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Features of Extragastric Helicobacteriosis In School-Age Children

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Abstract: This article is devoted to the study of the extragastric clinical and laboratory features of Helicobacter pylori (H. pylori) infection in school-age children. The aim of the study was to identify extragastric changes associated with H. pylori. During the study, the clinical signs and laboratory parameters of children were analyzed.

The results showed that iron deficiency anemia, allergic reactions, and changes in the immune system were more common in children with H. pylori infection. In some cases, the disease was found to proceed with hidden or mildly expressed symptoms. H. pylori infection affects not only the gastrointestinal tract but also other organs and systems in children, which requires early detection and a comprehensive diagnostic approach.

Keywords: Helicobacter pylori, children, extragastric helicobacteriosis, iron deficiency anemia, allergic diseases, clinical signs, laboratory parameters.

Introduction: Helicobacter pylori is a spiral-shaped, gram-negative, microaerophilic bacterium that mainly lives in the mucosa of the human stomach. This microorganism was first identified in 1983 by the Australian scientists Barry Marshall and Robin Warren, who later received the Nobel Prize for this discovery.

The study of the genetic variability of Helicobacter pylori has provided interesting information about human history. Based on multilocus sequence typing and more recently whole-genome sequencing, paleomicrobiology continues to attract the attention of researchers worldwide in relation to the ancient coexistence of this organism with humans. Three studies identifying the distribution of virulence factors have shown controversial results over the past 30 years, attempting to link the distribution of various virulence markers with the clinical outcomes of H. pylori infection. The three articles analyzed the prevalence and risks of multiple infections (genetically distinct isolates) and mixed infections (susceptible and resistant isolates). A number of studies confirm that the prevalence of H. pylori is decreasing worldwide, especially in developed countries and among children, but infection rates remain high in some ethnic minorities and migrants. Although there has been little new information about the route of transmission of H. pylori, intrafamilial spread appears to be important. There are also interesting articles about the presence of the organism in food, water, and the oral cavity [FitzGerald R, et al. Methods Mol Biol. 2021.2].

This review of recent publications related to the epidemiology of Helicobacter pylori highlights the origin of the infection, its changing prevalence, transmission, and outcomes. Several studies have focused on the ancestral roots of the bacterium, and the first genomic analysis of bacterial strains showed

that its coexistence with humans is older than previously thought. In contrast to the overall decline in H. pylori prevalence in some countries, including China and Japan, the prevalence of atrophic gastritis among younger populations has increased in Sweden. The prevalence of infection remains high among indigenous populations in Arctic regions, and reinfection rates are also high. High prevalence is also consistently observed in the Siberian regions of Russia. Several studies using multiplex serology have examined the distribution of different H. pylori serotypes and their associated risks, thereby allowing a more accurate risk assessment. Transmission of H. pylori, particularly fecal-oral transmission, and the use of well water and other untreated water sources have been discussed. Finally, the long-term course of H. pylori infection has been considered, with approximately 89% of non-cardia gastric cancer cases associated with the infection [Gravina AG, et al. World J Gastroenterol. 2018.3].

The epidemiology, diagnosis, clinical manifestations, associated pathology, and treatment approaches of Helicobacter pylori-related diseases differ significantly between children and adults. According to many foreign studies, Helicobacter pylori infection is the main etiological factor in the development of most gastrointestinal diseases. Spiral microorganisms located in the mucosa and on the mucosal surface were first described in the stomachs of cats and dogs by G. Bizzozero in 1893, and three years later by H. Salomon. In 1983, the Australian scientists R. Warren and B. Marshall proved the role of gram-negative anaerobic bacteria in pathogenesis.

This causative agent triggers local and systemic protective reactions in the body. Activation of the complement and cytokine systems, together with leukocytes and phagocytic macrophages of Helicobacter pylori, leads to the formation of IgA, IgG, and IgM antibodies and, consequently, neutrophilic infiltration of the gastric and intestinal mucosa. Chemotaxis and interleukin-8 play an important role in eliminating the pathogen by stimulating leukocytes to release lysosomal enzymes. At the same time, the interstitial space is damaged by active leukocytes, and enzymes and free oxygen radicals penetrate through the epithelium, disrupting its integrity. As a result, Helicobacter pylori destroys cells at the periphery of the lesion, making repair difficult.

Relevance of the Topic. According to the World Health Organization, up to 50% of the population in developed countries and up to 75–95% of the population in developing countries are infected with Helicobacter pylori (Hp). Today, the issues of diagnosing and treating Hp infection in children are becoming more relevant than ever, despite the declining incidence of gastric and duodenal ulcer disease. Hp is a bacterium that can survive in the acidic environment of the stomach and in altered duodenal mucosa, causing a number of diseases such as inflammatory and ulcerative lesions of the upper gastrointestinal tract.

