

Improvement of Methods for Correction of Clinical and Immunological Disorders in Comorbid State of Chronic Inflammations after COVID-19

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Received: April 03, 2021; **Published:** January 12, 2023

Abstract

Each body has its own defenses, which help to neutralize and destroy various microorganisms that can cause disease.

However, sometimes these defenses are weakened for whatever reason, and cannot cope with the infection penetrated. The question arises: how to boost immunity? How to prevent the occurrence of dangerous diseases? What can help strengthen the body? This article will help you understand these and other issues.

Keywords: Immunity, Kinds of Immunity, Gaimor Sinus, Herbal Preparations

Introduction

The frequency of odontogenic inflammation of the maxillary sinus is ambiguous. Odontogenic maxillary sinusitis accounts for 3 to 7% of the total number of all stomatological diseases, patients with odontogenic maxillary sinusitis account for about 25.8% among patients with inflammatory processes of the maxillary sinus and about 7.6% of all patients with maxillofacial diseases [1-4]. According to AA Timofeev [5], odontogenic sinusitis occurs in 21.3% of cases, and rhinodontogenic - in 3.1% of the total number of purulent - inflammatory processes in the maxillofacial region, and from all cases of sinusitis, 87% and 13%, respectively. Despite the emergence of new, original and, indeed, effective methods of diagnosis and treatment of paranasal sinusitis, their number is growing every year. According to the data of domestic and foreign authors, the incidence of chronic sinusitis over the past 10 years has increased by more than 2 times, and the proportion of patients hospitalized in ENT hospitals is increasing annually by 1.5 - 2% and has no tendency to decrease. Of particular interest in this plan are the combined diseases of the periodontal, maxillary sinus and bronchi. According to some authors, a combination of chronic nonspecific lung diseases and chronic sinusitis is noted in 17.7-28.0% of cases [1,6,12]. Studies have revealed a relationship between foci of chronic odontogenic infection and an increased risk of developing chronic obstructive bronchitis and bronchial asthma. The foci of infection in the tissues of the periodont also serve as a reservoir for the colonization of respiratory pathogens that cause the development of infectious pneumonia, and the destruction of the periodontal inflammation-destructive nature can sensitize the course of the bronchial organisms and thus with it [3,4,13].

In turn, a chronic process in the bronchi, reducing the general immunological reactivity of the body, can contribute to the progression of inflammatory diseases of the tissues of the parodontium. It is suggested that the quantitative and qualitative composition of the microbial landscape of the oral cavity is determined by the reactivity of the organism [5,7,9]. In addition, chronic obstructive pulmonary diseases are accompanied by the development of systemic hypoxia, including periodontal tissues, which, according to a number of researchers, is also a factor that aggravates the course of sinusitis [10,14]. Against the background of the existing metabolic disorders, the oxygen deficiency in the tissues of the periodont further inhibits the regenerative and reparative processes in all its structural components and the mucous membrane.

The importance of the combined pathology of the periodontal and bronchi is determined not only by the prevalence and severity of the disease, the negative effect on the body as a whole, but also by the low effectiveness of the treatment. In the domestic and foreign literature, there are practically no scientifically substantiated data on the possibilities of an integrated approach to systemic methods of treating sinusitis combined with chronic obstructive pulmonary disease (COPD), which is due to the functional and industrial separation of dentists with other specialties. At the same time, one of the main directions of therapeutic measures is the correction of the immunological imbalance detected in such patients [2,15].

At the present time, the study of the clinical and immunological features of the course of sinusitis combined with chronic obstructive pulmonary disease and the improvement of the methods of complex therapy is an urgent problem of stomatology.

In our age of new technologies, every year the burden of unfavorable environmental factors on our health is increasing. First of all, the mechanisms of the protective reactions of our body are exposed to the negative influence [2,17]. *Immunity* is the ability of human and animal organisms to specifically react to the presence of some substance, usually foreign, in it. This reaction to foreign substances ensures the body's resistance, and therefore is extremely important for its survival. The reaction is based on the synthesis of special proteins, so-called antibodies, capable of entering into combination with foreign substances - antigens. The science that studies the mechanisms of immunity is called immunology [1,3]. The main elements of the body's immune system are white blood cells - lymphocytes, existing in two forms: T-lymphocytes and B-lymphocytes. The antibodies produced by B-cells and entering the blood and other body fluids are referred to as factors of humoral immunity (from Lat. Humor - liquid). The protection of the organism, carried out with the help of T-cells, is called cellular immunity, since it is based on the interaction of individual cells with antigens. T cells not only activate other cells by releasing lymphokines, but also attack antigens with the help of structures containing antibodies on the cell surface.

