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ISSUES OF VACCINATION AND IMMUNOPROPHYLAXIS. FEATURES OF ITS IMPLEMENTATION IN ATHLETES DURING THE COVID-19 PANDEMIC

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ABSTRACT: *This article provides data on the problems of vaccination and immunoprophylaxis during the Covid-19 pandemic. The main changes concerning the body as a whole, as well as the immune system, are summarized. The problems of vaccination among the sports continent with a detailed algorithm are also considered.*

KEYWORDS: *coronavirus, Covid-19, vaccine, vaccination, immune system, immunoprophylaxis, athletes.*

COVID-19, or coronavirus, has radically changed the lives of people around the world, which also could not but affect the sports contingent. Despite the efforts being made to combat COVID-19, its effects may remain for many years or even decades. A clear example of the changes in life after the pandemic was the increase in the number of people working at home, online training, online training of athletes, and the use of social networks were actively introduced. In addition, the pandemic contributed to an increase in the frequency of various hidden types of disorders and other anxiety conditions.[2,4] All this dictates an increase in the activity of research to solve the problems of vaccination and vaccination prevention, which is especially relevant for athletes, given the specifics of their occupation.

If we turn to the history of vaccination and immunoprophylactic has a fairly long historical path, when the first reports of improvements in clinical conditions in patients, for example, when vaccinating children against measles, mumps, appeared.[3] There was a significant decrease in the number of cases, during immunization (vaccination), the disease proceeded with unexpressed clinical manifestations and regressed significantly and faster, while the clinical manifestations of the disease were not so pronounced in comparison with those who were not vaccinated.

According to the definition given by the World Health Organization (WHO), "vaccination is a simple, safe and effective way to protect against diseases before a person comes into contact with their pathogens. Vaccination activates the body's natural defense mechanisms to form resistance to a number of infectious diseases and makes the immune system stronger".[5]

However, it should be noted that in the light of recent literature data, there is a scientific consensus that vaccination is a fairly safe and effective way to combat infectious diseases and their destruction.[6] Limitations of its effectiveness, however, exist. Sometimes the protection does not work, due to the lack of response of the host's immune system, or not an adequate reaction. This may be due to the presence of clinical factors such as diabetes, steroid use, concomitant infection, or age-related characteristics.[7] This may also be due to genetic reasons, for example, if there are no B cell strains in the host's immune system that can generate antibodies suitable for effective reaction and binding to pathogen-related antigens.

Vaccination is the most effective method of preventing infectious diseases. Widespread immunity due to vaccination is largely responsible for the worldwide eradication of smallpox and the limitation of diseases such as polio, measles and tetanus in most countries of the world.[8]

The emergence of the New Coronavirus 2 (SARS-CoV-2), its widespread spread around the world, has set a global task for the health system in terms of strengthening preventive measures, as well as developing vaccines to reduce the incidence and prevent further spread.

Immunoprophylactic and vaccination are one of the effective ways to combat this disease, which has quite serious complications and manifestations. Activation of the immune system begins with an immune response to the introduction of the virus, as a result of which innate immunity and an antigen-specific reaction of bone marrow cells (B-cells) and thymus cells (T-cells) are activated.

Vaccination is the safest and most effective way to prevent infectious and viral diseases. The effectiveness and epidemiological effect of vaccination of the population against various diseases (influenza, respiratory infections) have been proven more than 30 years ago. Due to the development of immunology as a science, new methods of studying the effects of vaccines on the body of vaccinated patients have become available, which allowed us to approach the disclosure of immune mechanisms and the effects of vaccines in the post-vaccination period.

According to the latest data, vaccines can be considered not only as drugs capable of forming protection and immunity to invasive and non-invasive forms of the disease, but also capable of activating innate and adaptive mechanisms of the immune system. This allows us to conclude that the vaccine preparation in the early stages of the post-vaccination period is an immunotropic agent.

Modern vaccines created against respiratory infections with improved production technology contain adjuvants or conjugates in their composition, which, when introduced into the body of patients, work as immunotropic drugs, showing at the beginning a non-specific transient effect with a subsequent protective effect to the available pathogenetic agents. It should be noted that the duration of preservation of cellular memory has not been determined, but it is obvious that the activation or reactivation of the molecular cellular mechanisms of the immune system of the body in contact with a foreign antigen is of priority importance, since the outcome of the disease depends on its functional activity.

