ISSN 3060-4567

# CHICKENPOX IN CHILDREN

***Abdulloev Mukhriddin Ziedulloevich***

***https://orcid.org/0009-0005-2297-5516***

*Bukhara State Medical Institute named after Abu Ali ibn Sina, Uzbekistan, Bukhara, A. Navoi St. 1 Phone number: +998 (65) 223-00-50 e-mail: abdulloyev.muhriddin@bsmi.uz*

***Summary.*** *The article discusses questions of an etiopathogenesis, treatment and prevention of chicken pox which is a widespread infection in children. This article gives classical and atypical clinical manifestations and also registered complications of chicken pox.*

***Keywords:*** *with hicken pox, herpes-viral infection, virus, children*

*Chickenpox is an anthropozoonotic acute viral infection accompanied by intoxication and damage to the epithelium of the skin and mucous membranes in the form of a maculopapular -vesicular rash.*

Chickenpox was first described by the Italian physician and anatomist G. Vidus ( Vidius ) in the mid-16th century. The name varicella , distinguishing the disease from smallpox ( variola ), was introduced by the German physician O. Vogel (1772), and after the epidemic of 1868–1874, the disease began to be considered a separate nosological form. In 1911, the Brazilian physician E. Aragao discovered elementary bodies of the virus ( Aragao bodies ) in the contents of vesicles, and the virus was isolated from them in the 1940s.

The causative agent of chickenpox ( Herpes zoster ) is a DNA virus classified as human herpesvirus type 3, included in the family Herpesviridae , subfamily Alpha herpesviridae . This virus is present in large quantities in chickenpox blisters during the first 3-4 days of the disease, then its quantity rapidly decreases, and after the 7th day it cannot be detected. At present, the identity of the virus that causes shingles and the chickenpox virus has been established. The virus lives and reproduces only

ISSN 3060-4567

in the human body, it is extremely volatile (it can spread with air over distances of up to 20 meters, overcoming ventilation systems, elevator shafts and stairwells).

Chickenpox is a ubiquitous and highly contagious disease with a 100% susceptibility rate. This infection primarily affects children aged 1 to 10 years (75–85% of cases), with the peak incidence occurring at 3–4 years of age, and by the age of 15, about 80–90% of the population has had chickenpox. Before the introduction of the vaccine, about 4 million cases of the infection were registered each year. Currently, worldwide, the incidence and hospitalization rates due to chickenpox have decreased by almost 90%, which is due to the introduction of vaccination [1, 5].

The incidence among the urban population is almost 2 times higher than that among rural residents. The infection is characterized by autumn-winter seasonality, and the incidence during seasonal increases is approximately 70-80% of the total number of patients [1, 6]. The source of infection is patients with chickenpox and shingles. Patients with chickenpox become contagious at the end of the incubation period (48 hours before the rash appears) and continue to pose a danger to others until the 5th day after the last element of the rash appears. The virus is transmitted: 1) by airborne droplets - when talking, sneezing, coughing, kissing; 2) by contact - when the patient's saliva or the contents of the blisters come into contact with unaffected skin; 3) transplacentally - from a pregnant mother to the fetus, if the woman falls ill with either chickenpox or shingles during this period.

After the disease, immunity is maintained for life in 97% of the population, the remaining 3% can get sick again. People with normal immunity get chickenpox only once, since after the first case of the disease, an "immune memory" is formed in their body, which lasts for life and does not allow this disease to develop again. However, people with a severely weakened immune system can get chickenpox twice (repeatedly). The resistance of newborns to chickenpox is due to antibodies received from the mother, which circulate for up to 6 months.

After the disease, the virus can remain in the body in a latent state for life, localizing in the nerve ganglia. However, in some people it reactivates , causing the

ISSN 3060-4567

appearance of a painful rash on the skin of different areas of the body, as with chickenpox or simple herpes, which is localized along the nerve trunks (shingles). Unfortunately, the mechanisms of virus preservation and its possible subsequent activation with manifestations of the disease in the form of shingles have not been sufficiently studied.

