Neuro-Cell Molecular Research

Research Article

Neuro-Cell Mol Res 2025;2(1):12-15

Co-infection of *Helicobacter pylori* with *Blastocystis* and *Giardia intestinalis* in children with gastrointestinal symptoms

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DOI: 10.5281/zenodo.15311507

Received: 19 March 2025
Accepted: 22 April 2025
Published: 30 April 2025

The author(s) - Available online at **www.neurocellmolres.com.tr**

ABSTRACT

This study was conducted to investigate the relationship between *Helicobacter pylori* infection with *Blastocystis* and *Giardia intestinalis* infections in children

A total of 300 pediatric patients (0-17 years of age), including 155 patients who were determined to be *H. pylori* positive and 145 patients who were determined to be *H. pylori* negative, were included in the study. Stool samples of all patients included in the study were analyzed by the nativ-Lugol method

Among *H. pylori*-positive patients, 3.2% (5/155) had *G. intestinalis* and 6.4% (10/155) had *Blastocystis*. In *H. pylori* negative patients, *G. intestinalis* was detected in 3.4% (5/145) and *Blastocystis* in 6.2% (9/145). No statistically significant difference was found between *H. pylori* and *G. intestinalis* or *Blastocystis* positivity.

The incidence of *G. intestinalis* and *Blastocystis* infections in children is independent of *H. pylori* infection.

Keywords: *Blastocystis*, *Giardia*, *Helicobacter*, Intestinal, Stool

Cite this article as: Barlık F, Ateş N, Aydemir S. Co-infection of Helicobacter pylori with Blastocystis and Giardia intestinalis in children with gastrointestinal symptoms. Neuro-Cell Mol Res. 2025;2(1):12-15. doi:10.5281/zenodo.15311507

INTRODUCTION

In developing and underdeveloped countries, studies on co-infection of many different pathogens are frequently encountered. These pathogens, which cause common or similar complaints in patients, may prolong the clinical process or aggravate the clinical picture. Among these pathogens, especially parasitic agents draw attention [1].

Intestinal parasitoses are among the most common diseases worldwide. These parasitoses are serious public health threats that cause physical and mental health problems [2]. In the gastrointestinal (GI) tract, pathogenic bacteria, as well as a large number of commensal bacteria that affect the behaviour of the protozoan parasites with which they directly interact, can accompany this condition. Among pathogenic bacteria, *Helicobacter pylori* has been reported to affect the virulence and pathophysiology of parasitic protozoa [3].

Helicobacter pylori and intestinal parasites are infectious agents of public health importance worldwide and are common causes of GI disorders. *H. pylori* is a Gram-negative bacterium that has been identified as a major cause of peptic ulcers and stomach cancer. They produce certain enzymes that can have a devastating effect on the epithelial layer of the stomach and, more importantly, the active enzyme urease. The urease produced by *H. pylori* converts urea in the stomach wall into ammonia, which can cause an increase in the pH of the gastric environment. The acidity of the stomach is considered an important barrier of the innate immune system that protects against invasion by pathogens. Decreased acidity by *H. pylori* gives pathogens the opportunity to overcome this barrier and invade the gastric mucosa [2, 4]. This study was conducted to investigate the relationship between *H. pylori* infection and *Blastocystis* and *Giardia intestinalis* infections in children.

METHODS

Patient Selection

In this descriptive quantitative study, a total of 300 pediatric patients (0-17 years of age), including 155 patients who were determined to be *H. pylori* positive and 145 patients who were determined to be *H. pylori* negative, were included in this study between May-August 2024 at Van Yüzüncü Yıl University Dursun Odabaş Medical Center with gastrointestinal complaints and referred to the parasitology laboratory. Age and gender information of the patients were recorded.

Direct Microscopic Examination

Stool samples were collected from all patients included in the study. A rice grain-sized portion of stool was taken from each sample using a stick, and these samples were microscopically examined for intestinal protozoa using the native-Lugol method. Preparations were examined under a 40X objective to identify protozoan cysts and trophozoites.

Statistical Analysis

The comparison of proportions for categorical variables was conducted using the Z (t) test. A statistical significance level of 5% was utilized for calculations, and the MINITAB (version 14) statistical software package was employed for these calculations.

RESULTS

Of the 300 patients included in the study, 152 (50.7%) were male and 148 (49.3%) were female, with a mean age of 11.3± 5.2 years (0-17 years)

Microscopic examination of the samples revealed *G. intestinalis* in five (3.2%) and *Blastocystis* in 10 (6.4%) of the *H. pylori*-positive patients (155). *In H. pylori* negative patients (145), *G. intestinalis* was detected in five (3.4%) and *Blastocystis* in nine (6.2%) (Table 1). In the statistical evaluation, no statistically significant difference was found between *H. pylori* and *G. intestinalis* or *Blastocystis* positivity.

DISCUSSION

Helicobacter pylori is one of the most common pathogenic bacteria detected in humans, and diseases caused by this pathogen are an important public health problem, especially in developing countries. Infection with *H. pylori* is most commonly acquired during childhood and is reported to cause gastritis and peptic ulcer in infected individuals [5]. Intestinal parasitosis is a serious public health problem affecting approximately 3.5 billion people worldwide and causing diseases in approximately 450 million people. Children are the most affected [6]. The most common intestinal parasites in the GIS are protozoa, with *G. intestinalis* and *Blastocystis* being the most common protozoa [4, 7].

