

Helicobacter Pylori Infection in Children with Idiopathic Thrombocytopenic Purpura

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Abstract

Background: Today *Helicobacter pylori* is the most common bacterial infection worldwide and is associated with some extra-gastrointestinal diseases such as blood disorders including idiopathic thrombocytopenic purpura (ITP). Therefore, this study was designed and performed to determine the status of *Helicobacter pylori* infection in children with idiopathic thrombocytopenic purpura referred to Dr. Mohammad Kermanshahi Hospital in 2019.

Materials and Methods: In this cross-sectional study, 68 children with ITP were evaluated for *Helicobacter pylori* infection using stool antigen test. Information on *Helicobacter pylori* was collected using a checklist along with data on gender, age, type of ITP (acute / chronic), primary platelet counts, duration of ITP, and history of receiving treatment for *H. pylori* infection. Data were analyzed by SPSS-20 using descriptive statistics and the Chi-square test.

Results: The mean age of all subjects was 6.35 ± 3.44 years with an age range of 1 to 13 years. The mean duration of the disease was 9.73 ± 9.04 months. Among patients, 63.24% (43 patients) were boys. Regarding the type of ITP, the highest percentage was the Acute type of disease (72/06%). Also, based on the analytical results, there was no significant relationship between *Helicobacter pylori* infection and gender, mean duration of infection and type of ITP ($P < 0.05$).

Conclusion: According to the results of this study, half of the ITP patients had *Helicobacter pylori* infection, but there was no significant relationship between the type of ITP and its duration with *Helicobacter pylori* infection. Therefore, it is recommended to conduct similar studies with a larger sample size and perform follow-ups to achieve more accurate results.

Key Words: Children, *Helicobacter Pylori*, Immune Thrombocytopenic Purpura.

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1- INTRODUCTION

Helicobacter pylori (*H. pylori*) is the most common chronic bacterial infection in humans that has infected almost half the world's population (1-5). It is a gram-negative bacillus, microaerophilic, flagellate and spiral bacterium that was, firstly, isolated and introduced from human gastric biopsy specimens by Marshall and Warren in 1983 (6). In fact, the human stomach is the only known reservoir for this infection. This bacterium is the main cause of chronic gastritis, gastric ulcer, duodenal ulcer, non-ulcer dyspepsia, gastric cancer and MALT (mucosa-associated lymphoid tissue) lymphoma (4, 5, 7-14), and even some diseases and disorders outside gastrointestinal tract, such as coronary heart disease, chronic obstructive pulmonary disease (COPD), iron deficiency anemia, and ITP. It is also attributed to brain and neurological diseases such as migraine and Alzheimer, as well as longings of pregnant women (14-26).

The prevalence of *Helicobacter pylori* varies in different parts of the world; more than 80 percent of adults in Japan and South America are infected with *Helicobacter pylori*, compared to 40 percent in the United Kingdom and about 20 percent in Scandinavia. Epidemiological evidence shows that many people become infected with *Helicobacter pylori* in childhood. Social deprivations, large families, and large numbers of siblings are important risk factors. The infection is transmitted orally, and also through fecal-oral. The infection mainly begins in childhood and remains in the stomach for the rest of the life due to the specific condition of the bacterium and the lack of direct access to it by the immune system (27).

Helicobacter pylori infection is also associated with some diseases outside the gastrointestinal tract including blood

disorders such as idiopathic thrombocytopenic purpura (ITP). For example, a link between *Helicobacter pylori* infection and the incidence of autoimmune thrombocytopenia (ITP) has been reported in some studies (28, 29). Gasbarrini first reported this issue in 1998 in Japan, and concluded that by killing the bacterium in 72.2% of patients with chronic ITP, the platelet count increases to normal range. Studies have suggested that the cause of this disorder is probably the stimulation of the immune system and its activity against the outer covering of *Helicobacter pylori*, as well as its similarity to the structure of platelet membranes (28, 29). So far, many factors such as viruses, vaccinations, genetic factors and immunodeficiency have been suggested as possible triggers for the production of antibodies against platelets in this disease, but in many cases the cause of the disease remains unknown. According to numerous research studies in recent decades on the prevalence, diagnosis and treatment of ITP, this field needs to be further investigated and identify the predictors and pathogens of the disease. There is also no clear pathophysiological evidence for the role of this bacterium in acute and chronic ITP. Therefore, this study was designed and performed to determine the status of *Helicobacter pylori* infection in children with idiopathic thrombocytopenic purpura, referred to Dr. Mohammad Kermanshahi Hospital in 2019.