The entry point for infection is the mucous membrane of the upper respiratory tract. Multiplying on the mucous membranes, the virus enters the blood at the end of the incubation period, causing viremia . The virus is carried throughout the body by the bloodstream, the pathogen is fixed mainly in the epithelium of the skin and mucous membranes, where, multiplying, it leads to the appearance of a rash pathognomonic of chickenpox. In the early stages, the nuclei of the affected cells contain spherical eosinophilic inclusions ( Tizzer bodies ). In the process of nuclear degeneration, these bodies enter the cytoplasm. Cellular vacuoles quickly merge with adjacent ones, forming a vesicle. Initially, the vesicle is multi-chambered and consists of small cavities separated from each other by cellular cords, which subsequently quickly rupture due to the filling of the vesicles with liquid. The Malpighian layer is mainly affected. Changes in the mucous membranes are of the same nature as in the epidermis. The rash elements on the mucous membranes in chickenpox do not leave scars, since epithelial necrosis in chickenpox usually does not penetrate deeper than the germinal layer [5].

It should be remembered that the virus is not only dermatotropic , but also neurotropic , which is manifested in its ability to cause damage to the nervous system. In rare cases, damage to internal organs (liver, kidneys, lungs, central nervous system) is observed. Generalized forms of chickenpox develop in weakened children with an altered immune state (due to long-term treatment with hormones, cytostatics , with congenital or acquired immunodeficiency, etc.).

Disturbances in cellular immune responses are of great importance in the pathogenesis of the disease. Reproduction of the virus in lymphocytes, neutrophils, monocyte-macrophages leads to immunodeficiency of the T-cell type. The mechanisms of immunosuppressive action are due to the suppression of chemotaxis

ISSN 3060-4567

and a decrease in the activity of the phagocytosis process, inhibition of the function of T-killers, natural killers (NK), the reaction of lymphocyte blast transformation, and possible direct stimulation of T-suppressors. Interferon deficiency also plays a significant role in the pathogenesis of chickenpox , which is manifested in the suppression of the interferon reaction of leukocytes, a decrease in the ability of lymphocytes to synthesize gamma interferon, and fibroblasts - beta interferon.

Against the background of suppression of the T-lymphocyte system in individuals with impaired immune status, severe forms of chickenpox develop, and with the development of anergy in patients with chickenpox, susceptibility to other infections increases.

The indicated pathogenetic and immunological features of the development and course of chickenpox must be taken into account when treating patients.

**Clinical manifestations**

During chickenpox, there are 4 periods: incubation, prodromal, periods of rash and crust formation. The incubation period is 11-21 days. Prodromal phenomena can be observed for 1-2 days before the onset of the rash. In this case, the patient feels unwell, appetite decreases, headache, nausea, and sometimes vomiting occur. If the prodromal period is absent, the disease begins with the appearance of a rash. The period of rash in most patients proceeds without any particular disturbances in the general condition. Fever coincides with the period of rash appearance. The rash appears in spurts, so the fever can be wave-like. The first elements of the rash can appear on any part of the body, but most often on the face, scalp, back, less often on the abdomen, chest, shoulders, thighs. As a rule, there is no rash on the palms and soles. In this case, the presence of rash elements on the scalp is pathognomonic. The elements of chickenpox go through the following stages of development: spots, papules, vesicles, crusts ("false polymorphism"). At first, a red spot appears, the size of a pinhead to a lentil, round or oval in shape. Within a few hours, the spots acquire the character of papules with a clearly defined contour, and after a few more hours or the next day, a vesicle-bubbles with smooth edges and transparent serous contents forms in the center of the elements. In the case

ISSN 3060-4567

of suppuration of vesicles, pustules are formed, with deep damage to the skin, which can lead to the formation of small depressions in the center of the pustules, which leave scars. Rashes are often observed on the conjunctiva of the eyes, the mucous membrane of the mouth (hard palate, mucous membrane of the cheeks, gums, uvula, back wall of the pharynx), sometimes the larynx and genitals. Chickenpox is characterized by multiple rashes that appear in several stages, sequentially, over 2–5 days. Such a wave-like rash leads to the fact that on the same limited area of skin, elements of chickenpox are noted that are at different stages of development, which gives the rash a polymorphic character.

Depending on the course of the disease, clinical forms of chickenpox are distinguished - typical and atypical. Among the atypical, rudimentary, hemorrhagic, bullous, gangrenous and generalized rash should be noted.

The rudimentary form occurs without a rash or with a scanty rash, while the elements of the rash do not reach their full development, being limited only to the appearance of small red spots. Sometimes the rash may consist of only a few papules and small, barely noticeable blisters, while the polymorphism of the rash is weakly expressed.

