of bone marrow functions, violations of liver function [2, 3, 6].

Conclusions. Phytotherapy can not replace such effective methods of treatment of cancer as surgical treatment, chemotherapy and radiation therapy, but most oncologists have proven the advisability of complex treatment, when along with traditional treatment, the possibilities of phytotherapy are used. Medicines based on *Cathartus roseus* are most effective in the treatment of lymphomas, Kaposi's sarcoma, Letterter-Siva disease, chorionic carcinoma resistant to other chemotherapeutic drugs, neuroblastoma resistant to hormone therapy, inoperable breast cancer, severe forms of fungal mycosis, myeloma disease, germicogenic testicular and ovarian tumors, cancer of kidney, bladder, nasopharynx, lung.

Reference:

1. Kovalov VM, Pavlii OI, Isakova TI. *Farmakohnoziia z osnovamy biokhimii roslin* [Pharmacognosy with the basics of biochemistry of plants] / za red. prof. VM Kovalova / – Kharkiv : «Prapor», 2000. – 704 p. (in Ukrainian)
2. Korepanov SV. *Rasteniya v profilaktike i lechenii raka* [Plants in the prevention and treatment of cancer]. – Barnaul : OAO «Altayskiy poligraficheskiy kombinat», 1999. – 160 p. (in Russian)
3. Kosev PA. *Polniy spravochnik lekarstvennyih rasteniy* [Full reference book of medicinal plants]. – Moskva : Eksmo, 2007. – P. 881-882. (in Russian)
4. Menshikova ZA, Menshikova IB, Popova VB. *Entsiklopediya lekarstvennyih rasteniy* [Encyclopedia of Medicinal Plants]. – Moskva : Eksmo, 2007. – 496 p. (in Russian)
5. Turischev SN. *Fitoterapiya dlya vseh* [Phytotherapy for everyone]. – Moskva : PRESS Invest, 2005. – P. 63-64. (in Russian)
6. Chissov VA, Aleksandrova LM, Davyidov MI. *Onkologiya: natsionalnoe rukovodstvo* [Oncology: national leadership]. – Moskva : GEOTAR-Media, 2014. – P. 244-249.

Abstract.

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Key words: phytotherapy, oncological diseases, *Cathartthus roseus*.