CHICKENPOX DISEASE AND ITS SPECIFIC PREVENTION

[1] Masharipova Sh.S., [2] Masharipov S.M.
[1] Urgench branch of Tashkent Medical Academy
[2] Tashkent Medical Academy

✓ **Resume**

The article discusses the etiology, epidemiology and prevention of chickenpox, which is a common infection in children. Classical and atypical clinical manifestations, as well as complications reported in patients with chickenpox at the present stage, are presented.

Keywords: adults, children, chickenpox, herpes infection, spread, blisters.

Introduction. Every year from 1990 to 1994, before the chickenpox vaccine was available, about 4 million cases of the disease were reported in the United States. Of this number, approximately 10,000 cases required hospitalization and 100 patients died. Complications of chickenpox are recorded with a frequency of 5-6%, they serve as a reason for hospitalization in 0.3–0.5%. Of the total number of cases, this is several thousand per year. 30% of complications are neurological, 20% are pneumonia and bronchitis, 45% are local complications accompanied by scarring on the skin. The mortality rate from chickenpox is 1 in 60,000 cases. In 10-20% of those who have been ill, the chickenpox virus remains in the nerve ganglia for life and subsequently causes another disease that can manifest itself in old age – shingles or herpes. In response to vaccination, about 95% of children produce antibodies and 70-90% will be protected from infection for at least 7-10 years after vaccination. According to Japanese researchers (Japan is the first country in which the vaccine was registered), immunity lasts 10-20 years.

Chickenpox is an anthroponotic acute viral infection, an acute highly contagious viral disease with airborne transmission. Usually characterized by a febrile state, papulovesicular rash with a benign course.

Chickenpox was first described in the middle of the XVI century by the Italian doctors Vidus-Vidius and F.Ingranus as a type of smallpox. Until the middle of the 19th century, it was considered as a clinical variant of smallpox. After the epidemic of smallpox in 1868-1874, chickenpox was recognized as an independent disease. The term "varicella" was introduced in 1872 by Vogel. In 1888, the Hungarian physician J.Boker showed the epidemiological community of chickenpox and herpes

zoster. In 1911, the causative agent of chickenpox was discovered in the contents of vesicles, after which the disease was considered a separate nosological form. The pathogen virus was isolated in 1958.

The causative agent of varicella zoster is the Varicella zoster virus, a large virus visible in a conventional light microscope, which is detected from the 3rd-4th day in the contents of smallpox vesicles. Varicella Zoster is a DNA-containing virus classified as human herpes virus type 3, included in the family Herpesviridae, subfamily Alpha herpesviridae. The varicella zoster virus is unstable in the external environment — it quickly dies when exposed to sunlight, heating, and ultraviolet radiation. Outside the body, in the open air, the survival rate of the virus is about 10 minutes. The causative agent of chickenpox belongs to the herpes group viruses of the third type. The susceptibility to chickenpox is 100%. Chickenpox patients become contagious 20-24 hours before the rash appears and remain so for up to 4 days.

The chickenpox virus affects only humans, the only reservoir of the wild virus is humans. The Varicella Zoster virus is the cause of two diseases: chickenpox, which occurs mainly in childhood, and herpes zoster (shingles), which mainly affects the elderly and people with immunodeficiency. Varicella Zoster is the primary infection of Varicella Zoster virus, and herpes zoster in the vast majority of cases is the result of activation of latent Varicella Zoster virus (Varicella zoster relapse).

The epidemiology of chickenpox differs in temperate and tropical climates, the reasons for this are not clear. Presumably, the differences are the result of the properties of the virus — it is sensitive to temperature, climate, population density, and the risk of infection. People of all ages are susceptible to the disease. The contagiousness of chickenpox is 100% — everyone who has not previously encountered the virus gets sick. Like all herpesviruses, the varicella zoster virus has the ability to suppress the immune system. The virus lives and reproduces only in the human body, it is extremely volatile (with air it can spread over distances of up to 20 meters, overcoming ventilation systems, elevator shafts and stairwells). About half of the children get sick at the age of 5-9 years, less often — 1-4 and 10-14 years. About 10% of the patients are 14 years old and older. Before the introduction of the vaccine, about 3.5 million cases of infection were reported each year. Currently, in many countries, the incidence and hospitalization rate due to chickenpox has decreased by almost 90%, due to the introduction of vaccination. 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 rises is approximately 60-70% of the total number of patients. In the Republic of Uzbekistan, in recent years, the incidence rates (among adults and children under one year old) and hospitalization for chickenpox have remained at a fairly high level, and according to our observations, the infection has recently been characterized by a more severe course, often leading to serious complications. The source of infection is patients with chickenpox and shingles. Chickenpox patients 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 appearance of the last element of the rash. The virus is transmitted: 1) by airborne droplets - when talking, sneezing, coughing, kissing; 2) by contact – when saliva of the patient or containing bubbles gets on unaffected skin; 3) transplacentally – from the pregnant mother to the fetus, if the woman fell ill with either chickenpox or herpes zoster during this period.

