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Research Article

Helicobacter pylori Gastritis and Gastric Intestinal Metaplasia in Children: A Retrospective Study from Eastern Anatolia, Türkiye

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Abstract

Objectives: Helicobacter pylori (HP) infection is a major risk factor for gastric cancer and is associated with gastric intestinal metaplasia (GIM). This study aimed to assess the prevalence and characteristics of HP gastritis and GIM in children in Eastern Anatolia, a region with high gastric cancer incidence.

Methods: This retrospective study included children (<18 years) who underwent esophagogastroduodenoscopy with gastric biopsies at Van Training and Research Hospital between September 2021 and January 2023. Histopathological reevaluation was performed for HP infection and GIM. Demographic, clinical, and endoscopic features were recorded.

Results: A total of 246 patients were included (median age 14.2 years, 67.5% female). HP gastritis was found in 47.2% (n=116), with 7.8% (n=9) detected only in corpus biopsies. HP-positive patients were older than negatives (15.2 vs. 12.9 years, p=0.001). Antral nodularity was strongly associated with HP (p<0.001). GIM was identified in 3.7% (n=9), 66.7% were HP positive. GIM was complete in 6 and incomplete in 3 cases; 1 (11.1%) showed only corpus involvement.

Conclusion: HP gastritis and GIM are notable in children in this high-risk region. Corpus biopsies prevented missed diagnoses in 7.8% of HP and 11.1% of GIM cases, highlighting their importance. Older children with antral nodularity require evaluation

Keywords: Gastric biopsy, Helicobacter pylori, intestinal metaplasia

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Helicobacter pylori (HP) infection is one of the most common chronic bacterial infections worldwide and is strongly associated with chronic gastritis, peptic ulcer disease, gastric adenocarcinoma, and mucosa-associated lymphoid tissue (MALT) lymphoma.[1, 2] The pathogenesis involves persistent colonization of the gastric mucosa, triggering chronic inflammation which may progress through a cascade of precancerous lesions, including atrophic gastritis and gastric intestinal metaplasia (GIM).[3] HP infection typically begins in childhood and, if left untreated, can persist lifelong.[2, 4]

The global prevalence of HP infection varies by region, with the highest rates observed in developing countries.[1] Türkiye is recognized as a high-prevalence country for HP. A nationally representative study in adults using the ^{13}C-urea breath test reported an overall prevalence of 82.5%, with higher rates in rural areas and lower socioeconomic groups.[4] More recent pediatric investigations, however,

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indicate that infection rates in children vary considerably by region and methodology. Endoscopic studies report HP prevalence in children ranging between 30% and 56.6%,[5] while hospital-based biopsy series from Western Turkey indicate rates around 47.2%.[6] Region-specific studies from Eastern and Southeastern Türkiye show a broader range (23.6%-75.8%), with an average closer to 30.7%.[7] These data illustrate the wide variability in pediatric HP prevalence across different settings in Türkiye and underscore the importance of regional and methodological context when interpreting these estimates.

GIM, characterized by the replacement of gastric epithelium with intestinal-type epithelium, is a well-recognized precancerous lesion in the Correa cascade.[3] Although GIM extensively has been extensively studied in adults, reports of GIM in children have been increasing, raising concerns for early-onset gastric carcinogenesis.[2] However, data on the prevalence and clinicopathological characteristics of pediatric GIM remain scarce, particularly in countries with high HP prevalence. Therefore, the present study aimed to investigate the prevalence and clinicopathological features of HP gastritis and GIM in children undergoing endoscopic evaluation in the Eastern Anatolia region of Türkiye.

Methods

Study Design and Setting

This retrospective, cross-sectional study included all children aged <18 years who underwent esophagogastroduodenoscopy (EGD) with gastric biopsies at Van Training and Research Hospital between September 23, 2021, and January 12, 2023.

Endoscopic Evaluation and Biopsy Protocol

All EGDs were performed using standard pediatric or adult upper gastrointestinal endoscopes under general anesthesia. Endoscopic findings were recorded in the original procedure reports.

