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"EFFECTS OF COVID-19 ON SKIN CONDITION"

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SUMMARY

This article provides general information about skin lesions in COVID-19, provides detailed information about the elements of the rash, stages of severity and course. Examples of skin changes during coronavirus infection are given, the most common dermatoses are divided into groups. A skin rash in the presence of this infection can appear in people of any age, and moreover, it can worsen and complicate the course of the primary skin process.

Key words: COVID-19, rash, clinic, course, skin process. An increased background radiation, climate warming, environmental changes, an increase in population density, high migration activity of the population and other factors provoke the emergence and spread of new infections around the world.

The emergence in December 2019 of diseases caused by the new coronavirus has already gone down in history as an emergency of international importance. 02/11/2020 The World Health Organization has officially named the SARS-CoV-2 virus and the disease that is caused by this virus "COVID-19". 03/11/2020 The world organization declared the outbreak of coronavirus a pandemic (epidemic) [1, 2].

Coronaviruses are enveloped viruses with single-stranded "+" RNA, with genome sizes ranging from 25 to 32 thousand nucleotides, causing respiratory and intestinal diseases in animals and humans.

Currently, information on the epidemiology, clinical features, prevention and treatment of the new coronavirus infection caused by the SARS-CoV-2 virus (COVID-19) is constantly being supplemented and updated.

It is known that the most common clinical manifestation of a new infection is pneumonia, as well as respiratory distress syndrome in a significant part of patients. The defeat of the gastrointestinal tract and liver is detected in more than half of patients with COVID-19. In this case, the disease can begin with gastroenterological manifestations, which are subsequently joined by respiratory symptoms. The presence of lesions of the gastrointestinal tract and liver in patients with COVID-19 worsens the prognosis of the disease and increases the risk of mortality. In addition to respiratory failure, symptoms of COVID-19 are disruption of the central nervous system, cardiovascular system, disruption of the intestines, kidneys and other internal organs. Although COVID-19 is not a skin disease, it has a profound effect on dermatological manifestations (2,3). In the case of coronavirus infection, overexpression of pro-

inflammatory cytokines (low-molecular information soluble proteins that provide signaling between cells) can be observed, which leads to an imbalance in the inflammatory response, and this, in turn, can provoke the development of certain skin rashes [3].

For the current period, there are clinical observations describing skin lesions in the new coronavirus infection COVID-19. One of the first descriptions of skin manifestations in COVID-19 was published by the Italian dermatologist Recalcati S. (2020), who cited data on possible types of skin lesions as a variant of the manifestation of a new coronavirus infection COVID-19. While there is no final summarized data on the dermatological manifestations of COVID-19 from around the world, there is information from China, Spain, England and the United States. In these countries, studies were carried out on the basis of national medical centers that treated patients with coronavirus - in total, doctors described more than 350 cases of COVID-19 with skin symptoms [4, 6].

Symptoms of a new coronavirus infection can occur in almost the entire body, including the skin. Skin symptoms in people with coronavirus appear in different ways. Some point to a milder course of COVID-19, while others serve as a marker for a severe variant of the disease. Knowing the skin manifestations in COVID-19 will help diagnose the infection earlier and correctly assess the risks of each patient [5].

The skin best of all reflects the state of processes occurring in the human body, and is a kind of indicator of the state of the body. In many diseases of the internal organs, there are characteristic skin manifestations. A rash can be a symptom of infection with viruses, fungi, bacteria and allergies. Some types of skin rashes are

nonspecific and can appear for a variety of reasons. Only a specialist can accurately diagnose by taking anamnesis and conducting the necessary laboratory and instrumental studies.

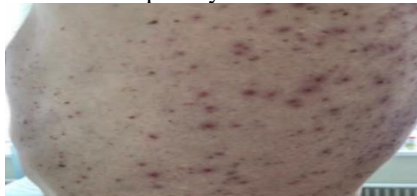
Many viral infections have some kind of skin manifestations, for example, measles, chickenpox, and others. As a rule, they do not require any additional therapy, i.e. symptoms disappear by themselves. The coronavirus is no exception. The latest data show that the coronavirus on human skin is manifested by rashes, redness, pseudo-frostbite. A rash on the skin with this infection can appear in people of any age, but more often young patients face a similar phenomenon [6].