Damage or inadequacy of this protective system can manifest itself in the form of allergic reactions to substances that are usually harmless to the body [3,22]. Congenital and acquired: congenital or hereditary. We are born with you with a certain set of antibodies, genetically laid down in us. For example, American Indians are much less susceptible to syphilis than Europeans. Acquired or adaptive. It is formed under the influence of the external environment. That is, any infection leads to the development of antibodies in the body, which immediately become involved in the struggle when they meet again with this pathogen. Vaccination is a particular case of acquired immunity.

Active and passive: active - the production of antibodies as a result of external influences. Post-infectious and post-vaccination immunity is always active. Passive - the introduction of antibodies from the outside. For example, serum containing donor antibodies. The composition of mother's milk includes antibodies that protect the baby, and this is also a passive immunity.

Specific and nonspecific: nonspecific - a complex of mechanisms aimed at protecting against any external intrusion. Example: saliva and tears contain antibacterial substances; interferon is present in the blood, which fights any viral particles that enter the body. Specific - antibodies against a very specific pathogen, some for influenza, others for plague, others for whooping cough, etc [4,6,23]. It is a great misconception that the immune system fights only against microorganisms or viruses. It also protects us from cancer cells, which are defined as "alien" and are eliminated by specific and nonspecific mechanisms. Therefore, one of the theories of the origin of cancer associates this disease with a malfunction in the immune system. There are several factors that negatively affect the immune system. Stress and negative emotions (fear, anger, jealousy, anxiety, disappointment, regret, concern), generated by the unsuccessful attempts of many people to meet the requirements of life, cause disastrous experiences. They give rise not only to neuroses, but also to many other diseases. Stress and negative emotions lead to an increase in blood levels of cortisol, a hormone that is a poison for immune cells [12,15]. The lack of sleep has the same effect on the immune blood cells. With a reduction in the time of sleep, the number of cells that defeat a viral infection is reduced by a third [7]. Unfavorable ecology. The human environment is ubiquitously contaminated with various

carcinogens (radioactive radiation, chemical and others). An unfavorable environment, constantly affecting the body, even in permissible concentrations, leads to “overwork” of internal organs and systems, including a decrease in immunity. So, the number of people suffering from various types of allergies at the beginning of the century was counted in units, and now more than 50% of the population suffer from it. Bad habits further worsen the air environment. Not only active, but also passive smoking contributes to the spread of infection. Sun rays. Ultraviolet rays, if exposed for too long, destroy the skin’s immune cells. Physical stress (work, sports), leading to overwork, reduces immunity. It is no coincidence that all peoples have at least one day of rest per week. A, if a person, in addition to five working days, still works on weekends (for example, at work), then the overload is inevitable. Temperature load (overcooling, overheating), leading to overwork, also reduces immunity [4]. Nutrition is, perhaps, the most important factor affecting the immune system. With a lack of food, it ceases to fulfill its protective function, the body easily, without a fight, becomes a victim of various infections. This circumstance should be borne in mind by those who often use a diet with limited calorie content. The defenders of our health - immune cells - need vitamins A, C, E and B, as well as trace elements such as selenium, zinc, iron. Their deficiency slows down the division of these cells, reduces their activity. All the necessary substances are contained in ordinary food. Self-disposal.

- Alcohol with frequent use suppresses the activity of T-lymphocytes - cells that play an important role in the destruction of pathogens.
- Some medications (antibiotics, cortisone and pain relievers) reduce the mobility of immune cells, their aggressiveness towards pathogens, and the ability to produce antibodies [6]. Signs of weakened immunity The line between reduced and normal immune function is very thin and it is impossible to determine it independently. Therefore, you should contact a doctor, an immunologist, an allergist, who will assign an immunological laboratory study to clarify the presence of immunodeficiency. Indirect signs of its decline can be:
 - Frequent colds, viral infections more than 5 times a year (this is normal for preschoolers, not for older children and adults, see the difference between influenza and SARS and how to treat a cold in a child).
 - Increased fatigue, general weakness, headaches, blue under the eyes, pallor of the skin. However, such symptoms can be present in case of blood diseases, therefore, in case of such symptoms, one should consult a doctor.
 - Drowsiness, insomnia (see how to fall asleep quickly).
 - Enlargement of the spleen, painless enlargement of the cervical and axillary lymph nodes.
 - Brittle nails, dull split hair (see causes of hair loss)
 - Dryness and flaking of the skin (see treatment of cracked hands).
 - Allergy - a sign of a failure in immunity (food allergies, allergies to the sun, cold allergies, allergic cough, allergic rhinitis).
 - Intestinal dysbiosis, which can be manifested by decreased appetite, flatulence, impaired stool, weight loss [7,18].

