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Detection of *H. pylori* Antigen in the Stool Samples of Children, in Tekirdag, Turkey

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Abstract

Introduction: *Helicobacter pylori* (*H. pylori*) is an important bacterial pathogen, predominantly in undeveloped countries and regions. We conducted this study to investigate the presence of *H. pylori* antigen in the stool specimens of children, in Tekirdag, Turkey. Material and Methods: Stool specimens of 1441 children aging between 0 month to 15 years, with the complaints of abdominal pain, anemia, gastroenteritis, nausea and vomiting were included in the study. The subjects were divided into three groups based on their ages: Group A (0 month - 5 years), Group B (6 - 10 years) and Group C (11 - 15 years). All specimens were tested for *H. pylori* antigen with HP Ag (DIA.PRO, Diagnostic Bioprobes, Italy). Results were evaluated statistically. Results: The median age of children with *H. pylori* positive samples was 6.6 ± 4.1 and 47.9% were girls. Overall positivity of *H. pylori* stool antigen was 6.6%. Positivity rates due to ages in Groups A, B and C were: 8.9%, 5.8%, 5.2% respectively (x^2 = 9.3, p = 0.01). No difference was observed due to gender (x^2 = 0.17, p = 0.68). Conclusion: Higher antigen positivity obtained in 0 - 5 years group, indicates the risk of acquiring the infection in early years of life. Preventive measures for the development of *H. pylori* infection gain importance, especially in developing countries.

Keywords

***Helicobacter pylori*, Stool Antigen, Children**

1. Introduction

Helicobacter pylori (*H. pylori*) is a spiral, gram negative bacterium and its role in gastritis, peptic ulcer, gastric

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carcinoma has been defined. Seroepidemiologic studies have indicated that the infection with this organism is very common throughout the world. Social and economic development decreases the prevalence both within and between countries. In developing countries a high prevalence and early colonization of *H. pylori* in childhood was described, in contrast to developed ones [1] [2].

H. pylori infection is diagnosed by invasive and non-invasivemethods. The invasive method involves endoscopy, followed by other tests, such as rapid urease, histo-pathology, culturing and Polymerase Chain Reaction (PCR). In previous years concern has been raised on the validation of non-invasive tests for assessing. Non-invasive methods include the urea breath test, serologic testsand detecting bacterial antigens in feces. In children, stool antigen test and urea-breath test demonstrated satisfactory sensitivity and specificity for the diagnosis [3].

In Turkey, results of some seroepidemiological studies of both healthy and symptomatic children, from different regions have been reported. Data obtained with non-invasive prodecures based on detecting the bacteria are still limited. Tekirdağ is a province of Turkey, located in the North-West of Turkey, in Thrace Region. No data representing this region, have since been reported. In this study we aimed to obtain the first results of this region with investigating the prevalence of *H. pylori* infection by using *H. pylori* stool antigen test in symptomatic children.

2. Material and Methods

The study was carried out, for a two year period from January 01, 2010 to December 31, 2011. The study population consisted of children between the ages of 6 months to 15 years, who attented to the Clinics of Paediatrics of Tekirdağ State Hospital. The complaints of the children were anemia, gastroenteritis, abdominal pain, nausea and vomiting. Patients were excluded if they had undergone previous treatment for *H. pylori*, and if they had taken any antibiotics or proton-pump inhibitors in the 4 weeks prior to the study.

After the physical examination stool samples of the children were collected. The stool samples were tested for the presence of *H. pylori* antigen with ELISA method (DIA.PRO, Diagnostic Bioprobes, Italy) according to the recommendations of the manufacturer.

Evaluating the results, the subjects were divided into three groups based on their ages: Group A (6 months - 5 years), Group B (6 - 10 years) and Group C (11 - 15 years).

Statistical Analysis

All statistical evaluations were performed using the Statistical Package for the Social Sciences (SPSS) for Windows (version 18.0). Descriptive statistics were calculated (frequency, mean and standard deviation) after performing data control. Chi-Square (χ^2) test were used to compare for categorical variables. All statistical analyses were performed with a 95% confidence interval (CI) and evaluated that two-ways.

3. Results

A total of 1441 children, 689 (47.8%) boys and 752 (52.2%) girls, a range age of 6 months to 15 years were studied. Of the stool samples obtained from 1441 children 96 (6.6%) were positive for *H. pylori* antigen.

The median age of children with *H. pylori* positive samples was 6.6 ± 4.1. Distribution due to genders was 47.9% girls and 52.1% boys. In *H. pylori* positive patient group, no difference due to gender was obtained (x^2 = 0.17, p = 0.68) (see **Table 1**).

H. pylori stool antigen positivity was, decreasing with age, as 8.9%, 5.8%, 5.2% in Groups A, B and C, respectively (x^2 = 9.3, p = 0.01) (see **Table 2**).