Thanks to Olga Zhukova, Associate Professor of the Department of Skin and Venereal Diseases of the Faculty of Advanced Training of Medical Workers of the RUDN University, the main types of skin rashes in coronavirus have been identified [7]:

angiitis of the skin - inflammation of the walls of blood vessels, manifested in the form of blisters, as well as inflammatory nodules, plaques and hemorrhagic spots of various sizes, caused directly by coronavirus infection, against which the walls of small vessels of the dermis are damaged by immune complexes circulating in the blood.



papulo-vesicular rashes - as a rule, they cover the whole body and are accompanied by vivid clinical manifestations of the disease. Most of all, they look like a rash that occurs with chickenpox. However, in the case of coronavirus, the rash will not be so voluminous, they are more like prickly heat.



psoriasis - papulo-squamous rash and pink lichen. They are the same inflammatory skin diseases that result in pink papules and plaques that are completely covered with scales. The clinical feature of lichen rosacea in coronavirus infection is the absence of a "maternal" plaque - the largest element that appears first in the classical course of dermatosis.



measles rash



toxidermia - they are not directly related to coronavirus infection, but result from drug intolerance.



urticaria - often it is she who first signals a person about the presence of coronavirus in the body.



trophic changes in facial tissues - they arise as a result of the use of a ventilator in the therapy of patients lying on their stomach for a long time.



Despite such a variety of clinical manifestations, it is still impossible to assert that they are caused by the pathogen Sars-CoV-2, and not concomitant diseases, further research is needed. Skin manifestations can also be associated with the use of drugs for the treatment of coronavirus. In such cases, it is necessary to determine which drug this reaction has occurred and cancel it. With these skin manifestations, the dermatologist must carefully take an anamnesis and suspect that the patient has a coronavirus infection, especially if there are or have been symptoms of SARS. Фото: ИЗВЯ/Павел Бедняков

Skin symptoms can be used to diagnose disease stage. Some scientists have already suggested assessing the viral load and correlating this with the appearance of dermatological symptoms, since they note more serious skin manifestations in severe cases of coronavirus infection. Previously, Spanish experts described such a specific skin symptom as "covid fingers". As Russian dermatologists said, outwardly this pathology may resemble mechanical injury or frostbite. At the same time, patients deny the possibility of such damage. Most likely, this is a special form of skin angiitis, which most often has an infectious and allergic origin and is one of the signs of COVID-19 infection [7].

With this pathology, the following elements of the rash are revealed:

- Irregular frostbite-like spots on the hands and feet, sometimes painful and itchy. They are mainly found in young patients with mild disease, appear in advanced stages and last about 12 days. Seen in 19% of cases.

- Focal eruptions in the form of small blisters, which can cause itching, are noted on the torso and upper and lower extremities. They occur before any other symptoms appear and are noted in 9% of cases in middle-aged patients; persist for 10 days.

- Maculopapular rashes, white or pink in color, often itchy. Marked in 19% of cases, mainly on the trunk, but also on the palms (inner side of the hand).

- The appearance on the skin of a vascular red-blue mesh (Livedo) or signs of skin necrosis was noted in 6% of patients, mainly of elderly age, with a severe course of the disease.

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At the same time, experts note that the rash can have various origins and it is difficult to classify it without the appropriate experience and knowledge. Now there is a special online register for the dermatology of the new coronavirus, where all countries can share the recorded cases of skin manifestations of COVID-19. Its main goal is to quickly and efficiently collect medical information that will help in the treatment of the disease.

After analyzing patients with cutaneous manifestations in COVID-19, the researchers identified the following severity [7]:

Easy form

- Rashes on fingers and toes, similar to frostbite, can appear with a mild course of coronavirus in children or young people. The average age of patients with rashes of the type of frostbite is 14 years. Doctors found this manifestation in 25 patients in Spain and 11 children in northern Italy. They had no symptoms typical of coronavirus, no objective reasons for frostbite, and the test result for COVID-19 was positive.

- With a rash of the type of frostbite, spots of bright red color with a pink-purple tint appear above the skin surface. The affected areas, as a rule, are located asymmetrically, and after recovery, the symptoms disappear without any treatment, leaving no scars.

- A rash with petechiae, small punctate hemorrhages, as with a purple rash, did not affect the skin of the palms and feet, and there was no manifestation on the oral mucosa. Such a symptom does not always indicate a coronavirus; it can also be caused by other infectious diseases or a reaction to medications. Biochemical blood tests and virological research will help to distinguish them.

- Of 27 children with a mild form of the disease, two developed a ring lesion resembling erythema multiforme. In this case, the rounded spots have a red center with a vesicle, resembling a target. These rashes can be grouped together. This symptomatology is typical for herpes simplex, but none of the patients

suffered from it. In such lesions, there are three color zones: a dark center with a blister or crust, a pale pink raised surface due to edema, and a bright red outer ring. Targetoid lesions appear anywhere on the body, including mucous membranes such as lips.