Despite the fact that today in every pharmacy you can find a lot of drugs to increase immunity, natural medicine recipes and herbal medicines are still very popular. Moreover, many scientific laboratories, which are engaged in the search for substances that strengthen the immune system, find inspiration in natural resources, isolating and studying the active components of plants. Physiologically active substances inside plants, due to their complex, delicately balanced composition by nature itself, cause complex changes in the function of the immune system. These changes, including selective stimulation of the lagging links of the immunological response and the same

selective suppression of overly active links, are called immunomodulation. Accordingly, the plants used for this purpose are called immunomodulators. Many known plants belong to the group of immunomodulators. Significant advances in the treatment of HAP in recent years are associated with the use of phytopreparations and alternative therapy, which significantly improve the survival rate and life prognosis of patients with cor pulmonale [3].

However, not all the effects of glycyrrhizic acid have been sufficiently studied. The plant world is rich in medicinal plants, among them you can distinguish naked licorice. Licorice naked has been used for a long time for diseases of the bronchocellular system in the practice of oriental medicine. Avicenna very often mentioned licorice in his "Canons" as a means of "facilitating the work of the bronchi and lungs, removing all kinds of fluids" [7].

Glycyrrhizic acid (HA) from the composition of naked licorice can have several beneficial effects at once. First of all, of course, we are talking about the presence of anti-inflammatory effects. In addition, drugs containing this substance have antiviral, antipruritic and immunostimulating effects. Antiviral action is carried out mainly against the following pathogens: human papilloma virus and some others [2,6,8]. The antiviral effect is based on the ability of glycyrrhizic acid to interrupt the reactions of viral DNA synthesis at various stages of this process. As a result, the assembly processes of viral particles cannot reach the stage of complete completion, and this means that the causative agent of the disease will be deprived of the opportunity to multiply. In addition, glycyrrhizic acid blocks the processes of interaction between the virus and the target cell, which greatly complicates the penetration of the pathogen, where it can have its harmful effect. In addition to the above, it should be noted the ability of glycyrrhizic acid to enhance the reactions responsible for the processes of biosynthesis of interferons. These substances significantly reduce the susceptibility of healthy cells to viral particles, which inhibits the spread of pathology. All of the above effects are manifested even with the use of drugs in non-toxic dosages, which means that the risk of developing unwanted consequences of antiviral therapy is minimized [1,2].

Glycyrrhizic acid preparations are highly active against the pathogens mentioned above. Unlike many other representatives of the group of antiviral drugs, addiction rarely develops to such drugs, even despite constant mutations of the causative agents of the disease. Glycyrrhizic acid is a stimulant of nonspecific immunity. When exposed to this substance phagocytic reactions are activated, which are responsible for the capture and destruction of foreign agents [1,10].

On the basis of the extract of licorice - glycyrrhizic acid, a number of expectorants have been created. However, due to the emergence of powerful expectorants, its use has receded into the background.

Celandine Big, elecampane tall, field clover (red), representatives of the stonecrop family [2]. Plants, called adaptogens, have an immunomodulatory effect. This category includes many representatives of the Araliaceae family (Eleutherococcus, Aralia), Chinese magnolia vine, Rhodiola rosea, licorice and some others. With weakened immunity, stimulation is required. For this purpose, use means -immunostimulants, for example, aloe-agave [3].

With the advent of biologically active food additives on the Russian market, immunomodulatory plants have become known that grow in South America, Southeast Asia and other regions of the Earth. Examples: gotu kola (Gotu cola), cat's claw - wiltsazora (*Uncaria tomentosa*). Immunomodulating plants can only increase humoral immunity [24].

Preparations for enhancing immunity

Medicines that have a stimulating effect on immunity can be classified both by origin and by the mechanism of influence.

