

Nezgoda Iryna, Levytska Lidiia, Bobruk Svitlana. Peculiarities of the course of chicken pox in children at the present stage. *Journal of Education, Health and Sport*. 2018;8(4):438-445. e-ISSN 2391-8306. DOI <http://dx.doi.org/10.5281/zenodo.1249695>
<http://ojs.ukw.edu.pl/index.php/johs/article/view/5504>

The journal has had 7 points in Ministry of Science and Higher Education parametric evaluation. Part B item 1223 (26.01.2017).
1223 Journal of Education, Health and Sport e-ISSN 2391-8306 7

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The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 16.04.2018. Revised 20.04.2018. Accepted: 30.04.2018.

UDK: 616.914-053

PECULIARITIES OF THE COURSE OF CHICKEN POX IN CHILDREN AT THE PRESENT STAGE

Iryna Nezgoda, Lidiia Levytska, Svitlana Bobruk

National Pirogov Memorial Medical University, Vinnytsya

Nezgoda Iryna - Dr. med., Professor, Head of Department of Pediatric Infectious Diseases, National Pirogov Memorial Medical University, Vinnytsya, Ukraine, E-mail: Nezgoda59@gmail.com, Cell. phone (097) 9143340, Address: Vinnytsya, 21000, Pirogova St., 56, National Pirogov Memorial Medical University, Vinnytsya, Department of Pediatric Infectious Diseases

Levytska Lidiia - Assistant Professor Department of Pediatric Infectious Diseases, National Pirogov Memorial Medical University, Vinnytsya, Ukraine, E-mail: flup2401@gmail.com. Cell.phone (096) 3467883, Address: Vinnytsya, 21000, Pirogova St., 56, National Pirogov Memorial Medical University, Vinnytsya, Department of Pediatric Infectious Diseases

Bobruk Svitlana - P.h.D Department of Pediatric Infectious Diseases Vinnitsa National Pirogov Memorial Medical University (21008 Vinnitsa, Solnyachna str. 9/18). E-mail: doctorbobruk@gmail.com, cell. phone: 067-90-40-568.

Abstract

The article presents the results of a clinical and laboratory examination of 57 children suffering from chicken pox from 1 month to 16 years of age who were treated at the Vinnytsiya Regional Pediatric Clinical Infectious Disease Hospital from January to December

2017. Among the children who were included in the monitoring group, the overwhelming majority included patients aged 4 to 8 years (56.2%). The most difficult case was the disease in children under 4 years of age, which was due to the addition of complications, mainly because of central nervous system. Laboratory diagnostic methods have proved the viral etiology of the disease, in particular, all the examined children have been allocated Varicella Zoster Virus (VZV) by the immunoassay (ELISA) and polymerase chain reaction (PCR). A combination of VZV infection with an active form of another herpetic infection (EBV, CMV or HHV 6) was observed in 17 children (29.8%).

Keywords: chicken pox, children, herpes infection, rash, vesicle.

Introduction. Chicken pox is an acute infectious disease known since 1767, when it was first established and described by English physician V. Heberden. Since then, scientists have shown that the pathogens of the disease - Varicella Zoster Virus (VZV) belongs to the family of type III herpes viruses and has a high level of contagiousity (93-98%), pantomic (impression of epithelium of the skin, mucous and cells of the nervous system).

In Ukraine, about 150 thousand children suffer from chicken pox every year, and mortality from the complications of this disease is about 2 per 100 thousand cases [1, 2]. At the same time, the development of complications is possible, primarily due to the direct influence of the virus and the addition of secondary bacterial infection in the form of abscesses, phlegmon, stomatitis and streptoderma [3]. Approximately 0.2% of cases have complications with the central nervous system, which manifested as cerebellitis [4, 5, 6]. In addition, there can be other complications with cases of chicken pox: myelitis, encephalomyelitis, opticomyelitis, polyneuropathy, optic neuritis, and serous meningitis [7, 8].

Despite the fact that the clinical symptoms of chickenpox are sufficiently described, and the etiotropic efficacy of acyclic nucleosides against VZV is proven, it is sometimes difficult to prevent the complications of this disease. In Ukraine, due to the lack of planned immunization against chicken pox, outbreaks of the illness are quite frequent, which is a serious problem for the population. Consequently, the relevance of chicken pox to modern medicine is unconditional.

The purpose of our study is to visualize the peculiarities of clinical symptoms of chicken pox and its complications in children of all ages, as well as to clarify the etiological structure of the associated forms of the disease.

Materials and methods of research

The research was conducted by the Department of Pediatric Infectious Diseases of National Pirogov Memorial Medical University. Under observation were 57 children, aged 1 month to 16 years old, who were treated at the Vinnytsia Regional Pediatric Clinical Infectious Disease Hospital over the period spanning from January to December 2017. The vast majority of patients - 32 children (56.2%) were children aged 4 to 8 years old, 21 children (36.8%) were aged 1 month to 4 years old, and 4 patients (7.0%) were children aged 8 to 16 years. The children in the observation group were randomly assigned as they were admitted to the hospital. The diagnosis was established on the basis of a complete clinical examination and a detailed history of the disease. The etiological factor of the disease was determined by immunoassay assay (solid phase ELISA, ELISA method) with the determination of immunoglobulins M (Ig M) to VZV in patients' blood and the molecular genetic method (polymerase chain reaction - PCR) with the determination of copies of VZV DNA in blood and smears - receptions to the secretion of vesicles. In addition, Ig M and Epstein Barr virus (EBV), cytomegalovirus (CMV), and type 6 of the herpes virus (HHV 6) were additionally identified for the purpose of determining the associated forms of the disease.