In the hemorrhagic form, on the 2nd-3rd day of the disease, the rash shows accumulation of hemorrhagic contents in the vesicles with the simultaneous appearance of petechiae and large hemorrhages on the skin and mucous membranes. Bleeding from the gums, nose and gastrointestinal tract is possible. The crust that forms in this form is black, deep in the skin, and often ulcerates. This form is usually observed in patients with previous hemorrhagic phenomena - with capillary toxicosis , Werlhof's disease [2].

In the bullous form, along with typical chickenpox blisters, large, flaccid, thin-walled blisters with yellowish-cloudy contents are observed on the skin, which dry out more slowly than usual and form a crust or, bursting, turn into long-term non-healing weeping surfaces. In the bullous form, independently formed blisters, quickly increasing in size along the periphery, can merge into large blisters.

ISSN 3060-4567

The gangrenous form is characterized by progressive necrosis. Several days after the appearance of vesicles, gangrenous rims appear around some of them, spreading along the periphery. The vesicles are round, large, several centimeters in diameter, filled with purulent-bloody contents. After opening, a necrotic scab forms in their place, and when it is rejected, long-healing ulcers of varying depths with undermined edges and a dirty purulent bottom are found. This form is characterized by severe intoxication and high mortality. The gangrenous form is rare, mainly in children with reduced reactivity of the body.

The generalized (visceral) form occurs during treatment with steroid hormones, in people weakened by serious illnesses. It is characterized by damage to internal organs. The course of the disease is very severe, often with a fatal outcome.

According to the severity of the disease, it can be mild, moderate or severe (a – with pronounced general intoxication; b – with pronounced changes in the skin).

Chickenpox is considered a benign disease, but in some cases complications may develop (in about 5-10%), sometimes very severe, which we sometimes observe in our patients. Among the complications of chickenpox, the most common are various purulent skin lesions: abscesses, furuncles, phlegmon. Purulent skin complications are based on superinfection with staphylococci or streptococci. One of the common causes of infection is scratching itchy skin areas by the patient. In most cases, the entry point for purulent infection is a damaged chickenpox vesicle. Less common complications: encephalitis, myocarditis, pneumonia, keratitis, nephritis, arthritis, hepatitis.

Clinically expressed picture of chickenpox pneumonia is one of the features of chickenpox in adolescents and adults. In this case, often simultaneously with mass rash and fever, the patient develops shortness of breath, cyanosis, cough with bloody sputum, chest pain. Physical changes are usually absent or very minor. The radiograph shows abundant small foci throughout. Clinical manifestations of pneumonia are observed for 7-10 days, radiographic changes - up to 1-2 months.

Encephalitis develops in 0.1–0.2% of children with chickenpox [6]. Chickenpox encephalitis or meningoencephalitis can develop in the first days of the

ISSN 3060-4567

disease (early) or (more often) during the period of crust formation (late). With late encephalitis, the patient develops lethargy, headache, vomiting, and the temperature rises again. The child's gait becomes unsteady, he cannot stand or sit, and complains of dizziness (cerebellar ataxia). His speech becomes dysarthric , quiet, slow. Convulsions and loss of consciousness are possible. Syndrome

Reye's syndrome (acute hepatic encephalopathy) is currently a rare but very dangerous condition that occurs in children and adolescents during treatment of viral fever (flu, chickenpox) with drugs containing acetylsalicylic acid (Aspirin), and is characterized by rapidly progressing encephalopathy (due to cerebral edema) and the development of fatty liver infiltration. Symptoms (rash, vomiting, confusion) appear approximately a week after the onset of the disease. In the laboratory, Reye's syndrome is characterized by an increase in the level of ALT, AST, urea, ammonia, prothrombin index with a normal bilirubin content.

Unlike Reye's syndrome, chickenpox hepatitis is usually asymptomatic and is characterized by increased activity of liver enzymes, especially ALT and AST .

