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# PREVENTIVE MEASURES ANDMODERN THERAPY OF CORONAVIRUS INFECTION

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***Absract:*** *Influenza and other respiratory viruses cause an imbalance of the interferon system, inhibition of cellular and phagocytic responses of the body. Long-term persistent viral and bacterial pathogens affect the development of atopy and can cause exacerbations of chronic respiratory diseases. Currently, the world is concerned about the rapidly developing epidemic in China caused by the new RNA-containing coronavirus COVID-2019 (Corona Virus Disease 2019 – coronavirus disease, 2019). This paper provides information on the origin, spread, and clinic of coronavirus infection, and highlights issues of prevention and therapy used for various human coronavirus infections that may also be in demand for COVID-2019 infection.*

***Keywords:*** *infectious diseases, coronavirus infection, coronavirus COVID-2019, pneumonia, prevention, interferons, Grippferon*

The high incidence of influenza and other acute respiratory viral infections (ARVI) is an important medical and social problem. Respiratory infections are on the 1st place among all human diseases in terms of social significance, huge damage caused to the health of the population and the country's economy. The incidence of influenza and other acute respiratory infections exceeds the total incidence of all other infections. According to WHO, at least 40 new forms of the disease have emerged in the last 20 years. Respiratory viral infections include influenza and other acute respiratory infections caused by DNA and RNA-containing viruses: parainfluenza, adenoviruses, respiratorysyncytial viruses, metapneumoviruses, bocaviruses, herpesviruses, coronaviruses, etc. It is known that the share of coronavirus infection accounts for from 4 to 20% of cases of all acute respiratory viral infections. Coronaviruses contain a single-stranded RNA molecule, have a shell with rare spikes or villi, resembling the corona during an eclipse of the Sun. Hence the name-coronavirus. Human coronavirus was first isolated in 1965 from an acute respiratory viral infection patient. Currently, the coronavirus family includes >40 species, and it is constantly being updated. The SARS virus (SARS) entered the human population from wild cats (weaver). It is transmitted not only through close contact with the patient through infected sputum,but also by airborne droplets and even by water. The incubation period is from 2 to 12 days. These viruses infect humans and various animals – cats, horses, swans, camels, dogs, birds, rabbits, bats, snakes, etc. In some situations, viruses can change and mutate. In the 20th century, coronaviruses were known as causative agents of acute respiratory diseases in humans and animals, but they were not considered particularly dangerous viral infections. Currently, the family of coronaviruses includes 2 types of viruses that cause severe respiratory infection in humans: SARS-CoV (Severe acute respiratory syndrome coronavirus), or Torsionallycausing severe acute respiratory syndrome, and MERS-CoV (Middle East respiratory syndrome coronavirus), or MERS-coronavirus, causing middle East respiratory syndrome. Coronavirus SARS caused an epidemic in 33 countries worldwide in 2003 (the largest number of cases was reported in China, Singapore and Canada)

with a total of 7,761 cases, 623 of which were fatal. At the end of December 2019, Chinese authorities reported an outbreak of pneumonia of unknown origin in the city of Wuhan (China). The first cases were related to the market, where they sell seafood and animals. Experts have previously established that the causative agent of the disease was a new type of coronavirus – COVID-19 (2019-nCoV). Currently, >80 thousand patients are registered in China and >2,000 people have died from a new >> coronavirus infection. Cases of suspected infections have been identified in 50 countries around the world (Singapore, Hong Kong, Japan, Australia, the United States, Italy, etc.). Researchers are trying to find out how easily the new coronavirus spreads among people. The pathogenesis of the new coronavirus infection has not been sufficiently studied. Presumably, its main source is bats. At the moment, it is not known whether the new virus is transmitted directly from bats or through some other mechanism (through an intermediary animal). The genetic sequence of COVID-19 is 79% similar to that of SARS-CoV. Much remains to be clarified by taking viral DNA samples from animals on the market and in the wild, but already the data obtained can improve the prevention and treatment of the disease. Chinese and WHO authorities have previously reported several cases of transmission between family members, but animals appear to be the most likely source of the virus. The virus is more easily transmitted from person to person. WHO is likely to issue recommendations on how to control the outbreak soon. The Chinese National Health Commission has classified the new coronavirus as a Class B infectious disease. The classification gives the central government the right to stop travel to, from, and within the city, as well as to take other emergency measures that could effectively shut down the city. Coronavirus infection is not a serious disease that is difficult to differentiate from rhinovirus infection. It affects not only adults, but also children, and along with rhinitis, patients may have mild pharyngitis and even bronchitis. The main difference between this infection in children is the presence in the vast majority of patients of symptoms of gastrointestinal tract damage, which are observed from the first hours of the disease and often precede catarrhal manifestations. Along with mucosal-serous rhinitis, inflammation of the laryngeal mucosa and an increase in cervical lymph nodes are often observed. Coronaviruses, like adenoviruses, are common pathogens of nosocomial infections. Severe acute respiratory syndrome (SARS) has many common symptoms and a number of similar properties to influenza-both in terms of the timing of occurrence and localization of viruses with increased virulence. It has been proven that SARS-SARS is caused by a new coronavirus, which has been temporarily named SARS-associated coronavirus (SARS-CoV, Severe acute respiratory syndrome coronavirus, or SARS-a coronavirusthat causes severe acute respiratory syndrome). The severe course of infection is associated with the development of viral pneumonia, accompanied by acute respiratory distresssyndrome (ARDS) and, as a consequence, acute respiratory failure (ARD). This pathology is characterized by a high rate of deaths (38%), since it is accompanied by ODN. So, 25% of the confirmed cases of the new disease in China were classified as severe: rapid progression of lower respiratory tract disease, pneumonia, ARD, ARDS, sepsis and shock were observed. In Wuhan, almost all patients with a severe course of the disease developed progressive ARD on the background of pneumonia and ARDS.

