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Measles - a disease that should be a thing of the past, but returns

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Abstract

The measles is a viral respiratory disease, in the form of an acute febrile illness with mucous membrane involvement and a rash. Human being is the only reservoir for this pathogen. Measles are highly contagious, spreads through the coughs and sneezes and by direct contact with secretions of an infected person. The risk of developing measles in a non-immune person, is more than 90% after contact with the pathogen. One ill person can infect 12-18 people. Permanent immunity gives the suffering from measles in the past, two doses of the vaccine give a resistance of 97%. Newborns are protected for the first 6-12 months of life with antibodies their get in the womb from mother if she is immune from getting sick. Measles is a mild or moderately severe disease. Complications occur in about 30% of patients. It include: inflammation of the middle ear, pneumonia, brain, myocardium, blindness, and a very rare complication - subacute sclerosing inflammatory brain - progressive CNS neurodegeneration that leads to death a few or a dozen years after the measles eradication. There is no causative treatment in a case of measles. We can only use symptomatic treatment - antipyretic drugs, antitussive, proper hydration and nourishment of the patient, rest, darkening of the room in the case of photophobia. For specific measles prevention methods, we include preventive vaccination and passive immunoprophylaxis. The MMR vaccine is usually well tolerated, rarely gives vaccine adverse events. . Anti-

vaccinations movements have been gaining popularity in the world for years, unfortunately contributing to the recurrence of disease epidemics that have nearly been eliminated.

Key words: measles, vaccination, MMR

The measles is a viral respiratory disease, in the form of an acute febrile illness with mucous membrane involvement and a rash. The etiological factor is the RNA virus of the genus *Morbillivirus*. Human being is the only reservoir for this pathogen. Measles are highly contagious, spreads through the coughs and sneezes and by direct contact with secretions of an infected person, eg urine. The risk of developing a non-immune person, who has not been suffering from measles, or having been vaccinated, is more than 90% after contact with the pathogen - this virus is more infectious than the influenza virus. One ill person can infect 12-18 people, it is called base reproduction rate. The incubation period after contact is about 8-12 days until the onset of the prodromal symptoms. A person infected with measles virus is the most contagious for the environment during the period of prodromal symptoms. It is about 5 days before the onset of rash, in the phase of intense cough. Infectivity lasts for about 3-4 days after the resolution of rash. The measles virus is able to survive in the air and on contaminated surfaces and is able to infect up to 2 hours. Permanent immunity gives the suffering from measles in the past, two doses of the vaccine give a resistance of 97%. Newborns are protected for the first 6-12 months of life with antibodies their get in the womb from mother if she is immune from getting sick.

Measles infection is 98% with clinical symptoms. The non-characteristic period of prodromal symptoms begins about 10-12 days after infection, in the form of high fever up to 40 ºC- lasting 1-7 days, weakness, lack of appetite, dry cough, rhinitis and conjunctivitis. Inflammatory conjunctivitis is usually more intense in adults with accompanying photophobia, eyelid edema and tearing. The next stage is the appearance of Koplik's spots - 1-2 days before the rash, lasting 1-2 days after the disappearance of rash. Koplik's spots appear on the oral mucosa at the level of second premolars - numerous gray-white clods on a red basis, about 1-2 mm in diameter. Lesions on the mucous membranes are a pathognomonic measles symptom that is sufficient to diagnose it, while the absence of Koplik's spots does not disclaims disease. Afterwards comes a erythematous-maculopapular rash of dark red to violet colour, 0.1-1 cm in diameter. The changes initially occur on the hairline and behind the ears, characteristic down the body in the hand occupation and the soles of the feet. The hairy scalp remains free of rash. The rash can blend over a large area of the body. During this period, the patient's general condition worsens, in addition, bronchitis and pneumonia may occur, diarrhea, lymphadenopathy, and splenomegaly. The rash lasts about 3-7 days, disappears in the order in which it appeared, leaving the epidermal exfoliation, improvement of the patient's general condition. The persistence of fever after this period or its recurrence is evidence of complications.

Measles is a mild or moderately severe disease. Complications occur in about 30% of patients. Most often they concern infants, malnourished children, adults over 20 with deficiencies in cellular immunity. Complications include inflammation of the middle ear, pneumonia, brain, myocardium, blindness, and a very rare complication - subacute sclerosing

inflammatory brain - progressive CNS neurodegeneration that leads to death a few or a dozen years after the measles eradication. Measles causes transient immunosuppression which may result in bacterial overexposure or worsening of the symptoms of latent tuberculosis. Death in the course of measles occurs in 0.1-1 / 1000 cases, according to other sources 1-3 / 1000 cases, unfortunately up to 30% in infants in developing countries. In children the most common causes are pneumonia, in adults, inflammation the brain. In pregnant women, measles infection may result in complications related to pregnant women and pregnancy itself, there is a greater risk of miscarriage, premature delivery, and low birth weight in a child. There are rarely birth defects in children of mothers with measles during pregnancy.

