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MEASLES IN UKRAINE: CURRENT CHALLENGES

Currently, the significance of the problem for measles in Ukraine is attributed to the increased incidence of outbreaks of the disease among children and teenagers with fatal cases. The findings of the analysis of the nationwide coverage for measles vaccination in 2012-2017 are unfavorable: in 2008 the rate of vaccinated individuals constituted 95%, while in 2012, 2013 and 2016 it was 79%, 49% and 45,5%, respectively. Estimates of measles incidence in Ukraine in 2012 revealed 12746 measles cases with the intensive rate of 27.9 per 100 000 of the population, indicating about a high epidemic rise of measles. During the in-between epidemic period, particularly in 2016, only sporadic 102 cases were reveled. In 2018, during the first two months 1248 measles cases were registered with measles-related deaths of 8 people: 6 deaths of children among which 1 death of a newborn with congenital measles and 1death of a baby aged 5 months.

The highest incidence rate of measles in Europe in 2014 was reported among children under one year old [7]. During the period from 01 January to 31 December 2017, 45% of measles cases were reported, among which were teenagers aged 15 and more, as well as elderly people. Mostly they were unvaccinated. However, the largest

group by the number of affected individuals was children under one year old (European Centre for Disease Control and Prevention). At the same time in 2016, in the Netherlands the rate of refugees vaccinated against measles was 88% [18]. The researchers indicated that appropriate coverage for measles vaccination among the low income population is crucial in prevention of the disease [8]. A randomized study in Guinea-Bissau demonstrated that discontinuing vaccination in low income countries affects the rate of infant mortality, shown in the example for the polio, in comparison to 2013 and 2017 [9].

We emphasize that the problem of discontinuing vaccination among children population within Ukraine, as well as parents' poor knowledge of measles-related complications and the measles vaccine has not been solved to date.

The bibliosemantic method has been used during the study. The review of the current publications on the indicated nosology has been made.

Measles is an acute infectious disease with respiratory and vertical transmission mechanisms. The peak incidence rate every 2 years can be explained by the accumulation of residents susceptible to measles. The measles morbidity was observed within a year with the peak incidence in autumn, winter and spring [2].

Measles was studied long before our era. There is a hypothesis that the measles virus emerged from the cattle plague during the period of livestock development. Vaccines against the disease became available in 1963 [10].

The studies report about the crystalline structure of the measles virus nucleic acid. The recent data on the mechanisms of chaperon action contribute to better understanding the virus genome replication and assembly of nucleocapsids. Scholars describe the conservative structural interface for nucleoprotein interaction, which can become the objective for the development of medication for the treatment not only the measles, but potentially other paramyxovirus disease [12]. Paramyxoviruses have been well studied to date [9]. For example, the fact that a complete closure of the nucleus of thermonuclear fusion does not lead to the paramyxovirus entry, can facilitate the development of strategies that prevent the virus entry without affecting

the profiles of the complementation synthesis as compared with standard F protein [13].

The measles virus can penetrate through the mucous membranes of the upper respiratory tracts and bulbar conjunctiva. The virus is deposited on the mucous membranes, penetrates into the submucous space and regional lymph nodes, where its fixation and primary replication occurs. From the third day of the incubation period the virus penetrates into blood where the primary viremia occurs. From the bloodstream measles virus enters the spleen, liver, bone marrow, lymph nodes, infects mononuclear cells and lymphocytes. From the 7^{th} day of incubation period the repeated viremia develops, which leads to the fixation of the virus in the epithelial cells of the skin, respiratory tract, bulbar conjunctiva, intestine with the development of dystrophic changes.

Measles rash is an infectious-allergic dermatitis with marked exudative component that occurs as a result of the interaction between sensibilizing lymphocytes and viral antigens in the endothelium of the capillaries and cells of the skin. The inflammatory process of the same nature occurs in the oral mucosa, where necrotizing epithelium becomes muddy and small white foci of necrosis are formed (Filatov-Koplik's spots) [1].

In addition to the destruction of cells of the mucous membranes, T-lymphocytes are also affected, which leads to lymphopenia [15] with the development of anergy, i.e., the reduction of general and local immunity, persisting within a month. During viremia the measles virus penetrates into the cells of the nervous system that can lead to serious complications as the measles-associated encephalitis and encephalomyelitis.

The clinical presentation and diagnosis of measles have been studied in details by many scholars. The incubation period is 9-17 days or 21 days in those individuals who were prescribed with gammaglobulin, blood products, immunosuppressants within the period after exposure to an infected person.

The atypical forms (mitigated measles) of the disease, shortened periods of illness, non-prominent clinical manifestations (catarrhal events, fever, small local

rash with shortened staging and short-lived pigmentation) are specific for children of the first year of life. Complications occur more often [3].

The analysis of the post-infectious encephalitis morbidity shows 7 cases per 100 thousand people worldwide, and 17 cases were reported among children under 1 year old. Notably, the incidence of post-infectious encephalitis is the greatest among teenagers [5].

The most life-threatening complication with measles is encephalitis [14]. Encephalitis is an inflammation of the brain parenchyma, which is characterized by the focal neurological symptoms, impairment of consciousness and seizures.

The prophylaxis includes isolation of the patient and room venting [6]. Active prevention involves the live measles vaccine of the L-16 strain, single dose of 0.5 ml subcutaneously made at the age of 12-15 months, or MMR three-in-one vaccine (against the measles, mumps, and rubella).Revaccination is made at 6 years old (seronegative, with absent immunity) [11].

We have carried out the analysis of the absolute and relative number of children (of all age groups), who received an immunization in 2006 and 2016 (vaccination and revaccination) within the Poltava region. The findings of this comparison, practically at all positions, revealed the twice lower number of the vaccinated children. This is dramatically unfavorable because it reduces the number of vaccinated residents among the population, leading to epidemics of highly life-threatening diseases and endangering the health of the nation. At the end of 2006, in the Poltava region the number of children population from 0 to 18 months was 271904 people, and in 2016 its number was reduced to 231573 people [16].

Conclusions. Currently, children infectious pathology has a significant share in the world. Immunization is a human right to a healthy life and is the most effective weapon in overcoming the controlled infectious diseases that remain a major cause of disability and mortality of population. Consequently, the worsening of vaccination coverage of the population in Ukraine and occurrence of deaths from measles-associated complications makes the issue of improving the epidemic surveillance of

significant importance to date; clinical recognition, serological tests are the warrant of the health of the nation.

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