**Age-related features of chickenpox**

In newborns and children of the first year of life (especially if the mother has not had chickenpox), the course of the disease has certain characteristics. From the first days, general infectious symptoms are detected: weakness, subfebrile body temperature, anorexia, sometimes vomiting, frequent stools. A profuse rash, appearing on the 2nd-5th day of the disease, can acquire a hemorrhagic character. During the rash, the body temperature is high, significant toxicosis, convulsions, loss of consciousness are possible. Often, a layering of secondary bacterial infection and the development of purulent foci of inflammation (pyoderma, phlegmon, pneumonia, etc.) are observed. If a woman is infected in the first months of pregnancy, a teratogenic effect of the virus on the fetus is possible, however, the birth of children with embryo- and fetopathies associated with chickenpox is very rare. According to modern studies, if infection occurs during the 1st or 2nd trimester of pregnancy, the spread of the virus to the fetus occurs in about 25% of cases. At the same time, the negative impact of the virus on the development of the fetus and

ISSN 3060-4567

the occurrence of developmental defects in children is observed in less than 1-3% of cases. The chickenpox virus can cause developmental disorders of the eyes, limbs, and developmental disorders of the bones of the skull and brain in the fetus. Some children develop only one of these defects, while others develop several or all [7].

According to literature, if a woman gets chickenpox shortly before giving birth (1–4 weeks) or 1–2 days after giving birth, then in 20–50% of cases the newborn child will also get sick. Due to the fact that this infection can develop aggressively in newborns, about 7% of newborns who get chickenpox die [7].

If a woman falls ill in the last days of pregnancy, congenital chickenpox is possible. This includes all cases of the disease that occur in a newborn up to 11 days old. The severity of the disease is determined by the time of infection. If a woman falls ill immediately before giving birth, chickenpox in a child appears on the 5th-10th day of life, has a severe course and often leads to the death of the child due to the generalization of the infection and damage to internal organs. If a woman falls ill 5-10 days before giving birth, the first clinical signs of the disease in the newborn appear immediately after birth. The course of chickenpox in these cases is milder, since the mother has time to develop specific antibodies that are transmitted to the fetus transplacentally [7].

In typical cases, diagnostics of chickenpox is not difficult. The diagnosis is established mainly on the basis of clinical features, taking into account the data of the epidemiological anamnesis. Laboratory methods that can be used include viroscopic , virological, molecular biological and serological analysis.

Treatment is carried out mainly at home. Only patients with complicated and severe cases of the disease, patients from risk groups, and those who cannot be isolated are subject to hospitalization.

The basis of treatment is compliance with hygiene measures aimed at preventing secondary infection. Clothes and bed linen should be changed every day; to avoid scratching, nails should be carefully, neatly and promptly cut (for children, put cotton mittens on their hands); a child with chickenpox can and should be bathed every day, but it is strictly forbidden to rub the skin with a sponge or washcloth; after

ISSN 3060-4567

bathing, you cannot wipe the child's body, but only gently blot it, since the crusts get soaked in water, which can become a threat of additional infection.

The rash that appears with chickenpox does not require any special treatment. Previously used locally aniline dyes (1% aqueous solutions of methylene blue or brilliant green) are not used today to treat chickenpox, which is due to both the growing resistance of a number of microorganisms to their action, and the unaesthetic nature of their use (traces of applying solutions to the skin remain for a long time, they tint clothes). In recent years, specialists around the world have recommended locally applying ointments (gels) with zinc (for example, Curiosin gel) for drying purposes, and ointments with an antibiotic for antimicrobial action. If the oral mucosa is affected, rinse with antiseptic solutions; damage to the conjunctiva threatens serious complications, so it is necessary to involve an ophthalmologist in the treatment.

Of course, most of the measures are aimed at preventing skin scratching and reducing itching. For this purpose, you can use first-generation antihistamines (fenkarol, suprastin), which have an antipruritic effect. In addition, symptomatic therapy is prescribed (antipyretic drugs). tva ).

Indications for the appointment of specific (antiviral) therapy with acyclic nucleosides (acyclovir, foscarnet , famciclovir , valacyclovir ) are severe and complicated forms of chickenpox.

Considering that in most cases of chickenpox hospitalization and specific etiotropic therapy are not required, it is justified to use drugs containing interferons or their inducers, which have antiviral activity against the H. zoster virus, for the treatment of patients at the outpatient stage .

One of the drugs that has proven its effectiveness in the treatment of chickenpox in children is inosine pranobex ( Groprinosin ), which has immunostimulating activity and non-specific direct antiviral action. The drug restores the functions of lymphocytes under immunodepression, increases blastogenesis in the population of monocytic cells, stimulates the expression of membrane receptors on the surface of T-helpers, has a stimulating effect on the

ISSN 3060-4567

activity of cytotoxic T-lymphocytes and natural killers, the functions of T-suppressors and T-helpers, increases the production of immunoglobulin G, interferons, interleukins (IL-1 and IL-2), reduces the formation of proinflammatory cytokines (IL-4 and IL-10), potentiates the chemotaxis of neutrophils, monocytes and macrophages.