In the sports world, COVID-19 significantly restricted sports activities, which contributed to the postponement or cancellation of a large number of national and international competitions. This led to the fact that the issues of vaccination against the new virus among elite athletes became relevant. Sports doctors faced a number of problems, including the effects of exercise on the effectiveness of vaccines, possible side effects, and the selection of the most appropriate vaccine.

Studies conducted in the population have shown an increase in the effectiveness of vaccines with an increased antibody titer in individuals who performed moderate-intensity physical exercises before vaccination, however, the evidence is not final and requires a search and study of the mechanisms of the immune response after vaccination of athletes.

Given the emergence of new vaccines against COVID-19, questions have arisen about choosing the most preferred vaccine for athletes. The main thing in choosing a vaccine is its availability, the presence of special requirements for storage and transportation, for example, among elite athletes who are preparing to participate in major competitions, have carefully regulated and pre-planned training schedules, while any breaks in training associated with vaccination processes can have a negative impact on the athletes' body, causing various acute symptoms of the disease, as well as post-vaccination reactions.

This leads to the fact that vaccination in athletes is always critical, especially if the vaccine is re-administered after 3-4 weeks, when severe side effects occur. In this regard, sports doctors should be aware of factors specific to athletes, such as vaccination planning in the context of peak training, or during periods of reduced workload before large-scale competitions.

Based on the above, the Republican Scientific and Practical Center for Sports Medicine has developed organizational bases for conducting vaccination (COVID-19) among the sports contingent, taking into account temporary recommendations based on the version of the 8th revision of the Ministry of Health of the Republic of Uzbekistan.

Organization and implementation of vaccination against COVID-19 of the sports contingent.

Vaccination against COVID-19 of the sports contingent for epidemic indications is carried out in the RNCSM, if the organization has a license providing for the performance of works (services) for "vaccination (preventive vaccinations)".

The organization and implementation of vaccination against COVID-19 of the sports contingent is provided by a formed working group of RNCSM employees. Vaccination against COVID-19 is carried out by medical workers who have been trained on the use of immunobiological drugs for the immunoprophylaxis of infectious diseases, the organization of vaccination, vaccination techniques, as well as on the provision of medical care in an emergency or urgent form, the rules of compliance with the "cold chain".

To implement vaccination measures in the RNPCSM, by order of the director of the center, responsible persons for vaccination were appointed, with the development and approval of standard operating procedures, algorithms, vaccination schedule (taking into account the storage time of the defrosted vaccine), routing schemes, action plans for the implementation of the "cold chain" during vaccine storage, in particular including a plan of emergency measures in case of emergency situations.

Vaccination against COVID-19 of the sports contingent was carried out with the "Gam-COVID-Vac" vaccine (hereinafter referred to as the vaccine), according to the instructions for use, to citizens who do not have medical contraindications, registered in accordance with the generally accepted rules for registration of Pharmaceuticals, vaccines and serums in Pharmaceutical Committee of the Republic of Uzbekistan.[1]

Contraindications for the introduction of component II:
- severe post-vaccination complications (anaphylactic shock, severe generalized allergic reactions, convulsive syndrome, temperatures above 40°C, etc.) for the introduction of component I of the vaccine.

It was used with caution in: chronic liver and kidney diseases, endocrine diseases (severe thyroid dysfunction and diabetes mellitus in the decompensation stage), severe diseases of the hematopoietic system, epilepsy and other CNS diseases, acute coronary syndrome and acute cerebral circulatory disorders, myocarditis, endocarditis, pericarditis.

Due to the lack of information, vaccination may pose a risk for the following groups of patients:
- with autoimmune diseases (stimulation of the immune system can lead to an exacerbation of the disease, especially it is necessary to treat with caution patients with autoimmune pathology, which tends to develop severe and life-threatening conditions);
- with malignant neoplasms.

Special instructions: patients receiving immunosuppressive therapy and patients with immunodeficiency may not develop a sufficient immune response. Therefore, taking drugs that inhibit the function of the immune system is contraindicated for at least 1 month before and after vaccination due to the risk of decreased immunogenicity.

The decision on vaccination should be based on an assessment of the benefit-risk ratio in each specific situation.