The suspicion of measles disease should be made in every patient with erythematous rash with high fever, accompanied by dry cough, rhinitis and conjunctivitis with photophobia. On the basis of clinical symptoms measles is difficult to differentiate with rash diseases with fever, among others rubella, scarlet, infectious mononucleosis, or parvoviral infection or allergic reactions. Any case of measles suspicion should be reported in the appropriate service. In the case of suspected sporadic disease, the diagnosis is made on the basis of laboratory tests. People who contact with a patient with laboratory confirmed measles, can be diagnosed based on clinical symptoms. Diagnosis of the etiological factor involves serological examination - ELISA or non-vaccine virus cultures. Laboratory diagnostics is possible already on the 2-4 day after the onset of rash.

There is no causative treatment in a case of measles. We can only use symptomatic treatment - antipyretic drugs, antitussive, proper hydration and nourishment of the patient, rest, darkening of the room in the case of photophobia. In malnourished children who are deficient in vitamin A, supplementation is indicated. In the case of complications, appropriate treatment is included - antibiotic therapy with bacterial complications, anti-swelling, anticonvulsant treatment in the case of encephalitis.

In the prevention of infection, we distinguish non-specific and specific methods. The first group of possible preventive measures includes isolation of the patient for 4 days from the onset of rash, throughout the entire period of infection in patients with immunodeficiency. People susceptible to infection (unvaccinated, without a history of measles) after contact with the patient should be isolated throughout the incubation period of 8-12 days. For specific measles prevention methods, we include preventive vaccination and passive immunoprophylaxis.

Vaccination is an application live or killed microorganisms (or fragments thereof, or metabolites) into the body, which allows active immunization - the production of specific antibodies, cellular immunity. Vaccinations are divided into: live / attentive and killed / whole or fragments of microorganisms. The measles vaccine is a live, combined vaccine - it contains fragments of two or more microorganisms, in this case it is a vaccine against: measles, mumps and rubella -MMR and measles, mumps, rubella and varicella-MMRV. Available MMR vaccines show high effectiveness in the prevention of diseases - in the case of measles in people who received 2 doses of the vaccine, its efficacy reaches 97%. MMR vaccination also gives long-term post-vaccination protection. Absolute indications for administration of MMR are typical for other live vaccines: severe allergic reactions after the previous dose, pregnancy, diagnosed severe immunodeficiency eg congenital immunodeficiency, long-term immunosuppressive treatment, period of chemotherapy, HIV infection during severe immunodeficiency, disease proliferative hematopoietic system. The remaining indications are

relative / temporary eg acute febrile illness, chronic disease exacerbation, a positive history of thrombocytopenia, supply of immunoglobulin containing blood products during the last 12 months.

The MMR vaccine is usually well tolerated, rarely gives vaccine adverse events. The most common is fever above 39 °C, usually 7-12 days after vaccination, affects 5-15% of vaccinated people. About 5% of people suffer from rash skin. Transient lymphadenopathy affects 5% of children and about 20% of adults and parotitis occurs in less than 1% of people. For serious vaccine adverse events after vaccination against MMR we include: fever convulsions (1/3,000-4000 vaccinated children, appears on the 6-14 day after MMR administration, do not leave permanent consequences), thrombocytopenic purpura (1/40000 vaccinated persons, occurs around 6 weeks after vaccination), anaphylactic reactions (relatively rarely 1.8-14,4/1000000 doses, probably reaction to the components of the gelatin vaccine, neomycin), encephalitis with the measles body (3 reports on the occurrence of the above-mentioned complication in people with acquired / congenital cell immunodeficiency). There are no scientific data confirming a cause and effect relationship with MMR vaccination and developmental disorders including autism, DM 1 and inflammatory bowel diseases.

Currently recommended MMR vaccination schedule includes 2 doses of the vaccine - the first one is administered in the second year of life, yet another unfortunately differently according to individual guidelines in a given country. The two dose regimen is effective, it is not recommended to administer more doses. According to the recommendations, adults vaccinated with one dose should get a second dose, people who have not been vaccinated so far should receive 2 doses of the vaccine with an interval of at least 4 weeks. Unvaccinated persons after contact with a measles patient should be vaccinated within 72 hours, this may prevent or mitigate the course of the disease. Unvaccinated people on contact with measles who have contraindications for vaccination should be given immunoglobulin.

