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FEATURES OF THE COURSE OF CHRONIC GASTRODUODENITIS ASSOCIATED WITH HELICOBACTER PYLORI IN SCHOOL-AGE CHILDREN

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ABSTRACT
The article presents an analysis of anamnestic, clinical, laboratory, and comorbidity index indicators in 106 children aged 7 to 16 years with a confirmed diagnosis of chronic gastroduodenitis (CGD), examined at the Department of Gastroenterology and the consultative diagnostic clinic of the Republican Specialized Scientific and Practical Medical Center of Pediatrics. Of these, 76 children (71.6%) were confirmed to have Helicobacter pylori (Hp)-associated CGD (main group), and 30 children (28.3%) had CGD without Hp (control group). Extra-gastric manifestations associated with Hp persistence were detected in 33 children (43.4%), while exogastric conditions developing outside the gastrointestinal tract but associated with Hp were found in 38 children (50.0%). Children with Hp-associated CGD showed significantly more frequent allergic and gastrointestinal disease in relatives, lower anthropometric z-scores indicating protein-energy deficiency, and a substantially higher comorbidity burden compared with the control group ($P<0.05$). These findings indicate that Hp plays a specific trigger role in the development of gastric and extra-gastric pathology in school-age children and should be taken into account when planning diagnostic and therapeutic strategies for this patient group.

KEYWORDS: Helicobacter pylori; Children; Chronic gastroduodenitis; Comorbidity; Extra-gastric manifestations

INTRODUCTION

According to the World Health Organization, up to 50% of the population of developed countries and up to 75–95% of the population of developing countries are infected with Helicobacter pylori (Hp). The problems of diagnosis and treatment of Hp infection in children remain highly relevant, regardless of the overall downward trend in the incidence of gastric and duodenal ulcers.

Hp is a bacterium capable of surviving in the acidic environment of the stomach and in the altered mucous membrane of the duodenum, causing a range of diseases, including inflammatory and ulcerative lesions of the upper gastrointestinal tract (Belmer et al., 2021a; Khudayberganova, 2021a; Cho et al., 2021).

Hp infection is now recognized as the cause of chronic gastritis in most patients and plays an important role in the development of peptic ulcer disease and gastric tumors (Vorobev, 2022; Ivashkin et al., 2018; Khudayberganova & Akhmedova, 2021b; Khudayberganova et al., 2021d; Kakiuchi, 2024; Kato et al., 2019).

Among children aged 7 to 11 years, the prevalence of Hp infection in gastrointestinal pathology exceeds 50%, and among senior schoolchildren it reaches 80% (Khudayberganova & Rakhmatullaeva, 2021c).

Infection with this bacterium occurs mainly in childhood, primarily during the first decade of life, with intrafamily transmission occurring predominantly through oral or household contact (Leontiadis et al., 2017; Kornienko et al., 2020; Malfertheiner et al., 2017). In addition to gastroduodenal pathology, the clinical presentation may include iron deficiency and iron-deficiency anemia associated with Hp persistence, vitamin B12 deficiency, growth retardation in adolescents, skin conditions, chronic urticaria, atopic dermatitis, and food allergy, with up to 120 associated conditions described in total (Ferdaus et al., 2024; Fiorini et al., 2018; Hashim et al., 2024). Whether Hp should be regarded as a pathogen specifically in the pediatric population, as opposed to an incidental commensal finding, itself remains a matter of ongoing discussion (Manfredi et al., 2023).

In 2021, a group of authors led by Professor L.B. Lazebnik in the Russian Federation developed the “VII National Recommendations for the Diagnosis and Treatment of Hp-Associated Diseases”; however, these recommendations are intended only for the adult population, and the development of analogous recommendations for children remains necessary. Given the well-established involvement of Hp in extra-gastric pathology, particularly in children with chronic gastroduodenitis (Bordin et al., 2022; World Health Organization, 2006; Kasparov et al., 2019), the relevance of this problem is undeniable and warrants further in-depth study.

Purpose of the study: to investigate the features of the clinical course of chronic gastroduodenitis associated with Helicobacter pylori in school-age children.

MATERIAL AND METHODS

The study examined 106 children aged 7 to 16 years undergoing treatment in the gastroenterology department and the consultative-diagnostic polyclinic of the Republican Specialized Scientific and Practical Medical Center of Pediatrics of the Republic of Uzbekistan. They comprised 76 children (71.6%) with Hp-associated CGD (main group) and 30 children (28.3%) with CGD without Hp (comparison group).