The vaccine "Gam-COVID-Vac" was obtained biotechnologically, in which the SARS-CoV-2 virus pathogenic to humans is not used. The drug consists of two components: component I and component II. Component I includes a recombinant adenovirus vector based on human adenovirus 26 serotype, carrying the SARS-CoV-2 virus protein S gene, component II includes a vector based on human adenovirus 5 serotype, carrying the SARS-CoV-2 virus protein S gene. The adenovirus vector is a genetically modified adenovirus. The vaccine induces the formation of humoral and cellular immunity against coronavirus infection caused by the SARS-CoV-2 virus. Vaccination is carried out in 2 stages with an interval of 21 days.

It is necessary to adhere to all strict rules, especially clearly indicated in the methodological manuals.

Vaccination against COVID-19 of the sports contingent is carried out according to the requirements of the SanPiN No.02-39-07 Supplement No.3 of 2015 and the Order of the Ministry of Health of the Republic of Uzbekistan No. 31 of 02/15/2021. "On the preparation and conduct of mass vaccination against coronavirus infection" in the vaccination offices of medical organizations, in compliance with the cleaning, ventilation, disinfection regime. In the vaccination office, it is necessary to have written instructions on the procedure for cleaning and disinfection of premises [9]. Before vaccination against COVID-19, the person to be vaccinated or his legal representative is explained by medical professionals the need for vaccination, possible post-vaccination reactions and complications, as well as the consequences of refusing vaccination; an athlete's questionnaire is issued to fill out; information material and informed voluntary consent to medical intervention.

After vaccination on the first or second day, short–term general (short-term flu-like syndrome characterized by chills, fever, arthralgia, myalgia, asthenia, general malaise, headache) and local (soreness at the injection site, hyperemia, swelling) reactions may develop and resolve over the next three days. Nausea, dyspepsia, decreased appetite, and sometimes an increase in regional lymph nodes are less common. Allergic reactions may develop.

It is recommended not to wet the injection site within 3 days after vaccination, do not visit the sauna, bath, do not take alcohol, avoid excessive physical exertion.

In case of redness, swelling, soreness of the vaccination site, take antihistamines. With an increase in body temperature after vaccination – non-steroidal anti-inflammatory drugs.

If the condition worsens after 3 days, immediately inform the district doctor at the polyclinic at the place of residence. In case of life–threatening symptoms - call an ambulance.

The results of the examination of the athlete, as well as permission to administer the vaccine or withdrawal from vaccination due to the presence of contraindications for vaccination should be recorded by the doctor in the medical documentation.

Vaccination against COVID-19 is carried out by medical staff of the center, trained in the rules of organization and technique of vaccinations, as well as emergency care in case of post-vaccination complications.

In order to ensure proper storage temperature (not lower than 18°C) in a medical organization, it is necessary to have serviceable freezing equipment containing a stock of MIBP, as well as the necessary number of thermal containers and refrigerating elements to them for the departure of mobile medical teams and in case of emergencies related to the failure of freezing equipment, in case of power supply violations.

Before vaccination, the vial with component I or II must be removed from the freezer and kept at room temperature until it is completely defrosted. After defrosting, it is allowed to store an opened 3.0 ml bottle

for no more than two hours at room temperature. Storage of the defrosted preparation in 0.5 ml vials is not allowed. It is not allowed: the presence of ice residues in the bottle, repeated freezing of the bottle with the solution and shaking the bottle!

A sterile syringe with a sterile needle is used to take each dose of the vaccine from a multi-dose vial. It is forbidden to leave the needle in the bottle cap for taking subsequent doses of the vaccine. The vaccine is injected intramuscularly into the deltoid muscle (the upper third of the outer surface of the shoulder), if it is impossible to inject into the deltoid muscle, the drug is injected into the lateral broad thigh muscle. Intravenous administration of the drug is strictly prohibited.

After vaccination, the packages from the used vaccines are stored and at the end of the working day are transferred to the responsible employee for removal from the monitoring the movement of medicines.

The Sputnik vaccine is registered under a special registration procedure, in connection with which it is necessary to notify the Ministry of Health and the Office of Sanitary and Epidemiological Supervision of the Republic of Uzbekistan about each fact of the use of the drug by transmitting information and entering it in the registration log.

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