All children in the observation group have confirmed the etiology of the disease.

Research results and their discussion. Among the children who were hospitalized in a hospital with a diagnosis of chicken pox, the majority were inhabitants of the city (86.0%). After conducting gender comparisons between patients, no significant difference was observed. Thus, out of 57 children, there were 29 boys (50.9%), and 28 girls (49.1%).

Having found out how the children were hospitalized to the hospital, 35 patients (61.4%) were hospitalized independently, 12 (21.1%) were delivered by ambulance and 10 (17.5%) children were sent to the hospital by the GP.

Determining the terms of hospitalization of patients found that 10 children (17.6%) applied for help until the third day after the appearance of the first clinical signs of the disease, 40 patients (70.2%) for 3 - 5 days and 7 children (12.2%) later than 5 days (fig. 1).

8.8% (5 children) of the chickenpox had a mild case, 56.1% (32 patients) had a moderate case, and 35.1% (20 children) had a severe case of the disease.

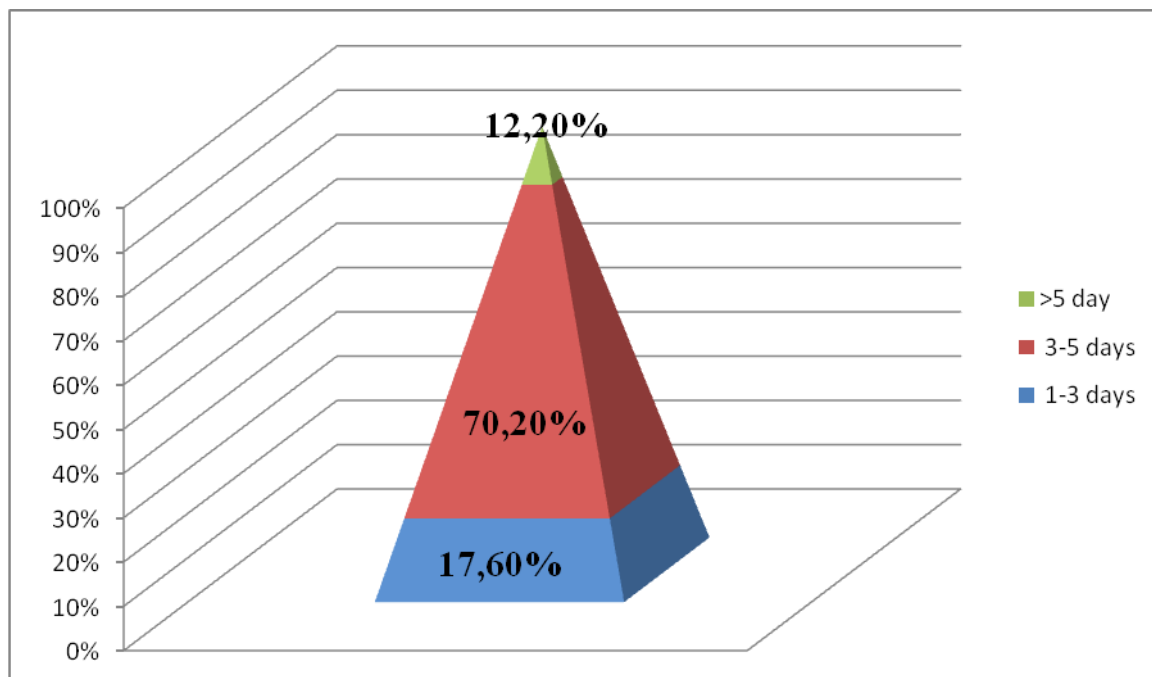


Figure 1 - The terms of hospitalization of children with a chicken pox to a hospital

Having analyzed the distribution of children by age according to the severity of the disease, it should be noted that the most severe cases were found in children 4 and younger (in 80.9% of cases), and the mild cases were found in children aged 8 to 16 years (75.0% of patients) (Table 1).

Table 1 - Distribution of children suffering from chicken pox by age and severity

Age of children Severity	1 mo- 4 years n=21		4 -8 years n=32		8- 16 years n=4	
	abs.	%	abs.	%	abs.	%
mild	-	-	2	6.2	3	75.0
modarate	4	19.1	27*	84.4	1	25.0
severe	17**	80.9	3	9.4	-	-

Note "*" is a significant difference between children aged from 1 month to 4 years and from 4 to 8 years of age with moderate cases;

"**" - a significant difference between children aged from 1 month to 4 years and from 4 to 8 years with severe cases;

In all children, the typical form of the disease was recorded. Among the main complaints were elevated body temperature, symptoms of intoxication (general weakness, lethargy, headache, refusal of food and drink) and the presence of a pseudopolymorphic rash on the body and mucous membranes.