It is now known that Hp infection is the cause of chronic gastritis in most patients and plays an important role in the development of gastric ulcer disease and tumors [4; pp. 20–32, 5; pp. 55–70, 9; pp. 196–205, 11; pp. 53–62, 16; pp. 1–3, 17; pp. 125–137].

In the population of children aged 7 to 11 years, the prevalence of Hp infection in gastrointestinal diseases exceeded 50%, and among high school students it reached 80% [10; pp. 10–18].

It is now well established that infection with this bacterium occurs mainly during childhood, especially within the first decade of life. Intrafamilial transmission is the main route and usually occurs orally or through household contact [7; pp. 212–239, 18; pp. 13–23, 19; pp. 6–30].

In addition to gastroduodenal pathology, persistent Hp infection may be associated with iron deficiency and iron deficiency anemia, vitamin B12 deficiency, delayed growth in adolescents, skin diseases, chronic urticaria, atopic dermatitis, food allergy, and many other conditions, with a total of up to 120 possible disease forms [13; pp. 181–188, 14; pp. 661–664, 15; pp. 1–20].

In 2021, a group of authors led by Professor L.B. Lazebnik in the Russian Federation developed the “VII National Recommendations on the Diagnosis and Treatment of Hp-Associated Diseases.” However, these recommendations are intended only for adults, and similar recommendations for children are still needed. Considering the proven role of Hp in the pathology of extragastric forms, especially in children with chronic gastroduodenitis [2; pp. 119–129, 3; www.who.int/childgrowth, 6; pp. 22–29], the relevance of this problem is beyond doubt and requires deeper research.

Etiology and Pathogenesis. The epidemiology, diagnosis, clinical manifestations, associated pathology, and treatment approaches of Helicobacter pylori-related diseases differ significantly between children and adults. According to many foreign studies, Helicobacter pylori infection is the main etiological factor in the development of gastrointestinal diseases. Spiral microorganisms located in the mucosa and on the mucosal surface were first described in the stomachs of cats and dogs by G. Bizzozero in 1893, and three years later by H. Salomon. In 1983, the Australian scientists R. Warren and B. Marshall proved the role of gram-negative anaerobic bacteria in pathogenesis.

This pathogen induces local and systemic immune reactions. Activation of the complement and cytokine systems, together with leukocytes and phagocytic macrophages of Helicobacter pylori, leads to the formation of IgA, IgG, and IgM antibodies and, consequently, neutrophilic infiltration of the gastric and intestinal mucosa. Chemotaxis and interleukin-8 play an important role in eliminating the pathogen by stimulating leukocytes to release lysosomal enzymes. At the same time, the interstitial space is damaged by active leukocytes, and enzymes and free oxygen radicals penetrate through the epithelium, disrupting its integrity. As a result, Helicobacter pylori destroys cells at the periphery of the lesion, making repair difficult.

Extragastric Forms. It is now well known that infection with this bacterium occurs mainly during childhood, especially within the first decade of life. Intrafamilial transmission is the main route and usually occurs orally or through household contact. In addition to gastroduodenal pathology, persistent Hp infection may be associated with iron deficiency and iron deficiency anemia, vitamin B12 deficiency, delayed growth in adolescents, skin diseases, chronic urticaria, atopic dermatitis, food allergy, and other disorders.

Laboratory Diagnosis. At present, diagnosis of H. pylori infection is carried out using several methods. These include non-invasive tests that do not require endoscopy or biopsy samples, such as serological and urine antibody detection, the urea breath test [UBT], stool antigen test [SAT], and stool PCR, as well as invasive tests that require biopsy samples obtained by endoscopy, such as histopathology, rapid urease test [RUT], microbiological culture, and PCR of biopsy specimens.

All of these methods have their own advantages and limitations. Depending on the clinical situation, some methods may be more preferable than others. Therefore, based on the clinical case, promising H. pylori diagnostic tests with high sensitivity, high specificity, cost-effectiveness, rapidity, and non-invasiveness are recommended. Although non-invasive tests have additional advantages such as lower cost, convenient sample collection, and faster results, antibody detection methods are considered less reliable because they have lower specificity than invasive tests. It is generally accepted that no single test can be considered the “gold standard” for diagnosing infection; rather, the reliability and accuracy of diagnosis increase when several diagnostic tests are used together.

