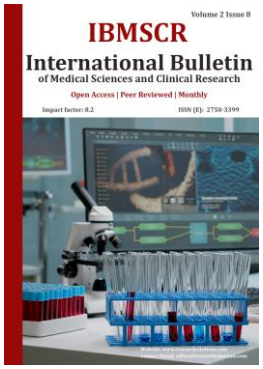

ANTICANCER DRUGS

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Annotation: The article presents an overview of anticancer drugs for medical use currently registered in Uzbekistan and at the final stage of their development - clinical trials in accredited testing centers for subsequent registration. The generalized information was obtained from official sources - the State Register of Medicines of the Ministry of Health of Uzbekistan, the Electronic Rubricator of Clinical Recommendations and Clinical Guidelines and orders on the Standards of Medical Care prepared on their basis. The place and role of chemotherapeutic agents in the treatment of oncological patients and typical schemes for the use of antiblastoma agents in the most widespread and most severe nosological forms of tumor diseases are shown.

Keywords: medicine, medicinal product, antitumor agents, anti-blastoma agents, chemotherapy, hormone therapy, photodynamic means, targeted therapy, cytostatic action, cytotoxic action, radiopharmaceuticals, phase specificity, cycle specificity, palliative care, adjuvant treatment, remission induction, maintenance therapy.

INTRODUCTION

Anticancer drugs (AP) are drugs used in oncology (Greek: onkos - severity, load) to disrupt the development or destruction of cells of systemic malignant blood diseases (hemoblastoses), true local tumors and their metastases.

Factors contributing to the malignant transformation of cells are carcinogenic substances (tobacco and other toxins), hormonal disorders, physical factors (radiation, etc.), viruses (changing the DNA of cells), long-term and severe infections and stress, weaken - providing immune protection [1–5].

MATERIALS AND METHODS

Normally, continuously formed tumor cells are destroyed by the system of antitumor immunity. With a weakening of this system or with excessive exposure to tumor development factors, an oncological disease develops.

Malignant tumors are characterized by a profound impairment of the degree of cell differentiation to the level of blasts and their uncontrolled reproduction and metastasis. For malignant diseases of epithelial and blood cells, it is customary to use the terms "cancer" (English cancer, trouble). Nosological forms of tumors are coded according to the International Classification of Diseases (ICD) and staged according to size and the presence of local and distant metastases (TNM system).

RESULTS AND DISCUSSION

As a cause of death, oncological pathology, which affects women and men with approximately the same frequency, occupies a leading position in Russia and in the world. The most common oncological diseases in women are breast cancer (more than 20% of all cancer cases in

Russia), skin cancer (more than 15%), uterine body and colon cancer (about 7% each). In men, lung cancer (more than 20%), skin, prostate and stomach cancer (approximately 10–12% each) predominate. The most common forms of cancer in the world are lung and breast cancer (approximately 12–13% each) and colorectal cancer (10%). Severe, transient, and prognostically unfavorable diseases can also include melanoma, sarcoma, and tumors of individual complex localizations [1].

To eliminate an important factor in the development of respiratory cancer, smoking is being fought. In 2017, the mandatory start of cancer treatment was established by law no later than 14 days after the morphological confirmation of the diagnosis. The survival rate of children with blood cancer has increased in recent years to 80%. It is planned that early detection of cancer will increase to 60% in 2022, and the 5-year survival rate of cancer patients will increase to 59% in 2022. Hopes for such progress may be associated with advances in the diagnosis and treatment of cancer [2].

Modern complex tumor therapy includes eight main methods of treatment: along with surgical removal of a tumor and/or metastases, their irradiation with ionizing radiation and virotherapy with oncolytic viruses, five methods of drug therapy can also be used: cytostatic and/or cytotoxic chemotherapy; hormonal therapy of hormone-sensitive tumors; photodynamic therapy; targeted therapy with drugs that act selectively on the target cell (target); immunotherapy to stimulate antitumor immunity.

Taking into account the breadth of the spectrum of the above nomenclature, it is impossible to describe the properties of each AP representative on the scale of one publication.

It seems appropriate to present the main pharmacological characteristics of only 11 most important representatives of AP (in alphabetical order) [2, 3].

Anastrozole is a non-selective aromatose inhibitor: it disrupts the synthesis of androgens and estrogens in the subcutaneous tissue and adrenal glands. Indications: early hormone-dependent breast cancer in menopausal women after tamoxifen therapy for 2–3 years. Side effects: allergy, hot flashes, oppression of hematopoiesis, dry mucous membranes, thromboembolism.

Asparaginase hydrolyzes asparagine and inhibits protein synthesis in tumor cells. Indications – acute leukemias: lymphoblastic and myeloblastic (recurrent), T-cell lymphoma, lymphosarcoma, reticulosarcoma. Side effects: pancreatitis, blood clotting disorders, allergies, nausea, hypoalbuminemia with edema, acute renal failure.

