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Relationship between *Helicobacter pylori* Infection and Parasitic Infection in Patients in Ilam

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Background: *Helicobacter pylori* is the responsible for chronic infection in the human stomach. Approximately half of the world population colonized or/and infected by this organism. *H. pylori* can increase the pH of the stomach lumen by urease producing and secretion. In this situation pathogenic intestinal protozoa can cross through stomach easily and cause disease. The aim of this study was to evaluate the relationship between *H. pylori* infection and intestinal parasitic infections in patients of Ilam city.
Materials and Methods: Following stool samples collection during 2013 in patients with abdominal pain in Ilam, Iran. *H. pylori* infection was investigated based on stool antigen analysis (HPSA) by enzyme-linked immunosorbent assay (ELISA) method in patients who had recurrent abdominal pain. Stool specimens were examined using the direct examination and the spontaneous sedimentation method for detecting the trophozoite and cyst of parasites.
Results: In this study, we found 65 patients with *H. pylori* infection. Out of these 65 patients, the percentage of patients with positive results for *Giardia lamblia* was 30.7% and for *Entamoebahistolytica*/*dispar* was 12.3%.
Conclusion: The results of this study suggest that *H. pylori* infection may provide favorable conditions for giardiasis infection; however, this presumption needs further studies with larger sample size.

Keywords: *Helicobacter pylori*, parasitic infection, *Giardia lamblia*

1. Background

Helicobacter pylori Helicobacter pylori is the responsible for chronic and also acute infections in the human stomach. Approximately half of the world population colonized or/and infected by this organism. (1). Commonly, in developed countries *H. pylori* infection occurred in adults rather than children (1, 2). According to previous studies, the *H. pylori* burden among in Iranian people is approximately 90 % (3).

This organism has different virulence factors. One of the major virulence factors is urease. *H. pylori* by secretion of this enzyme can degrades plasma urea which naturally is secreted inter stomach lumen. Due to this activity, H. pylori evade from stomach acidity and it can survive in this situation. In compare to other bacteria which produce three subunits urease, *H. pylori* produce two subunits urease with high activity (1, 2). When the pH of stomach's lumen decreased, makes favor for some protozoa to survive in stomach's (4).

Giardia is one of these protozoan that is can colonize in duodenum mucosa, jejunum, ileum, and colon (4). Generally, the prevalence of *Giardia* infections in the world wide is near to 20-60% (5). One of the risk factors for Giardiasis infection development is the low acidity of stomach. On the other hand, *H. pylori* can reduce the stomach acidity. In this case, reduction acidity of stomach due to urease activity of *H. pylori* is the risk factor and can develop *Giardia* infections (6).

2. Objectives

The aim of this study was to evaluate the relationship between *H. pylori* infection and prevalence of parasitic infection in patients in Ilam, Iran.

3. Materials and Methods

In this cross sectional analysis the patients with clinical significance of *H. pylori* infections that admitted to laboratory during 2013 were tested for *H. pylori* antigen by using enzyme-linked immunosorbent assay (ELISA) method in stool samples. Enrolled in this study. According to kit information, the sensitivity and specificity of this test are 83% and 92%, respectively.

Finally, the *H. pylori* positive samples were enrolled to study. Then, for direct examination of parasite's trophozoites in stool samples light microscope with 40X magnification power was used.

Also, for detection of parasite's ova sedimentation method was used as described previously (1). For acid-fast protozoa detection such as (*Isospora belli, Cyclosporacayetanensis, and Cryptosporidium parvum*) Ziehl-Neelsen staining according to protocol was used.

4. Results

A total of 130 patients with abdominal pain participated in this study, of which 65 patients were infected by *H. pylori* based on ELISA test. Another Patients without *H. pylori* infection were excluded from our analysis. Trophozoite and cyst of *Giardia lamblia* in 20 (30.7%) and 7 (10.7%) of samples were seen, respectively. However, only patients who had excreted trophozoite of *Giardia lamblia* were calcluded, since the presence of trophozoite in the stool is the sign of acute Giardiasis.

In 8 (12.3%) of samples *Entamoeba histolytica / dispar* cysts were seen. Any ova of parasites and acid-fast parasites were not seen.

5. Discussion

In current study, presence of parasitic agents among patients with *H. pylori* infections were evaluated.

As mentioned above, *H. pylori* is responsible for different type of disorders such as stomach inflamemation, duodenal ulcer, non-ulcerous dyspepsia, peptic ulcer, gastric cancer, and gastric mucosa associated lymphoid tissue (MALT) lymphoma (7, 8). Urea components can degraded by Urease of the bacterium which cause stomach's acid reduction (1).

The lowest pH of the stomach is an innate immune system that make barrier against pathogens, and any interferences with acid producing can diminish this barrier and allows organisms to cross the this type of immune system.

Giardia lamblia is a parasite which cause an infection in small intestine, named Giardiasis (9, 10). *Giardia lamblia* can be transmitted by fecal oral pattern. This organism is the major cause of the diarrhea in children (11). Many factors can be the risk factors for giardiasis infections such as economic situation, population density, hygiene level weather situation (12, 13). It has been demonstrated that, the prevalence of giardiasis is related with hygiene level.

According to a study in 2013, the prevalence of *G. lamblia* in the children of Ilam city were 11.7% (14) reported. But, our analysis showed the prevalence of *G. lamblia* in *H. pylori* infected patients in Ilam was 42%. Therefore, it is hypotheses, that *H. pylori* infection contribute with other infections such parasitic infection.

According to polymicrobial infections knowledges, one microbe make a favorable conditions for another one to more easily survive in their common host (15). In this regard, *H. pylori* has been known that it follow this pattern. For example, it has been reported that, *H. pylori* infections is related to *Schistosoma japonicum Salmonella typhimurium* infections (16, 17).

In Ankarklev and colleagues study's (2012), significant higher frequency of *Giardia* infection in *H. pylori* infected patients were found *(*18).

According to Moreira and colleagues (2005) study's, significant relation were seen between *H. pylori* infection and *G. lamblia* in the stool samples (19). I the Isaeva and colleagues (2010) study's, it has been shown, that 100% of *H. pylori* infection were concomitant with giardiasis (20). It has been reported a significant increase of urease activity in the group having co-infections (Giardiasis and *H. pylori*) than the group infected with *G. lamblia* alone (21, 22).

In other hand, high prevalence of *Giardia* in *H. pylori* infected patients may be not related together, or *H. pylori* colonization facilitated by a previous establishment of *G. lamblia*.

6. Conclusion

In this study, presence of parasitic infections in persons which infected with *H. pylori* were surveyed. In conclusion, prevalence of parasitic infections in *H. pylori* infected patients were considerable. Also, more studies are needed for the validation of the relevance between *H. pylori* infection and with other parasites.

Conflict of Interests

The authors declare they have no conflict of interests.

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Authors' Contributions

Study concept and design: Hossein Kazemian; collection of data: Aref Shavalipour, Hamidreza Houri and Reza Mohebi; literature search: Jalil Kardan Yamchi; critical revision of the manuscript: Sobhan Ghafourian & Hamid Heidari; Supervision: Nourkhoda Sadeghifard

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