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WHOOPING COUGH: EPIDEMIOLOGY, BIOLOGICAL PROPERTIES OF BORDETELLA PERTUSSIS

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Abstract: The problem of epidemiology, laboratory diagnostics and specific prevention of whooping cough remains relevant, since the incidence rate of this "vaccination-controlled" infection is growing annually, despite the wide coverage of vaccinations among children. Knowledge of the characteristics of the spread and course of whooping cough infection, the circulation of Bordetella pertussis strains in modern conditions, the pathogenicity factors of the pathogen and the mechanisms of pathogenesis of the disease is important for both medical students and doctors of various specialties - not only pediatricians, but also therapists, pulmonologists, bacteriologists, epidemiologists, etc.
Keywords: whooping cough, pathogenesis of whooping cough, epidemiology of whooping cough, laboratory diagnostics of whooping cough.

INTRODUCTION

Currently, the problem of whooping cough is again relevant for practical health care in all countries of the world. Despite the vaccination of this disease that has been carried out for more than 50 years, the intensity of the epidemic process and morbidity rates have been steadily increasing since the late 90s of the 20th century. At the same time, the increase in the number of manifest forms of whooping cough creates conditions for the involvement of children in the first months of life in the epidemic process, which is associated with an increase in the severity of the disease and mortality, and atypical, clinically unexpressed forms - to the lack of alertness of clinicians to this infection from the first days of the disease, which are the most favorable for laboratory diagnostics [1].

MATERIALS AND METHODS

Whooping cough is an acute airborne infection caused by microorganisms of the Bordetella pertussis species, characterized by lesions of the mucous membrane primarily of the larynx, trachea, bronchi and the development of a spasmodic cough. The bacteria that cause whooping cough were first isolated from a sick child in 1906 by two scientists - the Belgian Jules Bordet (the genus was named after him) and the Frenchman Octave Gengou (in honor of both of them, the causative agent of whooping cough is also called the Bordet-Gengou bacillus). In addition to describing the microbe, they developed a nutrient medium for its cultivation, which is widely used to this day and is also called the Bordet-Gengou medium in their honor [2].

RESULTS AND DISCUSSION

It is necessary to note the epidemiological features of whooping cough. This is a strict anthroponosis, in which the main source of infection is a sick person, the carriage of bacteria, as is still believed, has no epidemiological significance and has not been registered in groups free of whooping cough, and among children who have had the disease it is no more than 1-2%, with an insignificant duration (up to 2 weeks). Whooping cough is classified as a "childhood infection": up to 95% of cases are detected in children and only 5% in adults. Although the actual frequency

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of whooping cough in adults can hardly be reflected in official statistics due to incomplete registration of all cases, firstly, due to the prejudice of therapists about the age category susceptible to this infection - and therefore low alertness towards it, and secondly, because whooping cough in adults often occurs in atypical forms and is diagnosed as ARI or ARVI. The mechanism of transmission of the disease is aerogenic, and the route is airborne.

The causative agents of whooping cough are gram-negative small rods, the length of which is close to the diameter, and therefore, under microscopy, resemble oval cocci, called coccobacteria; they have a microcapsule, pili, are immobile and do not form spores. They are aerobic, develop better in a humid atmosphere at a temperature of 35–36 °C, and are classified as “fastidious” or “capricious” bacteria with complex nutritional needs [3].

The entry point for infection is the mucous membrane of the respiratory tract. Whooping cough bacilli exhibit strict tropism for the cells of the ciliated epithelium, attach to them and multiply on the surface of the mucous membrane without penetrating the bloodstream. Reproduction usually occurs over 2–3 weeks and is accompanied by the release of a number of strong exotoxins, the main ones being kT and adenylate cyclase. After 2–3 weeks, the causative agent of whooping cough is destroyed with the release of a large complex of intracellular pathogenicity factors. Inflammation develops at the site of colonization and invasion of the pathogen, the activity of the ciliated epithelium is suppressed, mucus secretion increases, ulcerations of the epithelium of the respiratory tract (RT) and focal necrosis appear. The pathological process is most pronounced in the bronchi and bronchioles, less so in the trachea, larynx, and nasopharynx. The resulting mucopurulent plugs clog the lumen of the bronchi and lead to focal atelectasis. Constant mechanical irritation of the DP receptors, as well as the effect of CT, dermonecrotisin, and B. pertussis waste products on them, cause the development of coughing fits and lead to the formation of a dominant-type excitation focus in the respiratory center, resulting in the development of a characteristic spasmodic cough. By this point, the pathological process in the bronchi is self-sustaining even in the absence of the pathogen [4].

CONCLUSION

An important method for assessing the effectiveness of population vaccination is serological monitoring of the level of collective pertussis immunity in those vaccinated with DPT vaccine in “indicator” groups of children aged 3–4 years who have not had whooping cough, with a documented vaccination history and a period of no more than 3 months from the last vaccination. Persons in whose blood serum agglutinins are determined in a titer of 1:160 or higher are considered protected from whooping cough, and the criterion for epidemiological well-being is the identification of no more than 10% of persons in the examined group of children with an antibody level of less than 1:160.

REFERENCES

1. Medunitsyn N.V. Vaccinology. Moscow: Triada-X; 2014.
2. Petrova M.S., Sigaeva L.A., Antonova N.A. Whooping cough (clinic, diagnostics, treatment): Methodical recommendations. Moscow; 2013.
3. Sizemov A.N., Komeleva E.V. Whooping cough: clinical presentation, diagnostics, treatment. Attending physician. 2015; 7: 82–87.
4. Chuprinina R.P., Alekseeva N.A., Ozeretskovsky N.A. Whooping cough prevention: development and use of acellular pertussis vaccine. Journal of Microbiology, Epidemiology and Immunobiology. 2016; 1: 99–105.

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5. Shinkarev A.S., Mertsalova N.U., Mazurova I.K., Borisova Yu., Zakharova N.S., Ozeretskovskaya M.N., et al. Modern strains of B. pertussis: immunobiological properties and improvement of vaccines. Journal of Microbiology, Epidemiology and Immunobiology. 2017; 4: 20–5.