Skin manifestations during the COVID-19 pandemic are gaining increasing attention as they can be useful for early diagnosis, especially in children and the elderly.

Medium form

The rash resembling chickenpox, the researchers associate with the intermediate severity of the course of the coronavirus. Most often, this symptom manifests itself in middle-aged patients. As with chickenpox, the rash consists of small, uniform blisters that are strewn across the skin of the torso. But true chickenpox and similar viral exanthema appear only after contact with someone who is already infected with these infections. In the case of COVID-19, this rash lasts about ten days and disappears along with the rest of the symptoms, and sometimes even earlier.

Heavy current

- Acro-ischemia affects the tips of the fingers, the balls of the feet, or the skin of the heel area. A severe course of COVID-19 can lead to hypercoagulation - excessive blood clotting. It hardly passes through the blood vessels, especially the small ones - capillaries and venules, which leads to their damage, blood stasis and the formation of blood clots - thrombi. The most severe and difficult patients are those who, in addition to the tips of the phalanges, have a cyanotic color of the skin and mucous membranes (so-called cyanosis).

- A rash like urticaria may appear before the "classic" symptoms of coronavirus in the form of cough and fever. In children, urticaria appeared in 19% of cases of the total number of people infected with coronavirus and was associated with a more severe course of the disease than in other peers. But not every urticarial rash is a manifestation of COVID-19. In this case, the virus may be indicated by an elevated temperature, which is not typical for ordinary urticaria.

- Most often, maculopapular rash occurs in patients with the new coronavirus. It lasts about nine days from the onset and mainly affects the thighs, forearms and shoulders.

The authors classify the skin manifestations of COVID into 6 categories, of which 3 are more specific signs: vesicular eruptions (as with chickenpox), vasculopathy (transient livedo-like rashes, purpura, eruptions like lichenoid photodermatitis and contact photodermatitis) and lesions (like chills) covid fingers) and 3 - less specific signs: dermatitis, maculopapular rash and urticaria-like elements [7].

If a rash of unknown origin appears, it is necessary to consult a doctor promptly. Delay can lead not only to complications and to improper self-selection of treatment, but also to infection of family members and other contact persons.

As a preventive measure, the authors propose testing at home for COVID, to reduce visits to medical facilities by potentially infected people. At the same time, using multivariate regression analysis, it was found that age over 65 years, coronary heart disease,

cerebrovascular disease and shortness of breath were independent risk factors associated with death in COVID.

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ПОТЕНЦИРОВАНИЕ МУЛЬТИМОДАЛЬНОЙ АНЕСТЕЗИИ КВАНТОВЫМ ИЗЛУЧЕНИЕМ ПРИ ПОМОЩИ ОПТОЭЛЕКТРОННЫХ УСТРОЙСТВ

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POTENTIATION OF MULTIMODAL ANESTHESIA BY QUANTUM RADIATION USING OPTOELECTRONIC DEVICES

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SUMMARY

The purpose of the work: to develop method of potentiation of multimodal anesthesia with led radiation in 650±20 nm and blue 470±10nm range using Autonomous optoelectronic devices.

Abstract . Material and methods. Conducting contact led exposure was carried out portable semiconductor led device AFS K-630/670 in the red range with a wavelength of 470±10 nm. Multimodal anesthesia was performed on the patients abdominal profile (n=124) (78 women and 46 men) with concomitant diseases aged 52 to 93 years/ The weight of patients ranged from 64 to 131 kg/ All patients had 3 degree of anesthetic risk according to the classification of MEAR. The patients were divided into 2 groups: the main group and the control group. In the main group (n=68) 42 patients underwent planned laparoscopic cholecystectomy, 26 patients herniation with alloplasty by laparoscopic method. In the control group (n=56) 39 patients underwent laparoscopic cholecystectomy and laparoscopic alloplasty in 17 patients.

Results. It is established that the potential multimodal anesthesia portable semiconductor led apparatus ASF-to -630/670 in the red range with a wavelength of 650±20 nm and in the blue range (the control group patients consumption of fentanil made up 4,92±0,34 mg/kg/h in the main 1,23±012 mg/kg/h. The indicator of Central hemodynamics *si* in main group increased at the end of surgery from 2,28±0,43 l/min/m² to 3,29 l/min/m². (**OPSS**) DIN C. sm⁻⁵ with the initial values from 1604,2±367,3 to 1196,7±385,1 DIN. C. sm⁻⁵. In the control group *si* increased at the end of surgery from 2,28±0,43 to 3,29±0,51 l/min/m². (**OPSS**) DIN C. sm⁻⁵ increased at 1598,7,±426,5 to 1610,7±429,1 DIN C. sm⁻⁵.