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# PREVENTION OF ACUTE RESPIRATORY VIRAL INFECTIONS

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**Annotation:** Viruses are the cause of most acute respiratory tract infections, which collectively claim more than 4 million lives per year. Acute respiratory viral infections (ARVI) lead in the structure of morbidity in different countries of the world [1]. Despite the enormous efforts in developing means for the prevention and treatment of this group of diseases, their results are very modest. Much of the research in this area is aimed at studying the pathogenesis and methods of prevention/therapy of influenza. However, the annual epidemics of the latter, significant variability in the time of peak incidence, variability and errors in forecasts of the dominant virus strains in the season indicate that influenza is currently poorly controlled by the existing prevention system[2].

**Key words:** Influenza, acute respiratory infections, pathogens.

**Relevance:** Modern influenza vaccines are highly likely to protect people only from influenza viruses, but not from numerous respiratory viruses. Influenza and other acute respiratory viral infections often lead to serious complications, which are especially severe in patients with diseases of the bronchopulmonary and cardiovascular systems, in the elderly and children. Influenza in 10–15% of cases is complicated by the development of pneumonia and damage to the ENT organs, and in 2–3% by myocarditis. 60% of people who have had ARVI or influenza develop post-viral asthenia syndrome (PAS) within one month, accompanied by emotional disturbances, mental disorders and constant fatigue, worsening the quality of life and negatively affecting the ability to work. Repeated infections with these infections have a particularly negative impact on human health. According to WHO, every year on average every adult gets sick with influenza or other acute respiratory viral infections twice, a schoolchild three times, a preschool child six times. Children in the first year of life experience from 2 to 12 episodes of ARVI. [1,4].

The most relevant acute respiratory viral infections, in addition to influenza, include: adenoviral diseases, parainfluenza; respiratory syncytial virus infection (RSV infection), rhinovirus and coronovirus infections. All of the above diseases have an airborne transmission route and are characterized by a combination of a general infectious syndrome (fever, headache, weakness, myalgia, etc.) with signs of respiratory tract damage. No cardinal clinical signs distinguishing pandemic influenza from seasonal influenza have been identified. It has been noted that pandemic influenza begins more gradually, with malaise, dry cough; body temperature reaches its maximum only on the second day; intoxication is moderate. Thus, it is often impossible for practitioners to clinically identify one or another form of acute respiratory viral infection in a particular patient, especially since in some cases there is a mixed viral infection (for example, a combination of influenza virus and adenovirus) [9].

**Purpose of the study:** Modern approaches to prevention and treatment of acute respiratory viral infections in Andijan region.

In the context of an ongoing influenza epidemic, when almost the entire population is at risk of infection, it is necessary to carry out mass protection measures. It is carried out using emergency nonspecific prophylaxis [4]. To solve this problem, great importance is given to drugs that have a rapid protective effect against all pathogens of acute respiratory infections. Modern medicine has etiotropic drugs whose action is aimed at suppressing the replication of ARVI viruses. The class

of antiviral chemotherapy drugs used for influenza and ARVI includes Remantadine and its derivatives, Arbidol®, neuraminidase inhibitors – oseltamivir and zanamivir [2].

The concept of nonspecific resistance includes the body's resistance to the effects of various unfavorable factors of the environmental and internal environment and its ability to maintain homeostasis - a full-fledged energy-information exchange between the internal environment of a person and the habitat. Nonspecific resistance of the body is ensured by the targeted interaction of various organs and physiological systems. Together with secreting outer integuments (skin, mucous membranes), cellular (phagocytic cells), humoral protection factors are important: enzymes, complement and the interferon system. The interferon system actively influences the entire complex of protective reactions of the body; interferon (IFN) is the most important factor in nonspecific resistance. The importance of IFN as a mediator of immunological processes has been established. Its regulating influence on the cellular and humoral immune system is known. In the general system of the body's defenses, IFN interacts with pathogens earlier than other protective factors and is significantly ahead of the specific immune response in time; therefore, stimulation of its production in the body is of great importance. IFN drugs are an important component of complex therapy and prevention of ARVI. For IFN, the point of application is viral mRNAs, which are blocked by interferon-induced proteins, which leads to a stop in the translation of viral proteins and, consequently, suppression of viral reproduction.

The study of natural IFNs revealed a wide range of their antiviral activity, as well as pronounced activity in oncological diseases. Positive results from the clinical use of IFN have shown the need for widespread production and use of these drugs. At the same time, a serious limitation in the use of natural IFNs is the likelihood of their contamination with infectious agents - hepatitis viruses, HIV, prions, impurities of uncontrolled biologically active substances, and ballast proteins. The question of the volume of donor blood was also important, because To obtain 1 g of IFN, it is necessary to process 100 thousand liters of blood. Advances in molecular biology have made it possible to develop complete eukaryotic proteins that are synthesized by prokaryotes as a result of genetic engineering technologies. Second-generation IFN preparations—recombinant IFNs—are not only much cheaper than natural ones, but also safer [4,5]. The next approach to emergency prevention and further treatment of ARVI is the use of recombinant interferons. Most ARVI viruses, including influenza, are quite sensitive to them [3]. At the same time, a number of pathogens of respiratory viral infections exhibit properties of antagonists to type 1 interferons. The processes of confrontation between the virus and infected cells cover the first 2 days of the infectious process [2]. The degree of suppression of interferon synthesis directly correlates with the pathogenicity of the pathogen. This circumstance primarily applies to avian influenza viruses and coronaviruses that cause atypical pneumonia. In this regard, the use of drugs based on recombinant alpha-2-interferon for preventive purposes (pre-epidemic period) becomes particularly relevant.