ΠPrevention and therapy. Treatment of such patients is difficult due to the polyethology of acute respiratory viral infections, which are caused by DNA andRNA-containing viruses, the presence of mixed infections and complicated forms of diseases, the formation of viral resistance to chemotherapy drugs, the development of secondary immunological insufficiency that aggravates the course and outcome of respiratory infection. The therapeutic effect is preserved against the background of taking chemotherapy only for respiratory viruses and does not affect the immune system; toxic side effects are possible. In the case of viral infection, the cytokine response develops mainly according to the Th1 cell type. This plays a crucial role in protecting against intracellular pathogens, including viruses. It is believed that the predominantparticipation of cytokines produced by Th2 cells is associated with viral persistence and chronization of the process, and the participation of cytokines produced by Th1 cells is associated with recovery and elimination of the pathogen. The main purpose of viruses is to inhibit the induction of

interferon synthesis and action (IFN) for unhindered infection of cells and spread through the body. In this situation, the use of a genetically engineered IFN preparation can prevent the inhibitory effect of the virus and make it possible to manifest the effect of IFN in full and in optimal time for blocking the spread of the virus. Thus, recombinant IFN introduced from the outside into the respiratory tract, for example in the form of drops, ointments or aerosol sprays, can have both a therapeutic effect at the initial stage of the disease and a preventive effect during an epidemic. Undoubtedly, IFNs are currently the drugs of choice in the treatment of viral infections. First, IFNs have antiviral activity against almost all types of DNA and RNA viruses, "launching" a program for the synthesis of antiviral proteins in cells. Secondly, IFN activates antiviral immunological reactions at the level of the body. The result is the involvement of all possible antiviral mechanisms in the organization of a single protective reaction of the body against the introduced virus. Previous in vitro studies vitroon SARS-CoV and MERS-CoV infections haveshown that IFN type 1 (IFNa/β) has inhibitory activity. To prevent коронавируснойthe coronavirus infection COVID-19 (2019-nCoV), the Ministry of Health (MOH) of Russia recommends individual non-specific prevention measures, for example: irrigation of the nasal mucosa with an isotonic solution of sodium chloride, which reduces the number of both viral and bacterial pathogens of infectious diseases. Separately, the Ministry of Health of the Russian Federation highlights the use of medicines with barrier functions as a method of combating the spread of coronavirus. In this case, special attention is paid to local forms of drugs containing IFN. For the prevention and treatment of children, including from the first days of life, the Ministry of Health of the Russian Federation recommends the use of recombinant IFNa-2b drugs (in the form of drops and sprays), which are widely used for therapeutic and preventive purposes in seasonal acute respiratory infections. The drug of choice allowed for use by pregnant women and children from the first days of life can be a domestic drugGrippferon in the form of nasal drops and spray. Mechanism of actionGrippferonis based on preventing the reproduction of any viruses that enter the body through the respiratory tract. Safety and efficacy of the drug Grippferon in the treatment and prevention of respiratory viral infections confirmed multiprophylaxisand therapy Treatment of such patients is difficult due to the polyethology of acute respiratory viral infections, which are caused by DNA andRNA-containing viruses, the presence of mixed infections and complicated forms of diseases, the formation of viral resistance to chemotherapy drugs, the development of secondary immunological insufficiency that aggravates the course and outcome of respiratory infection. The therapeutic effect is preserved against the background of taking chemotherapy only for respiratory viruses and does not affect the immune system; toxic side effects are possible. In the case of viral infection, the cytokine response develops mainly according to the Th1 cell type. This plays a crucial role in protecting against intracellular pathogens, including viruses.

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