2- MATERIALS AND METHODS

This cross-sectional study was conducted among children with idiopathic thrombocytopenic purpura who referred to Dr. Mohammad Kermanshahi Hospital, the specialized pediatric center in Kermanshah, Iran in 2019. Using the census method, 68 children with ITP were identified who met the inclusion criteria for being entered to the study.

The main inclusion criterion was the diagnosis of thrombocytopenia (based on platelets less than 150,000) in the child, at the time of referral or admission to the hospital. Thrombocytopenic patients with other causes including drug-induced thrombocytopenia, bone marrow failure thrombocytopenia, thrombocytopenia of hypersplenism, lupus thrombocytopenia (connective tissue disease), and those with HIV-related thrombocytopenia were excluded from the study based on test results and their medical history. Because patients were under 18 years of age, a written consent form was obtained from their parents for participating in the study.

In order to conduct the research, the samples were examined for *Helicobacter pylori* infection. For this purpose, stool antigen test was used. Stool *Helicobacter pylori* specific antigen test is a qualitative non-invasive, rapid, and easy test with high-sensitivity (81 to 97%) and high specificity (98 to 100%). The U.S. Food and Drug Administration (FDA) has approved the test for early diagnosis and determining the improvement of disease. The samples were taken by the central laboratory; and they were all analyzed by the same method using the ELISA test kit with the Acon brand. The results included

two groups of *Helicobacter* positive and *Helicobacter* negative.

Information on *Helicobacter pylori* was collected using a checklist along with data on gender, age, type of ITP (acute / chronic), primary platelet counts, duration of ITP, and history of receiving treatment for *H. pylori* infection. Data were analyzed by SPSS-20 using descriptive statistics including calculation of numerical indicators such as frequency, percentage, mean and standard deviation as well as the Chi-square test.

3- RESULTS

In this study, 68 children with idiopathic thrombocytopenic purpura were under examination, among whom 43 (63.24%) were boys and the others were girls. The mean age of the children was 6.35 ± 3.44 years, ranging from 1 to 13 years.

In terms of the ITP type, the highest percentage (72.06%) belonged to acute ITP. Also, the prevalence of acute and chronic ITP was higher in boys than in girls. *Helicobacter pylori* infection was also higher in boys than in girls (**Table 1**).

Table-1: Comparison of age, *H. pylori* infection and type of ITP in patients by gender

Variables	Categories	Gender		Total (n=68)
		Girls (n=25)	Boys (n=43)	
		Mean \pm SD / N (%)	Mean \pm SD / N (%)	Mean \pm SD / N (%)
Age (year)		6.76 \pm 3.05	6.11 \pm 3.66	6.35 \pm 3.44
ITP type	Acute	28 (41.14)	21 (30.8)	49 (72.06)
	Chronic	7 (10.29)	12 (17.65)	19 (27.94)
<i>H. Pylori</i>	Positive	11 (16.18)	23 (33.82)	34 (50)
	Negative	14 (20.59)	20 (29.41)	34 (50)

The mean platelet count in all patients was 36411.76 ± 23326.52 . The mean duration of ITP in the subjects was 6.29 ± 8.38 months. Also, the mean duration of

idiopathic thrombocytopenic purpura in patients with *Helicobacter pylori* infection was 6.64 ± 7.46 months and in non-infected individuals was 5.94 ± 9.32

months, showing no statistically significant difference ($P=0.7$).

Furthermore, the results of study manifested that in our sample, 34 patients (50%) were infected with *Helicobacter pylori*, and the other half were not infected.

In addition, out of 19 chronic ITP patients, 12 (63.15%), and out of 49 acute ITP patients, 22 (44.8%) were positive for *H.*

pylori, which indicated a higher prevalence of *H. pylori* in chronic ITP patients compared to acute ITP patients. In this study, there was no significant relationship between *Helicobacter pylori* infection and gender ($P = 0.4$). The relationship between *Helicobacter pylori* infection and ITP types was also not significant ($P = 0.1$) (**Table 2**).