Measles are endemic all over the world. The most effective tool for fighting against measles virus is vaccination. In the period before the introduction of vaccination against measles, it was a common childhood disease. In the past, periodic epidemic outbreaks every few years in the majority of the population, gave low susceptibility to infection in adults over 20 years of age. In the United States, before the introduction of vaccination in 1964, there were about 0.5 million cases a year, of which around 500 were fatal. In 95%, children under the age of 15 were subjected to the disease. After many years of vaccination in the United States, the incidence of measles in the period 2001-2010 was about 0.03-0.12 / 100,000. In Poland, obligatory vaccinations against measles were introduced in 1975. Until that time, 70,000-120,000 to 140,000-200,000 cases of measles in the epidemic period were registered annually, of which about 90% of cases were children up to the age of 10. In 2010-2016 in Poland, the incidence rate was 0.35 / 100,000, in 2016 only 133 cases of measles were reported. The measles meet the criteria for eradication - the man is the only virus reservoir, diagnostic tests are available to identify the disease, safe and highly effective vaccination is available. Unfortunately, for several years there has been an increase in the number of cases - according to the WHO in Europe by 83%. According to WHO, in the first half of 2018, 41,000 children and adults contracted measles in the area of the former Soviet Union, of which 37 people died. In March 2019, according to the European Center for Disease Prevention and Control (ECDC) report, the number of cases continues to increase. In January 2019, in 19 out of 29 countries, 881 cases of measles were recorded. Both unvaccinated children and adults are currently suffering from measles, appearing in countries from which it

has already been eliminated. In Poland, from January to 28 February 2019, 314 cases of measles were recorded, in the same period in 2018 only 29 cases of the disease were noted, and 339 cases of measles in the whole 2018! Recurrence of the disease is caused primarily by the deviation from vaccination, and thus the decline in the so-called community resistance, which results from the percentage of vaccinated people-the safety threshold. If ≥95% of the population is implanted, populations are considered to be resistant to the disease. In Poland, currently, around 93% of people are vaccinated against measles, which results in an increase in the number of cases. Since 2007, the number of European countries in which the safety threshold for measles has been reached and maintained is decreasing. The question arises as to why the number of vaccinated children is falling, despite the fact that MMR vaccination is compulsory in many countries.

According to the Polish National Institute of Health, in the first half of 2018, over 34 thousand parents refused to vaccinate their child. Vaccinations are considered the greatest achievement of modern medicine. Thanks to them, we do not know the diseases that our ancestors were sick and dying in childhood, and thus we do not have the sense of being threatened, for example, by measles or pertussis. Anti-vaccinations movements have been gaining popularity in the world for years, unfortunately contributing to the recurrence of disease epidemics that have nearly been eliminated. Supporters of these movements proclaim that vaccinations affect the development of the child, and the substances used to produce them are toxic. They base their beliefs on the work of the British doctor Adrew Wakefield, who in the reputable journal Lancet, in 1998 published a work on the association of the MMR vaccine with the occurrence of autism in children. These thesis turned out to be untrue, the work was manipulated, and its author was lifelessly deprived of the right to practice as a physician in 2010. Works on large groups of children have appeared, which denied the relationship between MMR vaccination and childhood autism. Anti-vaccination movements also pay great attention to the harmfulness of other components of vaccines, mainly aluminum salts. It is an adjuvant, a compound that strengthens the body's immune response to the vaccine. Aluminum has been repeatedly checked for safety, the content in the vaccine is trace, much lower than the permissible daily intake of aluminum salts. Also in this case, there are no studies confirming the influence of aluminum on the development of autism. There are plenty of anti-vaccine theories, it's hard to deny them all, one thing is certain, unfortunately they have a significant impact on the number of vaccinations. Anti-vaccine movements cite the freedom of choice, which is not synonymous with arbitrariness. Healthy people, without contraindications to vaccination, have a social responsibility to ensure population resistance for people who are susceptible to disease, and can not be vaccinated - premature babies, newborns, pregnant women, people with cancer, patients with immunodeficiency, etc.

One should conduct large-scale educational activities including media, internet, or individual work with a parent during a visit to the doctor of the first contact. It is necessary to deny false medical theories and bring their publishers to legal liability. Maybe a good idea as a protection for our children is a draft law requiring the implementation of compulsory vaccinations as one of the criteria for recruitment to state-owned educational institutions. We live in the 21st century, and we reject one of the greatest achievements in medicine, exposing children and immunodeficient person to serious illnesses, that people once fell into and dying of. We have not experienced these diseases for the most part, why do we refuse this for our children and grandchildren. "QUO VADIS HOMINE?"

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