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ACUTE RESPIRATORY VIRAL INFECTIONS (ARVI) AND OLD AGE PEOPLE

Saydakhmedov Zukhriddin Ibrkhimjon ugli
Assistant, Department of Therapeutic Sciences,
Fergana Medical Institute of Public Health

Abstract
The acute respiratory viral infections (ArVIs) are uncontrollable infections due to high transmissibility, broad spectrum of causative agents, the lack of effective antiviral drugs and vaccination against the majority of these agents (except for influenza virus). Furthermore, the problem of ArVI is of particular importance for elderly people taking into account the frequently occurring decompensation of pre-existing comorbidities due to ArVI that obscures ArVI and affects the course and outcome of the disease. The paper reports data on epidemiology, clinical features, diagnosis, and treatment of ArVI in elderly and senile patients.

Keywords: Immune system, viral respiratory infections, elderly patient, interferon, anti-interferon antibodies.

Introduction

Acute respiratory viral infections (ARVI)occupy first place in the structure of all human infectious diseases and are one of the most pressing medical and social problems. According to the World Health Organization, about 1 billion people fall ill with ARVI every year in the world: every 10th adult ARVI remain uncontrolled infections due to high contagiousness, a wide range of pathogens. The absence of effective antiviral drugs and vaccinal prophylaxis for most of them (with the exception of the influenza virus), as well as developing resistance to existing antiviral drugs. In old age,the problem of ARVI acquires special significance given frequent decompensation against the background of ARVI of comorbid pathology in the elderly, masking ARVI and affecting the course and prognosis of the disease Age-related depression of innate and acquired immunity (immunoaging) in combination with subclinical inflammation with aging (inflamaging) is one of the

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factors predisposing to more frequent and more severe acute respiratory viral infections in the elderly, compared to younger individuals.

More than 1/2 of ARVI cases are caused by rhinovirus, coronavirus, influenza virus and respiratory syncytial virus (RSV). If we exclude cases of etiologically unverified ARVI (26%), then these viruses are the cause of the disease in almost 80% of adult patients with ARVI. Special epidemiological studies of ARVI incidence among elderly and senile people are few in number and do not allow us to get a clear idea of this epidemiological situation. Meanwhile, the main causes of ARVI incidence and mortality in the elderly are influenza and RSV infection. During the virological examination of residents of long-term care homes (LDH), the main etiological factor of ARVI was influenza A virus (H3n2), human rhinovirus.

A multicenter study in 16 countries of the American continent showed that the average overall rate of influenza disease requiring hospitalization was 90/100 thousand among children under 5 years of age, 21/100 thousand among persons aged 5–64 years, and 141/100 thousand in the age category of 65 years and older. As can be seen, indications for hospitalization arose significantly more often in the elderly, which indicates a severe course of influenza in this category of patients. According to the assessment, the average number of patients with influenza disease requiring hospitalization in hospitals in North and South America was 772 thousand people annually. Hospitalization due to influenza and RSV infection in the United States is 63.5 and 55.3/100 thousand person-years, respectively, with the most frequent hospitalizations among persons aged over 65 years. Approximately 50,000 elderly and senile people die annually in the United States from influenza and RSV infection. Moreover, the burden of RSV infection is no less significant than influenza among high-risk elderly patients. In the United States, 2–10% of elderly people living in communities are infected with RSV annually, and approximately 11,000 people die from RSV infection [9]. RSV infection in the elderly, especially in the presence of comorbidity - cardiovascular diseases, chronic obstructive pulmonary disease (COPD), tumor processes, can cause severe complications with an unfavorable outcome.

There is a correlation between the development of RSV infection and hospitalization of patients with pneumonia, COPD, chronic heart failure and bronchial asthma in 10.6%, 11.4%, 5.4% and 7.2% of cases, respectively

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Along with influenza viruses and RSV, etiologic agents of ARVI in the elderly can be rhinoviruses, metapneumoviruses, coronaviruses, adenoviruses, parainfluenza viruses.

Although influenza is known to be one of the complications in elderly patients with comorbidity,diagnosis of this infection is not always simple due to difficulties in identifying and correctly interpreting the main signs of influenza. In such situations, fatal outcomes of the disease are often observed, even in the absence of pneumonia in some cases. Well-known local and general signs of ARVI can acquirecertain features in elderly and old people. This concerns, first of all, the presence and severity of the febrile reaction ("the older,the colder"), the nature and causes of such a universal respiratory symptom as cough (manifestation of ARVI or exacerbation of concomitant COPD), lacrimation and injection of scleral vessels (ARVI or chronic conjunctivitis). Often, against the background of ARVI, especially with influenza, there is decompensation of concomitant pathology (COPD, chronic heart failure, diabetes mellitus, etc.), which attracts the attention of the patient and the doctor, thereby masking the mild manifestations of ARVI. Below are the features of the clinical manifestations of ARVI and influenza in adults, including the elderly and old:

• gradual or acute onset of the disease;
• moderate or mild intoxication;
• subfebrile body temperature;
• moderate headache;
• myalgia, arthralgia, pain in the eye sockets (rare);
• damage to the respiratory tract (rhinitis, pharyngitis, laryngitis, bronchitis);
• cough: either barking, rough, paroxysmal,
or wet;
• catarrhal manifestations (runny nose, sore throat, hoarseness);
• injection of scleral vessels, eyelids, lacrimation, conjunctivitis.