Histopathological Assessment

All biopsy specimens obtained during EGD were initially evaluated by pathologists for routine diagnostic purposes. For the present study, archived histopathology reports were reviewed. In cases where gastric intestinal metaplasia (GIM) was reported, the original histopathology slides were re-examined by an experienced pathologist to confirm the diagnosis and characterize the lesion. GIM was classified as complete or incomplete, and its distribution (antrum only, corpus only, or both) was recorded. HP status was assessed using hematoxylin-eosin and Giemsa stains.

Data Collection

Demographic data (age, sex), clinical features, endoscopic findings, and histopathological results were retrospectively retrieved from hospital medical records.

Statistical Analysis

Data were analyzed using SPSS for Windows, version 22.0. Continuous variables were expressed as median (interquartile range, IQR), and categorical variables as frequency and percentage. Comparisons between groups were performed using the Mann-Whitney U test for continuous variables and the Chi-square or Fisher's exact test, where appropriate, for categorical variables. A two-tailed p-value <0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Ethics Committee of Van Training and Research Hospital (Approval No: 2023/21-01, Date: October 6, 2023). Written informed consent for endoscopic procedures was obtained from parents or legal guardians of all patients, and assent was obtained from children when appropriate. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Results

Table 1 summarizes the demographic, endoscopic, and histopathological findings of the patients according to HP infection.

Demographic Characteristics

A total of 246 pediatric patients were included in the study. The median age was 14.2 years (IQR: 10.3-16.3), and 67.5% (n=166) were female.

Helicobacter pylori Gastritis

HP gastritis was detected in 47.2% (n=116) of patients. Prevalence was slightly higher in females (51.8%, 86/166) than in males (37.5%, 30/80), although this difference was not statistically significant (p=0.41). The median age of HP-positive patients was significantly higher than that of HP-negative patients (15.2 years, IQR 11.6-16.6 vs. 12.9 years, IQR 9.6-16; p=0.001). In 7.8% (n=9) of HP-positive patients, HP was identified only in corpus biopsies.

Antral nodularity was the most common abnormality, observed in 21.1% (n=52) of patients, and was significantly more frequent in HP-positive than in HP-negative cases (88.5% vs. 11.5%, p<0.001). Among HP-positive patients, moderate to severe chronic gastritis was observed in 91.3% of cases. Atrophy was detected in the antrum of one HP-positive patient.

Table 1. Demographic, endoscopic, and histopathological findings of the patients

Variable	Total (n=246)	HP-positive (n=116)	HP-negative (n=130)	p
Age, years, median (IQR)	14.2 (10.3-16.3)	15.2 (11.6-16.6)	12.9 (9.6-16.0)	0.001
Female sex, n (%)	166 (67.5)	86	80	
Antral nodularity, n (%)	52 (21.1)	46	6	<0.001
Atrophy, n (%)	1 (0.4)	1	0	
GIM, n (%)	9 (3.7)	6	3	
GIM type				
Complete GIM	6 (66.7)	5	1	
Incomplete GIM	3 (33.3)	1	2	
GIM location				
Antrum only	7	4	3	
Corpus only	1	1	0	
Antrum + corpus	1	1	0	

HP: Helicobacter pylori; N: Number; IQR: Interquartile range; GIM: Gastric intestinal metaplasia.

Gastric Intestinal Metaplasia

GIM was identified in 3.7% (n=9) of patients, of whom 66.7% (n=6) were HP positive. The median age of patients with GIM was significantly higher than that of those without GIM (16.7 years, IQR 16.1-17.5 vs. 14.1 years; p<0.05).

Complete GIM was present in 6 patients and incomplete GIM in 3. In most cases (77.8%, n=7), lesions were confined to the antrum. One case (11.1%) involved both the antrum and corpus, and one (11.1%) was limited to the corpus. Overall, most GIM cases were confined to the antrum and associated with HP infection.

Diagnostic Impact of Corpus Biopsy

Biopsies were obtained from the antrum in all cases and from the corpus in 92.3% (n=227) of patients. In 7.8% (n=9) of HP-positive patients, infection was detected exclusively in corpus biopsies, and in 11.1% (n=1) of GIM cases, lesions were identified only in the corpus. Without corpus sampling, 7.8% of HP cases and 11.1% of GIM cases would have been missed.