Impact on Children’s Health. Helicobacter pylori is a serious public health problem and the main cause of chronic infection in children and adults worldwide. It is widespread globally and is particularly common in developing countries. If left untreated during childhood, H. pylori infection persists into adulthood. H. pylori poses a serious risk for the development of gastric cancer, as it is responsible for 90% of mucosa-associated lymphoid tissue lymphomas. Since 1994, the International Agency for Research on Cancer has classified H. pylori as a class I carcinogenic risk factor.

CONCLUSION

Thus, Helicobacter pylori infection plays a key role not only in the pathogenesis of peptic ulcer disease, but also causes gastric and duodenal diseases and chronic gastritis in children, while contributing to extragastric diseases and the formation of complex comorbidity. It creates difficulties in the management of comorbid pathology, increases treatment costs, and may lead to disability in patients. Infection is associated with the development of iron deficiency anemia, atypical allergic pathology, and delayed diagnosis of diseases. Based on numerous findings from foreign researchers, bacteria belonging to the Helicobacter pylori group have a proven impact on the quality of life of young patients and their dependence on parents. The infection causes various pathologies of organs and systems and worsens the clinical course of somatic diseases in complex comorbidity.

REFERENCES

1. Burucoa C. Epidemiology of Helicobacter pylori Infection. / C. Burucoa, A. Axon // Helicobacter. — 2017. — Suppl. 1. — DOI: 10.1111/hel.12403
2. Cho J. Helicobacter pylori Infection. / J. Cho, A. Prashar, N.L. Jones et al. // Gastroenterology Clinics of North America. — 2021. — 50(2). — pp. 261–282. — DOI: 10.1016/j.gtc.2021.02.001
3. Ихсанов С.Д. Язвенная болезнь у детей: современный взгляд на проблему. / С.Д. Ихсанов, Д.Ф. Сергиенко // Современные проблемы науки и образования. — 2017. — 2.
4. Korotkaya Y. Helicobacter pylori in Pediatric Patients. / Y. Korotkaya, D. Shores // Pediatrics in Review. — 2020. — 41(11). — pp. 585–592. — DOI: 10.1542/pir.2019-0048
5. Диагностика и лечение хеликобактерной инфекции у детей // Рекомендации общества детских гастроэнтерологов, гепатологов, нутрициологов. Редакция от 31.10.2021 г. Приняты на XX Российском Конгрессе «Инновационные технологии в педиатрии и детской хирургии». — Moscow, 2021
6. Xudayberganova, N. X., & Axmedova, I. M. (2023). Clinical and biochemical features of extragastric

manifestations of Helicobacter pylori-associated gastroduodenal pathology in children.