Herbal preparations

Echinacea

- This is the name of a whole clan from the Astrov family. This genus contains 10 species, of which Echinacea Purpurea is the most popular as a medicinal raw material. For medicinal purposes, all parts of the plant are used: stems, leaves, roots, flower baskets. Echinacea contains a large amount of vitamins and essential oils, has a direct antimicrobial and antiviral effect, and also stimulates cellular immunity (increases the number of leukocytes in the blood). The most popular drug containing echinacea is immunal [12].
- Echinacea purpurea is used: - for infectious and septic diseases, outwardly - for carbuncles, abscesses, infected wounds, burns of I-III degree (as an anesthetic) and severe bedsores:
 - Echinacea preparations are used with a prophylactic purpose at the first signs of a cold, with prolonged use of antibiotics, recovery of persons who have undergone exposure to radiation or living in areas unfavorable for radiation levels; - the anti-inflammatory effect of biologically active substances of echinacea is combined with its immunomodulatory properties and is used in pulmonary practice: regular prophylactic intake for 40-50 days allows you to almost 2 times reduce the likelihood of respiratory tract infection, and in case of infection, the disease occurs in a milder form;
 - Echinacea preparations are used in allergological practice, which is determined by their immunomodulatory, anti-inflammatory and antioxidant properties;
 - Echinacea preparations have a therapeutic effect in various pathological conditions by increasing the natural protective forces of the body.
- As a result of pharmacological studies, the stimulating effect of echinacea on the immune system has been shown. This effect is manifested not only in adults, but also in children with an unsettled immune system, as well as in elderly people, in whom the functions of this system are reduced due to general aging of the body [29].
- *Eleutherococcus* is a genus of thorny shrubs and trees from the Araliiev family, which includes 30 species. Its roots and rhizomes are considered medicinal raw materials. It is used as an extract. Contains a mass of useful substances with anti-stress action. It also contains caffeine, so it invigorates and increases performance. It was included in the composition of the drink under the name "Baikal", which was also called "Soviet Coca-Cola" [13].
- Ginseng - Whole volumes have been written about its beneficial properties, so I will not repeat myself, I will only point out that the composition of this root is similar to the composition of *Eleutherococcus*, therefore, almost everything that is written on ginseng is fair for *Eleutherococcus*. And do not forget about caffeine, which can cause an overdose, addiction and can be dangerous in case of hypertension and heart disease [7,14].
- Chinese schisandra is a perennial flowering plant. Fruits are used for food, tea can be brewed from the leaves. Contains a huge amount of Vitamin C, and also has a powerful psychostimulating effect, increases performance and resistance to stress, in case of an overdose, causes insomnia. Also, as with ginseng, it is necessary to take "hypertensive patients" and "cores" with caution.
- Bacterial preparations - a group of drugs containing components of the bacterial cell. Bacterial proteins entering the body do not cause a disease, but an immune response to a given microorganism, therefore, when it encounters a real microbe, the immune system will already be "armed" with antibodies. The action of drugs from this group is similar to vaccines [6,25]:

- Ribomunil, imudon, irl-19, lycopid, etc. - contains the components of bacteria most common in infections of the upper respiratory tract and ENT organs.
- Uro-vax - lysate of Escherichia coli bacteria, is used for chronic urinary tract infections caused by this microbe.

Interferon preparations are drugs with antiviral activity, divided into two large subgroups. Human interferon.

In fact, there are about 20 interferons in our body, divided into 3 subgroups (alpha, beta and gamma). Pharmaceutical companies can produce them both separately and in the form of mixed mixtures: laferon, viferon, velferon, gripferon, etc. Produced from donated blood or using genetic engineering. Stimulants of endogenous interferon production - a group of drugs in the fight against viral infections, especially influenza: anaferon, arbidol, amiksin, kagocel, etc [5].

Nucleic acid preparations are stimulators of cellular and, to a lesser extent, humoral immunity, the mechanism of action of which has not been fully understood. They are mainly used for bacterial infections (including tuberculosis), to enhance the effectiveness of vaccines: sodium nucleinate, derinat. Also, these drugs have a pronounced wound healing effect, which makes them very useful for purulent wounds and extensive burns. Some drugs of this group are used as stimulants of interferon production in viral infections - ridostin [7].

Thymus preparations or other name immunoregulatory peptides: thymalin, thymosin, thymactide, thymogen, etc. The very old group of immunomodulators, known since the 1970s. They are extracts of the thymus gland of animals. They stimulate individual links of immunity, but are effective only in immunodeficiency states caused mainly by chronic infections: tuberculosis, trophic ulcers, etc [22,30].

Biogenic stimulants

This is a group of immunostimulants, the source for which are animals or plant tissues: aloe extract, Actovegin, FiBS, humisol, biosed. The mechanism of action has not been fully understood, therefore, medical literature, which has not been abused by pharmaceutical cartels, is full of skepticism about the effectiveness of this group of drugs [8].