Viferon® is a complex antiviral immunomodulatory drug, used in the form of rectal suppositories, ointments and gels. When creating Viferon®, recombinant α-2b-INF was combined with vitamins C and E, which have membrane-stabilizing and antioxidant properties, which increased the antiviral and immunomodulatory activity of the drug [1,4].

γ-IFN is less studied, although its role in the processes of inhibition of virus entry into cells, decapsulation, replication of viral RNA and DNA, synthesis and assembly of viral proteins has been studied in various models of viral infections in in vitro and in vivo systems. The only γ-INF drug registered in Russia is Ingaron® (human recombinant interferon-γ). The drug was obtained by microbiological synthesis in a recombinant strain of Escherichia coli. According to the results of tests conducted at the Influenza Research Institute, it was shown that the drug Ingaron® exhibits pronounced antiviral activity against various strains of the influenza virus, and in some

cases significantly exceeds the activity of the reference antiviral drug Remantadine and can be used both for the prevention and treatment of numerous ARVI group [2,6,7].

It must be emphasized that IFN inducers have not only an antiviral, but also an immunocorrective effect, which allows them to be classified as broad-spectrum drugs. IFN inducers combine well with chemotherapy drugs, antibiotics, immunomodulators, IFN drugs, etc. IFN inducers are a heterogeneous group of high and low molecular weight natural and synthetic compounds [1,2,7,9].

As a result of targeted screening among compounds of various natures (acridones, fluorenones), a number of promising IFN inducers were identified. A comprehensive study of the safety and effectiveness of the new domestic drug Cycloferon™, which is a low-molecular synthetic substance belonging to the class of heteroaromatic compounds, has been carried out in the most detail. As a means of emergency prevention of influenza and other acute respiratory viral infections, Cycloferon™ was tested in adults and children during seasonal increases in morbidity under controlled epidemiological surveillance. Cycloferon™, as a drug of etiotropic action, has positively proven itself as a drug for emergency prophylaxis in organized groups during the already begun epidemic rise in the incidence of influenza and ARVI. Cycloferon™ has a bifunctional effect - it is able to suppress the reproduction of a wide range of pathogens of acute respiratory viral infections (orthamyxoviruses, paramyxoviruses, adenoviruses, coronaviruses, etc.) and at the same time has a pronounced immunocorrective effect, normalizing disorders of the immune system (secondary immunodeficiencies) that are so characteristic of respiratory viral infections . For the treatment of severe and complicated forms of influenza and acute respiratory viral infections, the use of the injection form of Cycloferon™ is recommended. Cycloferon™ combines well with other drugs traditionally used to treat influenza and ARVI, and does not cause side effects. Stimulation of the body's immune response has been shown when using influenza vaccines and Cycloferon™ together [5].

Interferon inducers that have a therapeutic and preventive effect in influenza and ARVI also include drugs of natural origin: Ridostin, obtained from the lysate of the yeast Saccharamyces cervisiae, and Kagocel®, synthesized on the basis of the sodium salt of carboxymethylcellulose and low molecular weight polyphenol gossypol, isolated from cotton [5] . The main advantage of IFN inducers is that the clinical effect of these drugs does not depend on the causative agent of ARVI.

To date, in Russia there is a fairly large selection of immunotropic drugs, which can be divided by origin into the following groups: drugs of microbial origin (pyrogenal, prodigiosan, ribomunil, sodium nucleinate; drugs of thymic origin (tactivin, thymalin, timoptin, timaktide, thymostimulin, vilosen , immunofan); drugs of bone marrow origin (myelopid, cytokines, molgrastim; synthetic drugs (levamisole, diucifon, poludan, dipyridamole and other interferon inducers, leakadine, kemantan); synthetic analogues of endogenous substances (Thymogen®, Lykopid®, Polyoxidonium®).

It should be noted that the specification of measures for nonspecific prevention and early treatment is facilitated by the use of drugs depending on the period: inter-epidemic, pre-epidemic, epidemic [5].

To prevent influenza and ARVI in the pre-epidemic period, it is recommended to carry out a set of sanitary and health measures (especially for high-risk groups), specific prevention (flu vaccination) and the use (optionally) of numerous means that increase the body’s nonspecific resistance.

During the epidemic period (seasonal increase in incidence), it is necessary to use first-line defense drugs that have a wide spectrum of etiotropic activity and are intended for emergency

prevention (chemotherapy drugs, IFNs and their inducers). Along with this, it is advisable to use drugs that activate natural immunity (adaptogens, herbal remedies).
In the case of an already established disease, intensive etiotropic therapy should be used in the first 24–48 hours after the appearance of the first signs of the disease, then immunocorrective, pathogenetic and symptomatic therapy becomes the mainstay. Thus, rational pharmacotherapy of influenza and other acute respiratory viral infections should be based on a combination of epidemiological analysis data, information about specific pathogens and a combined algorithm for using a wide arsenal of drugs with different mechanisms of action.

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