All children who entered the hospital had a high body temperature. Within the youngest age group from 1 month to 4 years, 90.5% of children had a temperature ranging from 39.0 to 40.00 C, while low-grade body temperature in patients did not register at all (Table 2).

Table 2 - Indicators of temperature in patients with chickenpox of children of all ages

Temperature	Age of children, n=57					
	1mo- 4 years n=21		4 -8 years n=32		8- 16 years n=4	
	abs.	%	abs.	%	abs.	%
37.0- 38.0 °C	-	-	1	3.1	4	7.0
38.0 -39.0 °C	2	9.5	26*	81.3	-	-
39.0 – 40.0 °C	19	90.5	5	15.6	-	-
Duration of hyperthermia (days),M±m	13.23±0.68		6,17±0,51		5.12±0.27	
	8.17±0.49					

Note. "*" Is a statistically significant difference between the groups of children from 1 month to 4 years and from 4 to 8 years.

Children aged 4 to 8 years have significantly ($p < 0.05$), compared to the younger group of patients, had body temperature ranges from 38.0 to 39.0 C. Analyzing the temperature values in children aged 8 to 16 years it should be noted that in 100% of children the body temperature had subfebrile numbers.

At the same time as the body temperature rose, there was a rash in the children that was pseudopolymorphic in the form of macules, papules and vesicles. In 5,2% of children, hemorrhagic rash was also observed. All examined rashes were chaotic on the skin of the abdomen, limbs, hairy side of the head, and on the mucous membranes: in 14 children (24.6%), the enanthema was observed in the oral cavity (in the form of superficial ulcers), in 6 patients (10.5%) - on the genitals and in 37 (64.9%) children, the elements additionally covered all visible mucous membranes of the body (oral cavity and genital organs). The duration of rashes in children varied from 3 to 10 days. Thus, in 5.3% of children (3 patients) the appearance of new elements of rash was observed occurring from 3 to 5 days. In 52.6% of cases (30 children), new elements of rash appeared from 5 to 7 days and in 42.1% of patients (24 children) - from 7 to 10 days.

Given that the symptoms of the infectious process persist for a long time, and new elements of the rash appear on the 10th day of the illness, respectively, and the duration of stay in the hospital was extended. On average, patients with chicken pox were in the hospital

(8.17 ± 0.49) days (Table 2). Estimating the length of the stay in the hospital depending on age, it should be noted that the ones that spent the longest time under observation were patients aged from 1 month to 4 years (13.23 ± 0.68 days), and children aged 8 to 16 years spent an insignificant amount of time (5.12 ± 0.27 days) in the hospital bed.

35.1% (20 patients) of children with severe onset of chicken pox were recorded to have complications of various organs and systems. Impression of the central nervous system in the form of acute encephalitis, with a predominance of focal symptoms and cerebellar ataxia, was observed in 12 children (21.1%), with the youngest in the group younger than 4 years of age. The presence of viral encephalitis in patients with chicken pox confirmed the tropism of the pathogen to the nervous system.

Impression of the broncho-pulmonary system, which was confirmed as auspicious and radiologically, was noted in 5 children (8.8%). Two of these children had acute bronchitis, while pneumonia was observed in 3 children.

The current course of chicken pox is also accompanied by thrombocytopenic purpura with the development of DIC. This complication occurred in 3 patients (5.2%). The main manifestation of this syndrome was a hemorrhagic rash on the body of children. Individual petechiae were polychrome, asymmetric and painless. Laboratory thrombocytopenic purpura was accompanied by a decrease in platelet count to $(130.7 \pm 5.4) \times 10^9 / l$, hemoglobin to $(85.3 \pm 1.2) g / l$, and prolonged bleeding time.

It is important to note that in 29.8% of cases (17 children) of the chicken pox, it was in the form of a mixed infection. The association was EBV in 10 children (17.5%), CMV in 5 patients (8.8%) and HHV 6 type - 2 children (3.5%). It should be noted that all complications were confirmed through the patients' blood, using modern methods of diagnosis of ELISA and PCR.

Out of all the cases of these complications, 80.9% were present in children younger than four years old.

All children under observation were discharged from the hospital in a satisfactory condition, after normalization of laboratory parameters with observance of all periods of isolation.

Conclusions

1. Chickenpox is a highly contagious disease caused by the type III herpes virus, which is characterized by omnipresence and tends to increase.

2. The peculiarity of clinical symptoms of chickenpox, at the present stage, is the course of the disease in moderate (56.1%) and severe (35.1%) degrees of severity.

3. The severity of the disease is due to the young age of children and the development of complications (35.0%).

4. Among the complications of chicken pox, 21,1% of children had complications of the central nervous system, 8.8% had damage to the broncho-pulmonary system, and 5.2% of patients experienced complications with the vascular system.

5. The complicated course of the disease was caused by co-infection in the form of association with EBV in 17.5% of cases, with CMV in 8.8% of children and with type HHV 6 in 3.5% of patients.

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