7. Xudayberganova, N. X., & Alikulov, I. T. (2023). Helicobacter Pylorosis in Children: Features of Diagnosis and Treatment. European Science Methodical Journal, 1(9), 23–28.
8. Xudayberganova, N. X., Azimova, M. M., & Talipov, R. M. (2023). Formation of Iron Deficiency Anemia in Children with Chronic Gastroduodenitis of Helicobacteriosis Etiology.
9. Xudayberganova, N. X., Azadaeva, K. E., & Alikulov, I. T. (2023). Determination of Nutrition-Dependent Micronutrient Deficiencies Among School-Age Children.
10. Khudayberganova, N. X., Rakhmatullaeva, G. K., & Alikulov, I. T. (2023). Helicobacter pylori infection and principles of therapy in children. Best Intellectual Research, 9(3), 272–277.
11. Khudayberganova, N. X., & Axmedova, I. M. (2023). Course of chronic gastroduodenal pathology in children and Helicobacter pylori infection. Academic Research in Educational Sciences, (1), 196–205.
12. Khudayberganova, N. X., Talipov, R. M., & Khaydaraliev, S. U. (2023). Modern concepts of the formation of Helicobacter pylori-associated gastroduodenal pathology in children.
13. Khudayberganova, N. X., & Rakhmatullaeva, G. K. (2023). Prevalence of Helicobacter pylori infection in children with gastroduodenal pathology. Best Intellectual Research, 9(3), 278–281.
14. Khudayberganova, N. X. (2023). Study of Helicobacter pylori infection in school-age children with chronic associated gastroduodenal pathology. Best Intellectual Research, 9(3), 282–289.
15. Treatment of Helicobacter pylori infection in children and probiotics / N.N. Dekhnich, N.V. Ivanchik // Consilium Medicum. Pediatrics. — 2014. — No. 2.
16. Helicobacter infection in children: features of diagnosis and treatment / A.E. Abaturov, O.N. Gerasimenko. — 2011. — No. 4.
17. Akhmedova, I. M., & Khudayberganova, N. X. (2022). Extragastric manifestations of chronic gastroduodenitis in children.
18. Khudayberganova, N. X. (2022). Clinical characteristics of Helicobacter pylori-associated gastroduodenal pathology in children.
19. Khudayberganova, N. X., Salaeva, M. S., Azimova, M. M., Sibirkina, M. V., Nurmetov, Kh. T., Eshmurzaeva, A. A., & Tukhtaeva, N. Kh. (2019). Study of the nutritional status of school-age children with excess body weight. National and international standards of food safety: current problems of nutrition and digestion, 298.
20. Nurmetov, Kh. T., Talipov, R. M., Khudayberganova, N. X., Azadaeva, K. E., & Khodzhimatova, I. Kh. (2024). Features of immune status in some digestive diseases.
21. Khudayberganova, N. X., Nurmetov, Kh. T., & Khaydaraliev, S. U. (2024). To assess the prevalence of iron deficiency anemia and Helicobacter pylori infection among school-age children with chronic gastroduodenal pathology.
22. Chey WD, Wong BC, Practice Parameters Committee of the American College of Gastroenterology. 2007. American College of Gastroenterology Laboratory Diagnosis of H. pylori Infection on the management of Helicobacter pylori infection. Am J Gastroenterol 102:1808–1825. https://doi.org/10.1111/j.1572-0241.2007.01393.x
23. Oluwasola AO, Okolo CA, Otegbayo JA, Adeniyi B, Kehinde AO, Akere A, Ola SO, Lawal TO, Idowu PA, Odaibo G, Lawan AI. 2011. Comparative study of methods of diagnosis of Helicobacter pylori infection in Ibadan, Nigeria. Niger J Gastroenterol Hepatol 3:31–38.
24. Kabir S. 2001. Detection of Helicobacter pylori in faeces by culture, PCR and enzyme immunoassay. J Med Microbiol 50:1021–1029. https://doi.org/10.1099/0022-1317-50-12-1021
25. Hunt RH, Xiao SD, Megraud F, Leon-Barua R, Bazzoli F, van der Merwe S, Vaz Coelho LG, Fock M, Fedail S, Cohen H, Malfertheiner P, Vakil S, Hamid S, Goh KL, Wong BC, Krabshuis J, Le Mair A, World Gastroenterology Organization. 2011. Helicobacter pylori in developing countries. World Gastroenterology Organisation global guideline. J Gastrointestin Liver Dis 20:299–304.
26. Iwanczak F, Pytrus T, Iwanczak B, Gościniak G, Witkowska-Vogtt E, Dzierzanowska D, Laszewicz W. 2005. Assessment of selected tests in diagnostics of Helicobacter pylori infections. Pol Merkur Lekarski 19:52–56.
27. Ansari S, Yamaoka Y. 2018. Current understanding and management of Helicobacter pylori infection: an updated appraisal. F1000Res 7:721. https://doi.org/10.12688/f1000research.14149.1
28. Usui Y, Taniyama Y, Endo M, Koyanagi YN, Kasugai Y, Oze I, Ito H, Imoto I, Tanaka T, Tajika M, et al. 2023. Helicobacter pylori, homologous-recombination genes, and gastric cancer. N Engl J

Med 388:1181–1190. doi: 10.1056/NEJMoa2211807

29. Huang J, Lucero-Prisno DE III, Zhang L, Xu W, Wong SH, Ng SC, Wong MCS. 2023. Updated epidemiology of gastrointestinal cancers in East Asia. Nat Rev Gastroenterol Hepatol 20:271–287. doi: 10.1038/s41575-022-00726-3

30. Zamani M, Ebrahimtabar F, Zamani V, Miller WH, Alizadeh-Navaei R, Shokri-Shirvani J, Derakhshan MH. 2018. Systematic review with meta-analysis: the worldwide prevalence of Helicobacter pylori infection. Aliment Pharmacol Ther 47:868–876. doi: 10.1111/apt.14561

31. Axon A. 2014. Helicobacter pylori and public health. Helicobacter 19:68–73. doi: 10.1111/hel.12155

32. Friedrich V, Gerhard M. 2023. Vaccination against Helicobacter pylori — An approach for cancer prevention? Mol Aspects Med 92:101183. doi: 10.1016/j.mam.2023.101183

33. Ahn HJ, Lee DS. 2015. Helicobacter pylori in gastric carcinogenesis. World J Gastrointest Oncol 7:455–465. doi: 10.4251/wjgo. v7.i12.455