A fairly new drug Polyoxidonium, which is now actively used, in addition to immunostimulating, antioxidant, detoxifying and membrane stabilizing effects, has the properties of a hepatoprotector (review of tablets for the liver) - hepatoprotectors. To increase its bioavailability, a drug has been created - longidase (a combination of lidase and polyoxidonium) [9].

Vitamins

They normalize metabolic processes in the body, including restoring the functioning of the immune system. But it is best to use natural products containing vitamins - fruits, vegetables, cereals, nuts, sea fish, etc. vitamins). Moreover, studies by doctors at the University of Washington led to terrible results. For many years they have studied the evolution of the state of health of 78,000 people 50-76 years old and came to a startling conclusion. The increased use of vitamins C and E at the same time is extremely dangerous, since it leads to a significant increase in the risk of developing lung cancer. Finnish scientists have come to the conclusion that the combination of E and C vitamins provokes the onset of tuberculosis. You should be aware that there are many multivitamin complexes on the Russian market, the content of vitamin E in which is very high, moreover, often vitamin complexes cause allergic reactions. Therefore, their use should be treated with caution, as with any drugs, drink vitamins only in a strict course of indications and appointment of a doctor, give preference to 1-2 component preparations (it is better to make sure that there is a lack of one or another vitamins in blood) [4, 17-19]. Transfer-factor. In the early 50s of the last century, special proteins were discovered that transmit information from one immune cell to another, providing a link between cellular and humoral immunity. The combination of these proteins was called the transfer factor. In the 80s of the 20th century, Life Research was able to develop a technology for extracting the transfer factor from cow colostrum and chicken yolks. It

was found that the transfer factors of cows are identical to human ones, as a result of which the idea was born to stimulate the production of antibodies in our body with their help. For more than 30 years Life Research has been selling the transfer factor as a BAA all over the world. The manufacturer claims that their product has no contraindications and side effects, so it can be used even for pregnant and nursing infants. Doubts are raised by the fact that for all these years Life Research has not been able to register the transfer factor as a drug. It is believed that they do not have sufficiently convincing data on the clinical efficacy of the manufactured product [17]. Medicines and preparations. 'Immunal' is produced in Slovenia; (Immunal) - 100 ml of a 20% solution of ethanol contains 80 ml of juice of flowering echinacea purpurea in 50 ml bottles. It is used to increase nonspecific immunity in case of recurrent colds, to prevent colds and flu, to prevent immunodeficiency with prolonged antibiotic therapy. Drink Immun-Guard is a source of sambunigrin glycoside, echinacoside and vitamin C. It has antipyretic, diaphoretic, diuretic, anti-inflammatory, expectorant, and sedative effect. It is used for colds, flu, bronchitis, pneumonia, dry cough, edema [7].

Our domestic medicine produces a natural immunostimulant called ImmuHelp. Immuhelp has a complex effect on the immune system and has an original combination of herbal components. One capsule of Immuhelp contains: golden root, wild rose, valerian, marsh air, scarlet, elecampane, anise, carnation, mint, oregano. The drug is intended to maintain the function of the immune system and restore normal physiological functions of the body in asthenic conditions and also after prolonged bed rest. As an immunostimulating agent, Immuhelp is prescribed: Children 1 capsule 3 times a day 5 - 10 minutes before meals, adults 1 - 2 capsules 3 times a day 5 - 10 minutes before meals. The course of treatment is 15 days. In scientific research [3,4,5] examples are given: the prescription of antibiotics is inadequate: the use of two or more antibiotics in the absence of a pronounced clinic of inflammation. Surgical treatment was carried out in 70% of cases: plastic fistula (7.7%); radical sinusitis (83%); cystohaymorotomy (8.2%). Among the operated patients with acute sinusitis made up 1.8% of all examined and about 44% in this group. With ACHOG, 31% of all patients and 57% with a diagnosis of ACHD were operated on. Conservative treatment was carried out in 35 (2.4%) patients with chronic odontogenic sinusitis, 12 (0.8%) patients with a foreign body in the maxillary sinus.

Conclusion

Thus, the problem of prevention, diagnosis (including differential) and treatment of odontogenic sinusitis is an urgent task of dentistry. Among the causes of the development of the disease, a significant part is made up of pathological processes, the development of which was facilitated by inadequate medical tactics in the treatment of chronic inflammatory processes in the upper jaw molars.

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Volume 12 Issue 2 February 2022

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