4. Discussion

During the last decade, investigators focused on the role of *H. pylori*, the cause of gastritis and peptic ulcer disease, in the development of other digestive diseases and several extra-intestinal pathologies (iron deficiency anemia (IDA), growth retardation, idiopathic thrombocytopenic purpura (ITP), asthma andallergic disorders) [4] [5].

H. pylori, shows worldwide distribution, predominantly in countries or regions with poor socioeconomic conditions. All studies to date have shown an inverse relationship between *H. pylori* infection and socioeconomic status. Person-to-person spread is widely considered to be the most prevalent means of transmission. *H. pylori*

Table 1. *H. pylori* infection frequency by gender (n = 96).

Gender	*Helicobacter pylori*-positive	
	Boys	Girls
Group A (6 months - 5 years)	23	17
Group B (6 - 10 years)	18	20
Group C (11 - 15 years)	9	9

(x^2 = 0.17, p = 0.68).

Table 2. *H. pylori* infection frequency by age.

Age group		*Helicobacter pylori*		
		Positive	Negative	%
Group A (6 months - 5 years)	(n = 448)	40	408	8.9
Group B (6 - 10 years)	(n = 653)	38	615	5.8
Group C (11 - 15 years)	(n = 340)	18	322	5.2

(x^2 = 9.3, p = 0.01).

infection is most likely to occur in populations in which fecal-oral disease transmission is common [4] [6]. Early acquisition of *H. pylori* occurs generally in children less than five years ofage and the agent does not lead to clinically apparent disease. In some developing countries, most of the population is reported to be infected by age ten years and infection is universal by midlife. Similarly, our results showed that, majority of the *H. pylori* antigen positive children were exposed to the agent in the first 10 years of life [2] [6].

Seroepidemiological studies have shown that a large proportion of healthy people have antibodies against *H. pylori* and infection rate increases with advancing age [6]. Some serological studies conducted in asymptomatic Turkish children showed the overall seropositivity rates, ranging between 30.9% - 78.5% [7]-[16]. The results of a study in asymptomatic people in Turkish population indicated that, more than 30% of the subjects acquired infection before teenage and about 70% of adults had antibodies against *H. pylori* [11]. In a study conducted in the northwest region of Turkey, overall seropositivity was found as 23.9% increasing with age, similar in males and females and inversely related to economic status in asymptomatic children [17]. Data on *H. pylori* seroprevalence in Turkish children mainly depends on studies carried out in the middle and western regions of Turkey [8]-[10]. But, still there is limited data on seroepidemiology of *H. pylori* infection among children living in the urban areas of eastern Turkey [15]. In our study, the children had some complaints concerning the disease and we focused on the presence of bacteria. Our results—representing an example of a western region with a developed socio-economic status—showed that, the bacteria presence was decreasing with age that correlates with the results of seroepidemiological studies performed in our country. Also no relationship was observed in *H. pylori* acquisition due to genders, showing similarly to the results of other studies.

Several invasive and non-invasive tests are available to diagnose *H. pylori* infection. An ideal test for *H. pylori* is noninvasive or minimally invasive, highly accurate, inexpensive, and readily available and enables differentiation between active or past infection with the organism. In addition, such a test must enableto discriminate the presence of *H. pylori* infection and *H. pylori*-associated disease. As such an ideal test do not currently exist, the advantages and drawbacks of tests that are available require critical evaluation and must be assessed for suitability for use in children [13] [18].

Testing of *H. pylori* antigens in stools has shown promising results in adults for the non-invasive diagnosis of gastric infection [19] and appears to be accurate for use in monitoring the success of eradication therapy. However, patients may be reluctant to collect stool specimens. In addition, refrigerated stools are more difficult to test. For children, *H. pylori* stool antigen test is a suitable test with many of the above characteristics. Studies about the performance of test has revealed the sensitivity 96% - 98% and specificity 80% - 100% [20] [21].

Diagnostic methods based on the isolation of bacteria is still the gold standard, but the requirement of an invasive procedure restricts its usage in the pediatric age group. For this reason this study was planned to detect

the presence of the bacteria with the stool antigen test. The correlations of our results with results of some serological studies conducted in different regions of Turkey has shown this test to be reliable in children. In pediatric population, additional studies in evaluating the accuracy of stool antigen testing for both initial diagnosis and posttreatment follow-up are required before specific recommendations can be considered [22].

5. Conclusion

In conclusion, the data of this study which is based on 1441 children-aged between 6 months to 15 years, who are applied to the hospital in a period of two years, are important, but actually the results of this hospital based study do not represent the community. Our results showing the higher antigen positivity in the first group, indicate the exposure to the agent in the early years of childhood. Lack of hygiene during the baby feeding is very important. In Turkey, there are some traditional behaviors which may lead the acquisition of the agent in early childhood, as sucking the teat before giving it to the baby and sharing the spoons, forks and cups. Such behaviors are common in general population, but more often in uneducated families. So physicians in maternal and child health centers need to give education about the usage of teat and the feeding bottles, as well as the importance of hygiene, hand washing to the patients and education need to be provided in general. So with these data, the importance of preventive measures for the development of *H. pylori* infection in children, especially in developing countries and societies with poor socioeconomic conditions is emphasized.