After the disease, immunity persists for life in 97% of the population, the remaining 3% may get sick again. People with normal immunity suffer from chickenpox only once, because after the first case of the disease, an "immune memory" is formed in their body, which persists for life and does not allow this disease to develop again. However, people with severely weakened immune systems can get over chickenpox twice (repeatedly). The resistance of newborns to chickenpox is due to antibodies received from the mother, which circulate up to 6 months. After the disease, the virus can remain latent in the body for life, localized in the nerve ganglia. However, in some people it is activated, causing a painful rash to appear on the skin of different areas of the body, as in chickenpox or herpes simplex, which is localized along the nerve trunks (herpes zoster). Unfortunately, the mechanisms of preservation of the virus and its possible subsequent activation with manifestations of the disease in the form of shingles have not been sufficiently studied. The entrance gate of infection is the mucous membrane of the upper respiratory tract. Multiplying on the mucous membranes, the virus enters the bloodstream at the end of the incubation period, causing viremia. With the blood flow, the virus spreads throughout the body, 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 for chickenpox. In the early stages, the nuclei of the affected cells contain spherical Tizzera corpuscles. During the degeneration of the nuclei, these corpuscles enter the cytoplasm. Cellular vacuoles quickly merge with adjacent ones, forming a vesicle. Initially, the vesicle is multicameral and consists of small cavities separated from each other by cellular strands, which later

quickly rupture due to the filling of the vesicles with liquid. The malpighian layer is mainly affected. The changes on the mucous membranes are of the same nature as in the epidermis. The elements of the rash on the mucous membranes in chickenpox do not leave scars, since necrosis of the epithelium in chickenpox usually does not penetrate deeper than the germinal layer. 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 prolonged treatment with hormones, cytostatics, with congenital or acquired immunodeficiency, etc.). Violations of cellular immune reactions are of great importance in the pathogenesis of the disease. Reproduction of the virus in lymphocytes, neutrophils, monocytes-macrophages leads to immunodeficiency of the T-cell type.

The mechanisms of immunosuppressive action are due to the suppression of chemotaxis and a decrease in the activity of the phagocytosis process, inhibition of the function of T-killers, natural killers (NK), the reaction of blast transformation of lymphocytes, and possible direct stimulation of T-suppressors. Interferon deficiency also plays an essential role in the pathogenesis of chickenpox, which manifests itself 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, people with impaired immune status develop severe forms of chickenpox, and with the development of anergy in patients with chickenpox, susceptibility to other infections increases. These pathogenetic and immunological features of the development and course of chickenpox should be taken into account in the treatment of patients.

Age-related features of chickenpox in newborns and children of the first year of life (especially if the mother is not vaccinated or did not have chickenpox before pregnancy), the course of the disease has certain characteristics. From the first days, common infectious symptoms are detected: weakness, subfebrile body temperature, anorexia, sometimes vomiting, frequent stools. An abundant rash that appears on the 2nd-5th day of the disease can become hemorrhagic in nature. During rashes, body temperature is high, significant toxicosis, seizures, loss of consciousness are possible. There is often a layering of secondary bacterial infection and the development of purulent foci of inflammation (pyoderma, phlegmon, pneumonia, etc.). If a woman is infected in the first months of pregnancy, the teratogenic effect

of the virus on the fetus is possible, but the birth of children with embryonic and fetopathies associated with chickenpox is very rare. According to modern research, if infection occurs during the 1st or 2nd trimester of pregnancy, the spread of the virus to the fetus occurs in about 35% of cases. At the same time, the negative effect of the virus on fetal development and the appearance of malformations in children is observed in less than 1-3% of cases. The varicella zoster virus can cause fetal developmental disorders of the eyes, limbs, and the formation of bones of the skull and brain. Some children develop only one of these defects, others have several or all of them.

According to literature and scientific articles, if a woman gets sick with chickenpox shortly before giving birth (1-4 weeks) or 1-2 days after giving birth, then a newborn child will also get sick in 20-50%. Due to the fact that this infection can develop aggressively in newborns, about 11% of newborns with chickenpox die. If a woman falls ill in the last days of pregnancy, congenital chickenpox is possible. It includes all cases of the disease that occurred in a newborn under the age of 15 days. The severity of the disease is determined by the period of infection.

When a woman is ill immediately before childbirth, chickenpox in a child manifests itself on the 5th-10th day of life, has a severe course and often leads to the death of the child due to generalization of 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 a newborn appear immediately after birth. The course of chickenpox in these cases is easier, because the mother has time to develop specific antibodies that are transmitted to the fetus transplacentally. Diagnosis of chickenpox in typical cases is not difficult. The diagnosis is established mainly on the basis of the clinic, while taking into account the data of the epidemiological history. Viroscopic, virological, molecular biological and serological analyses can be used from laboratory methods. Treatment is carried out mainly at home. Only patients with complicated and severe course of the disease, patients from risk groups, as well as those who cannot be isolated, are subject to hospitalization.

Currently, a number of countries are vaccinating against chickenpox among people belonging to risk populations (Austria, Belgium, Finland, Poland, etc.). Of course, such immunization tactics do not significantly reduce the incidence of chickenpox in general, but provide individual protection for the most vulnerable populations. In other countries (Japan, Canada, Germany, etc.), vaccination against chickenpox is carried out within the framework of National vaccination calendars, which makes it possible to quickly reduce the incidence of chickenpox among the

population. According to research, the vaccine sufficiently protects against chickenpox and its complications. Of course, people who have received vaccination may 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 received vaccination. Vaccinations against chickenpox are not carried out in the Republic of Uzbekistan.

In case of illness, a person is usually isolated at home. Patients living in dormitories, in specialized institutions or in large families are hospitalized. Also, severe forms of chickenpox, young children, in the presence of complications or other serious illness are subject to hospitalization. The insulation stops 5 days after the last rash. For children attending organized children's groups, there is a procedure for admission to children's institutions provided for in the instructions. Disinfection is not carried out due to the instability of the virus, frequent ventilation and wet cleaning of the room are sufficient.

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