Protozoa are known to be frequently present in co-infections. Co-infections of *H. pylori* and protozoa are expected due to transmission dynamics [8]. In a meta-analysis study, it was reported that overlaps between *H. pylori* and protozoa were high in countries with low human development index (HDI) and income levels [9].

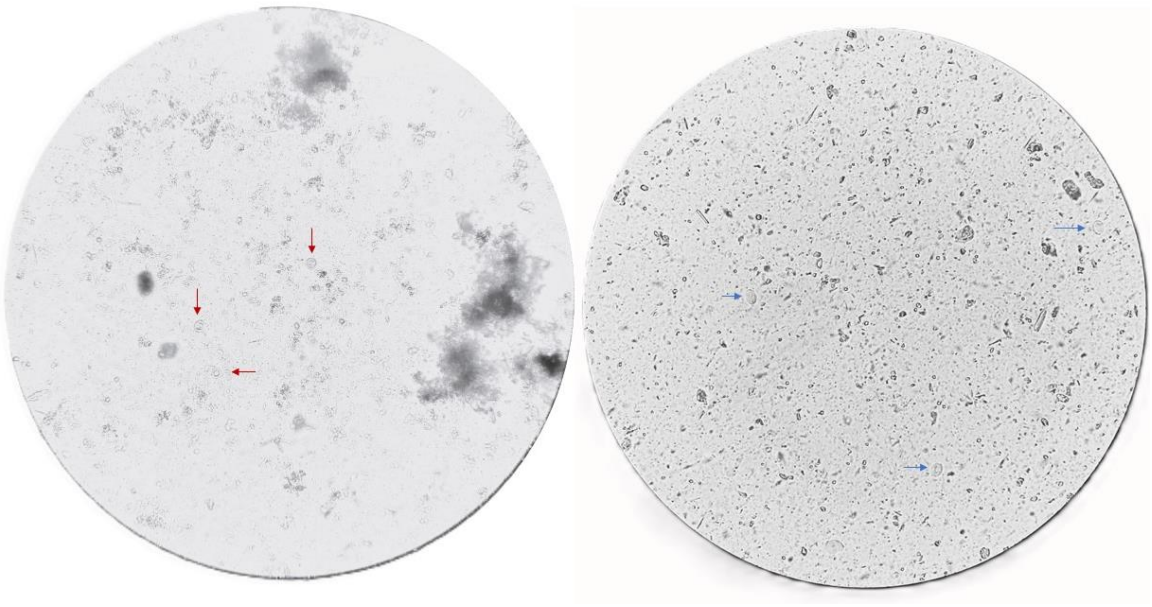

Figure 1. *Positive samples of Blastocystis (red arrow) and Giardia intestinalis (blue arrow) (400x).*

Table 1. *Distribution of intestinal parasites coinfected with H. pylori*

H. pylori	*G. intestinalis*			*Blastocystis*		
	Positive (%)	Negative (%)	p.	Positive (%)	Negative (%)	p.
Positive (n:155)	5 (3.2)	150 (96.8)	0.915	10 (6.4)	145 (93.6)	0.931
Negative (n:145)	5 (3.4)	140 (96.6)		9 (6.2)	136 (93.8)	
Total (n:300)	10 (3.3)	290 (96.7)		19 (6.3)	281 (93.7)	

Several cross-sectional studies from different countries have reported a possible association between *G. intestinalis* and *H. pylori* [10-13]. In a study conducted in Egypt, *G. intestinalis* and *H. pylori* co-infection was reported to be common in school-age children [14]. Similarly, in a study conducted in Uganda, it was reported that the incidence of *G. intestinalis*, which was found to be 20.1% in children, was higher in *H. pylori* positive than in *H. pylori* negative children [12]. In this study, no correlation was found between *H. pylori infection* and *G. intestinalis* prevalence in children. We believe that this may be due to the recently developed infrastructure of the Van region, where the study was conducted. Because both organisms are known to infect children at high rates in low-income countries [12]. However, the incidence of *G. intestinalis* was low in this study (3.3%). Therefore, we believe that studies with a larger number of participants should be conducted to understand the relationship between *H. pylori* and *G. intestinalis*.

There are also studies investigating *Blastocystis* coinfection with *H. pylori* infection. In patients with irritable bowel syndrome, *H. pylori Blastocystis* (77.3%) positives were found to be higher than *Blastocystis* (50.5%) negatives [15]. *H. pylori Blastocystis* mixed infection was found to be statistically significantly higher in patients with colorectal cancer. However, the sample of the two studies is quite different from the sample of this study. In this study, no relationship was found between

H. pylori infection and *Blastocystis* prevalence in children. In our opinion, although there may be a relationship between *H. pylori* infection and *Blastocystis* prevalence in some chronic diseases, there is no relationship between *H. pylori* infection and *Blastocystis* prevalence in the general population.

In conclusion, we believe that the prevalence of *G. intestinalis* and *Blastocystis* in children is independent of the prevalence of *H. pylori* and that children should be evaluated

for parasitic agents regardless of the presence or absence of *H. pylori*.

Acknowledgements

This study was presented as an abstract by S.A. at the 6th International Harran Congress on Scientific Research

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

Conflicts of Interest

There is no conflict of interest for the publication of this article.

Ethics committee approval

The study was approved by Van Yüzüncü Yıl University Non-interventional Clinical Research Ethics Committee (Date: 19.04.202 and Decision No: 2024/04-11). Informed consent was obtained from the parents of the patients, and confidentiality of the information was guaranteed

Referee Evaluation Process

Externally peer-reviewed

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