The diagnosis of chronic gastroduodenitis was established according to the classification of Mazurin (1994). The comorbidity index was assessed according to the method of Charlson et al. (1987).

Laboratory methods included complete blood count and stool analysis, examination for helminth eggs and occult blood in stool, and enzyme-linked immunosorbent assay for Hp antigen in stool. Instrumental methods included esophagogastroduodenoscopy (EGDS) performed in all children using an Olympus GIF 80 flexible fibroscope, and abdominal ultrasound performed using a Toshiba Aplio 500 device (Japan).

Statistical processing was performed by calculating the arithmetic mean (M), standard error (m), and confidence intervals (σ), with significance of differences assessed using Student's t-test in Microsoft Office Excel 2010. Differences were considered statistically significant at $P<0.05$.

RESULTS

Among the examined children, 40 (52.6%) were of primary school age (7–11 years) and 36 (47.3%) were of senior school age (12–16 years). Hp-associated CGD was observed in 37 boys (48.6%) and 39 girls (51.3%), indicating no significant difference in sex distribution. The mean age of the children was 11.3±0.6 years, and the mean disease duration was 5.4±0.9 years.

In children with Hp-associated CGD, allergic and gastrointestinal diseases were more frequently identified among relatives: 27 (35.5%) and 56 (73.6%) in the main group versus 2 (6.6%) and 10 (33.3%) in the comparison group, respectively ($P<0.05$; $P<0.01$). Hypersensitivity to food and drugs in the anamnesis was identified in 27 children (35.5%) of the main group and 2 children (6.6%) of the comparison group. Among children diagnosed with Hp, 39 (51.3%) had relatives with diseases of the stomach or duodenum, supporting the likelihood of mother-to-child transmission of Hp infection.

Analysis of physical development revealed differences between groups depending on Hp association. The lowest indicators were found among boys with confirmed Hp infection: mean height z-score was −2.94±0.24, weight z-score was −2.07±0.26, and BMI z-score was −2.11±0.20, indicating a moderate degree of protein-energy deficiency (Table 1).

Table 1 Indicators of physical development according to Hp association in children with CGD

Criterion	Group I, girls (n=39)	Group I, boys (n=37)	Group II, girls (n=15)	Group II, boys (n=15)
Height (SD)	−2.07±0.18	−2.94±0.24*	−0.49±0.33	−0.26±0.9
Weight (SD)	−2.04±0.8	−2.07±0.26*	−0.98±0.20	−0.26±0.11
BMI (SD)	−2.08±0.17	−2.11±0.20**	−0.01±0.33	−0.12±0.05

Note: * $P<0.05$, ** $P<0.01$, statistically significant differences versus Group II.

Children with Hp infection more often had a history of incomplete or short-duration breastfeeding ($P<0.05$); exclusive breastfeeding up to 6 months was documented in 8 children (10.5%) of the main group versus 18 children (60.0%) of the comparison group. Premature and improperly sequenced introduction of complementary foods was observed twice as often in the main group ($P<0.05$).

Pain, dyspeptic, and asthenovegetative syndromes were more common in the main group. Abdominal pain was detected in 48 children (63.1%) of the main group and 20 children (66.6%) of the comparison group. Dyspeptic symptoms were present in all 76 children (100%) of the main group and 23 children (76.6%) of the comparison group; nausea was noted in 27 cases (35.5%), belching in 59 cases (77.6%, $P<0.001$), indigestion in 19 cases (25%), and bitter taste in 16 cases (21.1%), each exceeding the corresponding comparison-group frequencies. Asthenovegetative syndrome was detected in 67 children (88.1%) of the main group and 23 children (76.6%) of the comparison group, and decreased appetite in 52 children (68.4%) of the main group versus 8 children (26.6%) of the comparison group ($P<0.05$).

On EGDS examination, antral erosive gastritis was identified in 24 children (31.5%), hypertrophic gastritis in 10 (13.1%), and atrophic gastritis in 10 (13.1%), indicating a long-standing pathological process. Signs of reflux esophagitis were found in 22 children (20.7%) of the main group, with a duodenogastric-to-gastroesophageal reflux ratio of 1:2.9; 57 older-school-age children (74.9%) in the main group had combined GERD and duodenogastric reflux.