Discussion

HP infection remains one of the most common chronic bacterial infections in children, especially in highly endemic countries such as Türkiye, and constitutes a major risk factor for the development of gastric precancerous lesions, including GIM.[1, 2] In this study, almost half of the children undergoing EGD were HP-positive, and GIM was detected in a small but clinically relevant proportion of patients (3.7%). Our results are consistent with previous studies showing that HP infection is strongly associated with chronic gastritis and the development of GIM in children.[8, 9] These findings highlight the importance of early diagnosis and eradication of HP in children to prevent progression along the Correa cascade. Interestingly, in our cohort, GIM was observed not only in the antrum but also in the corpus in a subset of patients. This observation is consistent with earlier pediatric studies reporting that corpus involvement may be seen even at young ages, potentially indicating progression to a more advanced stage in the precancerous cascade.[8, 10] Similarly, Li et al.[11] reported that antral GIM in children may coexist with other mucosal changes and that the likelihood of GIM increases with age, supporting our finding that older children were more likely to have GIM. Since corpus-predominant or multifocal GIM has been associated with a higher malignant potential in adults,[3] the presence of such lesions in children may warrant careful long-term surveillance. Furthermore, the prevalence of GIM in our study (3.7%) was similar to that reported by Kara et al. (3.1%),[9] lower than that described by Villarreal-Calderon et al. (6.1%),[12] and higher than that reported by Yu et al. (1.1%).[8] Such differences may be explained by variations in histopathological definitions or geographic differences in HP virulence factors.[1]

Another important finding of our study was the diagnostic contribution of corpus biopsies. Infection was detected exclusively in corpus samples in 7.8% of HP-positive cases, and GIM lesions were detected exclusively in the corpus in 11.1% of GIM cases. This finding reinforces the ESPGHAN/NASPGHAN guideline recommendation that both antral and corpus biopsies should be obtained during pediatric endoscopy to ensure accurate diagnosis of HP and related mucosal changes.[2] Failure to include corpus sampling may lead to underdiagnosis, particularly in cases with patchy or corpus-predominant involvement, as highlighted in previous pediatric series.[8, 10]

From a clinical perspective, the detection of corpus or multifocal GIM in pediatric patients is concerning, since in adults such patterns are associated with an increased risk of progression to gastric adenocarcinoma.[3] Moreover, Li et al.[11] reported that in follow-up biopsies of children with GIM, persistent lesions were observed in 40.7% of cases, suggesting that once established, GIM may persist for years despite the absence of dysplasia. This finding emphasizes the need for careful follow-up of pediatric GIM cases, particularly in high-risk geographic regions. Although the malignant potential of pediatric GIM remains uncertain, these patients may benefit from tailored surveillance strategies, especially in regions such as Eastern Anatolia, where gastric cancer incidence is high.[4]

Strengths of this study include its relatively large sample size, the use of standardized endoscopic and histopathological protocols, and re-examination of GIM cases by a pathologist to confirm diagnosis and classification. Limitations include its retrospective single-center design, the absence of HP virulence factor analysis, and the lack of long-term follow-up to assess the natural history of GIM in this population.

Future prospective multicenter studies with longitudinal follow-up are needed to clarify the progression risk of pediatric GIM and to establish optimal surveillance protocols in high-prevalence settings.

Conclusion

HP gastritis is frequent in children and may coexist with GIM, particularly in regions such as Eastern Anatolia where HP prevalence and gastric cancer rates are high. Our findings emphasize the need for corpus biopsies to avoid premalignant lesions and support further prospective studies to clarify the natural history and clinical impact of GIM in children.

Disclosures

Ethics Committee Approval: The study protocol was approved by the Ethics Committee of Van Training and Research Hospital (Approval No: 2023/21-01, Date: October 6, 2023). Written informed consent for endoscopic procedures was obtained from parents or legal guardians of all patients, and assent was obtained from children when appropriate. The study was conducted in accordance with the principles of the Declaration of Helsinki.

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