Clinical features of influenza, somewhat different both in nature and in the degree of severity of manifestations, include:

• sudden onset of the disease;
• severe intoxication;
• high body temperature;
• severe headache;

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• myalgia, arthralgia, pain in the eye sockets (severe);
• severe injection of scleral vessels;
• damage to the respiratory tract - mainly tracheitis;
• dry, hacking cough;
• catarrhal manifestations are not expressed (soreness along the trachea, sore throat);
• bright hyperemia of the oropharynx with a cyanotic tint of the soft palate

The presence of comorbid pathology (cardiovascular diseases, COPD and bronchial asthma, diabetes mellitus, liver and kidney diseases) plays a significant role in the formation of clinicalmanifestations, course, prognosis and treatment of ARVI in the elderly.Comorbidity, on the one hand, aggravates the prognosis of ARVI, and on the other hand, masks the viral infection, complicating its timely diagnosis. Mortality in ARVI includes acute toxic mortality in the first days of the disease, mortality due to bacterial complications, mainly pneumonia (2-3 weeks of the disease), and delayed mortality associated with exacerbations and complications of concomitant pathology (heart failure, COPD, diabetes mellitus, etc.). Clinical manifestations of RSV infection (a common ARI in the elderly) are very variable in their severity - from the absence of symptoms of infection to the development of severe respiratory failure and death. Often, after an incubation period of 3-5 days, symptomatic respiratory diseases begin with symptoms of a common cold. In general, clinical manifestations of RSV infection are similar to those of other ARIs and include cough (>90% of episodes), nasal congestion and rhinorrhea (22-78%), sore throat (16-64%), shortness of breath (51-93%). In differential diagnostics with influenza, attention is drawn to the presence of symptoms more characteristic of RSV infection, such as rhinorrhea, wheezing, shortness of breath, while with influenza, respiratory symptomatology is less typical, and fever>38°C, myalgia predominate.

Treatment. tactics for patients with ARVI include etiotropic, pathogenetic and symptomatic therapy.

Etiotropic therapy for ARVI is problematic due to the huge number of pathogens (over 142 different viruses). Etiotropic therapy that blocks viral replication, i.e. has a direct antiviral effect, is limited to only one ARVI pathogen - the influenza virus. The group of antiviral drugs includes neuraminidase inhibitors (oseltamivir, zanamivir) and M2-channel blockers of the virus (remantadine, amantadine).

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Along with neuraminidase inhibitors and M2-channel blockers, the above-mentioned direct antiviral drugs include a hemagglutinin inhibitor and a fusion inhibitor (Umifenovir). Oseltamivir and Umifenovir have proven efficacy. Etiotropic therapy is indicated for hospitalized patients with severe influenza in the presence of risk factors for severe course. Antiviral drugs should be prescribed as early as possible - in the first 48 hours from the onset of symptoms of the disease, without waiting for laboratory verification of the diagnosis. These recommendations are applicable to all groups of patients, especially for the elderly, with various concomitant pathologies, prone to a more severe course of the disease. The advantages of timely administration of antiviral therapy are a reduced risk of complications, shortening the period of fever and other symptoms, which has been clinically proven. Antiviral therapy is indicated even when patients seek medical care late: when using oseltamivir, it is necessary to pay attention to kidney function. Taking into account the frequent comorbidity in the elderly, in particular the presence of chronic kidney disease and a decrease in creatinine clearance to 10–30 ml/min on the first day, the drug is prescribed at full dosage (150 mg/day), and subsequently the dose of oseltamivir should be reduced to 75 mg/day.

Pathogenetic therapy of ARVI is carried out mainly by influencing the interferon (IFN) system, which is the most important component of innate immunity. The reaction of the IFN system significantly outpaces the specific immune response, largely determining the course and outcome of viral infections. Active viral infection has an adverse effect on the IFN system. This is especially true for influenza viruses and RSV, the most common causative agents of ARVI in the elderly with a severe, often prognostically unfavorable course of the disease. For pathogenetic therapy of ARVI, human IFN preparations (natural and recombinant IFN) and preparations of endogenous IFN inducers (natural and synthetic compounds) are used. IFN inducer drugs have certain advantages over IFN drugs, which are as follows:

• the ability to "switch on" IFN synthesis in certain cell and organ populations (certain advantages over polyclonal stimulation of immunocytes with interferons);

• the possibility of an additive and even synergistic effect when used in combination with other antiviral drugs;

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• stimulation of the synthesis of one's own IFN, which does not have antigenicity, unlike the most widely used recombinant IFNs at present;
• relatively long circulation of IFN at a therapeutic level after a single administration of the drug (to achieve similar concentrations when using exogenous IFNs, multiple administrations of significant doses are required);
• balanced IFN synthesis, ensuring the body's protection from excess IFN. The potential of these agents is associated with the formation of the body's own IFNs in concentrations that have antiviral activity and circulate for a long time. Induction of the production of the body's own IFNs is more physiological than the use of exogenous IFNs, which inhibit the production of the body's own IFNs, and is characterized by better tolerability. The use of endogenous IFN inducers is most relevant in unvaccinated individuals in the pre-epidemic period, especially in patients with risk factors for the development of complications (immunodeficiency, diabetes mellitus, cardiovascular and chronic pulmonary diseases).
Conclusion.Thus, innovative interferon preparations can be considered as a new paradigm in the pathogenetic therapy of patients with acute respiratory viral infections.

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