Ultrasound examination revealed biliary system disease (biliary dyskinesia, chronic cholecystitis) in 31 children (40.7%) and pancreatic disease in 3 children (3.9%). By biliary sediment type, type 1 was found in 26 children (61.9%), type 2 in 12 (28.5%), and type 3 in 4 (9.5%), with type 1 significantly more frequent than types 2 and 3 ($P<0.01$ for both).

Extra-gastric manifestations within the digestive system were identified in 33 children (43.4%) of the main group, including gallbladder dyskinesia (65 [85.5%] vs 0% in controls), biliary sediment (23 [30.2%] vs 0%), sphincter of Oddi dysfunction of pancreatic type (35 [46.0%] vs 7 [2.3%]), irritable bowel syndrome with constipation (22 [28.9%] vs 5 [16.6%]), irritable bowel syndrome with diarrhea (6 [7.8%] vs 2 [6.6%]), food allergy (27 [35.5%] vs 2 [6.6%]), gastroesophageal reflux disease (56 [73.6%] vs 1 [3.3%]), and protein-energy deficiency (22 [28.9%] vs 3 [10.0%]).

Exogastric conditions developing outside the digestive system but associated with Hp were found in 38 children (50.0%) overall, including musculoskeletal changes such as posture disorders (54 [71.0%] vs 4 [30.0%]), dental caries (50

[65.7%] vs 5 [16.6%]), autonomic dysfunction (74 [97.3%] vs 14 [46.6%]), neurotic and asthenoneurotic conditions (40 [52.6%] vs 6 [20.0%]), and excess body weight (16 [21.0%] vs 2 [6.6%]).
Analysis of the comorbidity index showed that 20 children (26.3%) of the main group and 11 (36.6%) of the comparison group had a low comorbidity value (fewer than 3 comorbidities); 26 (34.2%) and 7 (23.3%), respectively, had moderate values (4–5 comorbidities); and 12 children (15.7%) of the main group had high values (more than 6 comorbid conditions), a category not observed in the comparison group.

DISCUSSION

The present findings confirm that Hp-associated CGD in school-age children is characterized not only by the expected gastroduodenal symptomatology but also by a substantial burden of extra-gastric and exogastric manifestations, affecting the hepatobiliary, musculoskeletal, autonomic nervous, and nutritional domains. This pattern is consistent with the broader literature describing Hp as a systemic trigger capable of contributing to a wide range of conditions beyond the gastrointestinal tract, with up to 120 associated conditions described across various organ systems (Ferdaus et al., 2024; Fiorini et al., 2018; Hashim et al., 2024).
The markedly higher comorbidity index observed in the main group, together with the anthropometric evidence of protein-energy deficiency specifically among Hp-infected boys, underscores the potential of chronic Hp infection to impair normal growth and development during a critical period of childhood, consistent with previously reported associations between Hp persistence and growth retardation in adolescents (Khudayberganova et al., 2021d; Khudayberganova & Akhmedova, 2021b).
The association between shortened or absent exclusive breastfeeding and higher rates of Hp infection observed in this cohort aligns with the recognized role of early-life oral and household contact as the principal transmission route for Hp within families (Kornienko et al., 2020; Malfertheiner et al., 2017), and suggests that infant feeding practices may represent a modifiable factor relevant to Hp transmission risk in this population.
Existing national and international clinical guidelines for Hp management remain oriented primarily toward the adult population (Malfertheiner et al., 2017; Kato et al., 2019), and the VII National Recommendations developed for the Russian Federation in 2021 likewise apply only to adults. Given the distinct extra-gastric symptom burden and comorbidity pattern documented here in children, the present findings support the continued call for pediatric-specific diagnostic and management guidelines for Hp-associated disease, rather than direct extrapolation from adult-oriented recommendations.
This study has limitations inherent to its single-center, cross-sectional design, including reliance on Charlson comorbidity index scoring that was originally developed and validated for adult populations, and the absence of longitudinal follow-up data on treatment response or long-term outcomes of the documented extra-gastric manifestations, both of which represent priorities for future research.

CONCLUSION

Taking into account the comorbidity index of children with Hp-associated CGD together with the frequency and severity of the identified extra-gastric manifestations of Helicobacter pylori infection, Hp appears to play a specific trigger role in the development of both gastric and extra-gastric pathology in school-age children. This should be taken into account in the management of these patients and warrants further study directed toward the selection of appropriate corrective therapy.

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