Table-2: Comparison of positive and negative *H. pylori* according to the gender and type of ITP

Variables	Categories	Positive H.Pylori	Negative H.Pylori	Chi-square	P-value
		N (%)	N (%)		
Gender	Boy	23 (67.65)	20 (58.82)	0.56	= 0.4
	Girl	11 (32.35)	14 (41.18)		
	total	34 (100)	34 (100)		
ITP type	Acute	22 (64.71)	27 (79.41)	1.82	= 0.1
	Chronic	12 (35.29)	7 (20.59)		
	Total	34 (100)	34 (100)		

4- DISCUSSION

In the present study, 68 children with idiopathic thrombocytopenic purpura were examined to determine the status of *Helicobacter pylori* infection. According to the results of the study, about 72% of patients had the acute type of ITP and the rest had the chronic type. In terms of gender distribution, 63.24% of them were boys and the average age of the total sample was 6.35 years. Moreover, the rates of both acute and chronic ITP were higher in boys than in girls. In the study of Arzanian et al, (2007) the result indicated that out of 31 children under 14 years of age with chronic ITP, 54.8% were girls (30).

The results of the present study revealed that the prevalence of *Helicobacter pylori* infection in all children with ITP was 50%; where the percentage in chronic ITP was 63.15% and 44.8% among acute ITP

patients. In the study by Lu et al. (2013), the prevalence of *Helicobacter pylori* infection was 41.30% in the group with acute ITP and 35.71% in the control group (31), which was consistent with the results of the present study. In another study by Stasi et al. (2005) among ITP patients, *Helicobacter pylori* infection was positive in 47% of the sample (32). However, in a study by Shigeto et al. (2004), the prevalence of *Helicobacter pylori* in 61 patients with chronic ITP was 86.9% (33) which was higher than that of the present study. Further, the results of our study demonstrated that the association between *Helicobacter pylori* infection and ITP type was not statistically significant. Similarly, in the study by Lu et al. (2013), no significant association was observed between acute ITP and *Helicobacter pylori* infection (31).

In the study by Estrada-Gómez et al. (2007) on 99 patients with *H. pylori*

infection, the prevalence of thrombocytopenia was 14%; and, among 23 patients with ITP, the prevalence of *Helicobacter pylori* was 60% (34). In the same line, the results of the study by Jaing et al. (2006) did not show a significant relationship between *H. pylori* and acute ITP, but the researchers stated that screening to examine the presence of *H. pylori* in children with acute ITP is not prohibited (35).

Moreover, the results of the present study showed that the mean platelet count in patients was 36411.76 ± 23326.52 . In the study of Arzanian et al. (2007), the average platelet count of patients ranged from 50,000 to 125,000 (30). In the study of Estrada-Gómez et al. (2007) also in 14 patients with *H. pylori* infection and ITP who underwent eradication for *H. pylori*, only 3 patients had an increase in platelet count (34). The study of Stasi et al. (2005), evaluating the results of eradication of *Helicobacter pylori* infection in patients with ITP on 137 patients with *Helicobacter pylori*, found that eradication was successful in 54 patients and increased platelet count in 17 patients; while the increasing of platelet count in 11 patients was stable for one year. This increase was greater in those who responded to treatment than in those who did not. They concluded that eradication of the infection can be effective in patients with acute ITP and higher platelet counts (32). Yet another study by Suvajdžić et al. (2006) in Serbia, conducted on 54 patients, showed a prevalence of 72/2% for *Helicobacter pylori* infection. Eradication of *Helicobacter pylori* was successful in 23 patients and only 6 patients had an increase in platelet count after *H. pylori* eradication (36).

In the present study, the mean duration of ITP was 6.64 months in patients with *Helicobacter pylori* infection and 5.94 months in non-infected individuals; and this difference was not statistically

significant. Similarly, in the study by Arzanian et al., there was no statistically significant difference between infected and non-infected patients with *Helicobacter pylori* in terms of the duration of disease (30).

5- CONCLUSION

Based on the results of this study, half of ITP patients were infected with *Helicobacter pylori*, but there was no significant relationship between the type of ITP and its duration with *H. pylori* infection. Therefore, due to the discrepancy between the present results and those of some previous studies, it is recommended to conduct similar studies with a larger sample size and perform follow-up to achieve more accurate results.

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