Vinblastine is an inhibitor of tubulin polymerization and spindle formation in tumor cells at the metaphase stage. Indications: lymphogranulomatosis, lymphocytic lymphomas, Kaposi's sarcoma. Side effects: dermatitis (skin ulceration), oppression of hematopoiesis, damage to the mucous membranes (stomatitis, dyspepsia, abdominal pain, enterocolitis). For the treatment of hematopoiesis suppression with vinblastine (as with other hematotoxic APs), colony stimulating factors, interleukins and/or erythropoietin are used. Hormonal and antihormonal AP are correctors of humoral regulation of cell differentiation and inhibitors of tumor cell division. Indications: ethinylestradiol - prostate cancer (in young men); megestrol - cancer of the prostate, breast, ovaries; goserelin - cancer of the prostate, breast, uterus; flutamide - prostate cancer (in older men); tamoxifen - cancer of the breast (breast), uterus. Side effects: ethinylestradiol - feminization, dyspepsia, pruritus; megestrol - depression, convulsions, alopecia, edema; goserelin - erectile dysfunction, fever, swelling; flutamide - gynecomastia, mastalgia; tamoxifen - bleeding, fever, vomiting. Doxorubicin is an inhibitor of

enzymes for the synthesis of nucleotides, intercalation of the DNA molecule (impairs matrix functions), an inhibitor of topoisomerase II (causes single- and double-strand breaks in the DNA of tumor cells). Indications: acute leukemia, sarcoma, ovarian and bladder cancer. Side effects: cardiotoxicity, nephropathy, candidiasis, oppression of hematopoiesis, damage to the mucous membranes of the gastrointestinal tract (GIT).

Interferon alfa is an activator of macrophage functions and lymphocyte cytotoxicity, an inhibitor of tumor cell proliferation. Indications: sarcoma on the background of HIV infection, hairy cell leukemia, acute viral hepatitis, tick-borne encephalitis, genital warts. Side effects: influenza-like syndrome, dyspepsia, arrhythmias, impaired consciousness, convulsions, paresthesia, hematopoietic disorders.

Methotrexate, an inhibitor of dihydrofolate reductase, reduces the synthesis of thymidylate and purine nucleotides necessary for the synthesis of DNA and RNA in tumor cells. Indications: chorionic carcinoma, head and neck tissue cancer, lung and breast cancer, non-Hodgkin's lymphomas. Side effects: liver damage, oppression of hematopoiesis, damage to the mucous membranes of the gastrointestinal tract (nausea, vomiting, diarrhea), decreased potency, amenorrhea, alopecia.

Mercaptopurine is an inhibitor of enzymes for the synthesis of purine nucleotides, preventing their incorporation into DNA and RNA of tumor cells. Indications: acute leukemia in adults. Side effects: oppression of hematopoiesis, damage to the mucous membranes of the gastrointestinal tract, decreased potency, amenorrhea, alopecia.

Monoclonal antibodies: trastuzumab is an inhibitor of epidermal growth factor receptor type 2 (HER2). Rituximab is an inducer of B-lymphocyte lysis (binds to the CD20 transmembrane antigen on pre-B-lymphocytes and B-lymphocytes). Indications: trastuzumab – gastric adenocarcinoma, breast cancer metastases with overexpression of HER2. Rituximab - B-cell lymphoma (non-Hodgkin's), chronic lymphocytic leukemia. Side effects: trastuzumab - oppression of hematopoiesis, dyspepsia, edema, shortness of breath, allergy, arthralgia, myalgia; rituximab - edema, arrhythmias, allergies.

Fluorouracil, an inhibitor of thymidylate synthetase, disrupts the synthesis of pyrimidine nucleotides and prevents their incorporation into the nucleic acids of tumor cells. Indications: cancer of the stomach, colon, breast, ovary. Side effects: dermatitis, oppression of hematopoiesis, damage to the mucous membranes of the gastrointestinal tract, decreased potency, amenorrhea, alopecia.

Cyclophosphamide - AP, which alkylates the DNA of tumor cells, disrupts their matrix functions. Indications: leukemia (all types), lymphogranulomatosis, non-Hodgkin's lymphomas, breast and ovarian cancer. Side effects: hemorrhagic cystitis, oppression of hematopoiesis (anemia, leukopenia, thrombocytopenia), damage to the mucous membranes of the gastrointestinal tract (nausea, vomiting, diarrhea), decreased potency, amenorrhea, alopecia.

Patients with the same nosological form of the tumor usually represent a heterogeneous group with a different response to treatment and a different prognosis.

The tactics of using AP is determined by the type and stage of the tumor process, as well as by the cyclo- and phase-specificity of the drug. Phase-specific APs act on a certain phase of the cycle: G0 is the resting phase, G1 is the initial growth phase (RNA and protein synthesis), G2 is the phase of preparation for mitosis (protein synthesis); S is the phase of DNA replication; M-phase - mitosis.

Cycle-specific APs are effective throughout the entire cycle of cell division. Cyclone-specific APs act on tumor cells in the G0 resting phase.

In real clinical practice, AP is often used as part of standard regimens. Below are the schemes for the use of AP in the most widespread and most severe nosological forms of tumor diseases, included in the Clinical Guidelines, which since 2014 have been compiled and approved by professional communities of doctors - specialized associations.

CONCLUSION

The development of AP and the continuous improvement of schemes for their use based on clinical recommendations and in accordance with the latest official information in the GRLS of the Ministry of Health of Uzbekistan can become one of the factors in increasing the 5-year survival rate of Uzbek patients with the most common oncological diseases.

References:

1. Garin A.M., Bazin I.S. Morbidity, mortality, long-term results and consequences of treatment of cancer patients in different countries of the world. Russian journal of oncology. 2016; 21(1-2): 11-7.
2. Dmitrieva N.B., Kukushkin G.V. Medicines for the treatment of infectious and oncological diseases: a textbook. M.; 2016.
3. V. I. Chissov and M. I. Davydov, ed. Oncology: National Guide. Moscow: GEOTAR-Media; 2013.
4. Alyautdin R.N., red. Pharmacology. Moscow: GEOTAR-Media; 2016.
5. Avdeev S.N., red. Federal Guidelines for the Use of Medicines (Formulary System). Issue XVIII. M.; 2017.