The mechanism of the antiviral action of the drug is associated with the inhibition of viral RNA and the enzyme dihydropteroate synthetase , which is involved in replication, enhancing the synthesis of lymphocyte RNA suppressed by viruses, which is accompanied by the inhibition of the biosynthesis of viral RNA and the translation of viral proteins. The drug is most effective when prescribed early, when there is a risk of the virus entering the body, or in the first two days of the disease. For chickenpox, Groprinosin is prescribed to children at a daily dose of 50 mg / kg (1 tablet for every 10 kg of body weight) in 3-4 doses for 10-14 days (until the symptoms disappear). Currently, a number of countries are vaccinating against chickenpox among people belonging to risk groups (Austria, Belgium, Finland, Poland, etc.).

Of course, such immunization tactics do not allow to significantly reduce the incidence of chickenpox in general, but provide individual protection for the most vulnerable groups. In other countries (USA, Canada, Germany, etc.), vaccination against chickenpox is carried out within the framework of National Immunization Calendars, which allows to reduce the incidence of chickenpox among the population quite quickly [4, 8].

The vaccine can also be used for emergency prevention (after contact with a patient with chickenpox) to prevent outbreaks. If the vaccination is given no later than the 3rd day after probable contact, the infection can be prevented in 90% of cases. According to research , the vaccine provides sufficient protection against chickenpox and its complications. Of course, people who have been vaccinated can get chickenpox, but the disease will be mild. Vaccination is recommended for children aged 12 months and older, as well as adolescents and adults who have not previously had chickenpox and have not been vaccinated [8].

ISSN 3060-4567

## L I T E R A T U R A

**1.** Galitskaya, M.G. Chickenpox: possibilities of fighting the “old enemy” in the practice of a pediatrician / M.G. Galitskaya, A.G. Rumyantsev // Zaporizhzhya Medical Journal. - 2010. - V.9, No.5. - P.99-102.

**2** . Krasnova, E.I. Hemorrhagic form of chickenpox in children and its outcomes (based on our own observations), prevention options / E.I. Krasnova [et al.] // Attending physician. - 2012. - No. 3. - P. 26-31.

**3.** Baranov, A.A. Prevention of chickenpox by means of specific prophylaxis in Belarus, Kazakhstan, Russia and Ukraine / A.A. Baranov [et al.] // Pediatric pharmacology. - 2008. - V.5, No.3. - P.6-14.

**4.** Rumyantsev, A.G. Efficiency and safety of vaccination against chickenpox in children / A.G. Rumyantsev // Zaporizhzhya Medical Journal. - 2011. - V.4, No.5. - P.11-16.

**5.** Nikiforova, L.V. Modern features of the clinical course of chickenpox in children / L.V. Nikiforova [et al.] // Zaporizhzhya Medical Journal. - 2011. - V.13, No.4. - P.122-123.

**6** . Cahide , Y. Severe neurological complications of chickenpox / Y. Cahide , Ç. Hüseyin // Eur. J.Gen. Med. – 2005. – Vol.2(4). – P.177–179.

**7.** Chicken pox and Pregnancy // World Health Organization [Electronic resource]. – 2014. – Mode of access: http:// http://www.cdc.gov/pregnancy/infections-chickenpox.html. – Date of access: 01/04/2016.

**8.** Varicella Zoster Virus // World Health Organization [Electronic resource]. – 2013. – Mode of access: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/varicella.pdf. – Date of access: 01/04/2016.

**9.** Abdulloev M. et al. View Of An Infectious Disease Specialist On The Course Of The Cortex In Children // AMALIY VA TIBBIYOT FANLARI ILMIY JURNALI. - 2023. - Vol. 2. - no. 12. pp. 930-939.

**10.** Ziyodulloevich AM EFFICIENCY OF ETIOTROPIC TREATMENT IN CHRONIC VIRAL HEPATITIS //Galaxy International Interdisciplinary Research Journal. – 2023. – T. 11. – No. 4. – pp. 450-454.

**11.** Ziyodullayevich AM Studies on the Determination of Cytokines in Patients with Chronic Hepatitis C with Criglobulinemia //American Journal of Pediatric Medicine and Health Sciences (2993-2149). – 2023. – T. 1. – No. 10. – pp. 487-495.