References

[1] Go, M.F. and Crowe, S.E. (2000) Virulence and Pathogenicity of *Helicobacter pylori*. *Gastroenterology Clinics*, **29**, 649-670. http://dx.doi.org/10.1016/S0889-8553(05)70136-9

[2] Lehours, P. and Yilmaz, O. (2007) Epidemiology *Helicobacter pylori* Infection. *Helicobacter*, **12**, 1-3. http://dx.doi.org/10.1111/j.1523-5378.2007.00541.x

[3] Hardin, F.J. and Wright, R.A. (2002) *Helicobacter pylori*: Review and Update. *Hospital Physician*, 23-31.

[4] Akin, L., Tezcan, S., Hascelik, G., *et al.* (2004) Seroprevalence and Some Correlates of *Helicobacter pylori* at Adult Ages in Gulveren Health District, Ankara, Turkey. *Epidemiology and Infection*, **132**, 847-856. http://dx.doi.org/10.1017/S0950268804002262

[5] Tünger, Ö. (2008) *Helicobacter pylori* Infeksiyonları. *Infeksiyon Dergisi* (*Turkish Journal of Infection*), **22**, 107-115.

[6] Parsonnet, J. (1998) Helicobacter. In: Gorbach, S.L., Bartlett, J.G. and Blacklow, N.R., Eds., *Infectious Disease*, WB Saunders Co, Philadephia, 1952-1961.

[7] Ozden, A., Bozdayi, G., Ozkan, M., *et al.* (2004) Changes in the Seroepidemiological Pattern of *Helicobacter pylori* Infection over the Last 10 Years. *Turkish Journal of Gastroenterology*, **15**, 156-158.

[8] Altuglu, I., Sayiner, A.A., Ozacar, T., *et al.* (2001) Seroprevalence of *Helicobacter pylori* in a Pediatric Population. *Turkish Journal of Pediatrics*, **43**, 125-127.

[9] Buyukgebiz, A., Dundar, B., Bober, E., *et al.* (2001) *Helicobacter pylori* Infection in Children with Constitutional Delay of Growth and Puberty. *Journal of Pediatric Endocrinology and Metabolism*, **14**, 549-551. http://dx.doi.org/10.1515/JPEM.2001.14.5.549

[10] Arslan, D., Kendirci, M., Kurtoglu, S., *et al.* (2000) *Helicobacter pylori* Infection in Children with Insulin Dependent Diabetes Mellitus. *Journal of Pediatric Endocrinology and Metabolism*, **13**, 553-556. http://dx.doi.org/10.1515/JPEM.2000.13.5.553

[11] Us, D. and Hascelik, G. (1998) Seroprevalence of *Helicobacter pylori* Infection in an Asymptomatic Turkish Population. *Journal of Infection*, **37**, 148-150. http://dx.doi.org/10.1016/S0163-4453(98)80169-2

[12] Yilmaz, E., Dogan, Y., Gürgöze, M.K., *et al.* (2002) Seroprevalence of *Helicobacter pylori* Infection among Children and Their Parents in Eastern Turkey. *Journal of Paediatrics and Child Health*, **38**, 183-186.

[13] Doğancı, T., Kansu, A., Doğancı, L., *et al.* (1998) 6 Ay-5 Yaş Arası Çocuklarda *Helicobacter pylori* Seroprevalansı. *Journal of Gastroenterology*, **9**, 138-145.

[14] Altındiş, M. (2001) Afyon Bölgesinde *Helicobacter pylori* Enfeksiyon Sıklığı. *Genel Tıp Derg*, **11**, 109-113.

[15] Selimoglu, M.A., Ertekin, V. and Inandi, T. (2002) Seroepidemiology of *Helicobacter pylori* Infection in Children Living in Eastern Turkey. *Pediatrics International*, **44**, 666-669. http://dx.doi.org/10.1046/j.1442-200X.2002.01639.x

[16] Yegane Tosun, S., Kasirga, E., Ertan, P., *et al.* (2003) Evidence against the Fecal-Oral Route of Transmission for *Helicobacter pylori* Infection in Childhood. *Medical Science Monitor*, **9**, CR489-CR492.

[17] Kaya, A.D., Gencay, E., Ozturk, C.E. and Yavuz, T. (2008) Seroprevalence of *Helicobacter pylori* Infection in

Children in Northwest Region of Turkey: Relationship with Iron Deficiency Anemia. *Journal of Tropical Pediatrics*, **54**, 353-354. http://dx.doi.org/10.1093/tropej/fmn028

[18] Gold, B.D., Colletti, R.B., Abbott, M., Czinn, S.J., Elitsur, Y., Hassall, E., Macarthur, C., Snyder, J. and Sherman, P.M. (2000) *Helicobacter pylori* Infection in Children: Recommendations for Diagnosis and Treatment. *Journal of Pediatric Gastroenterology and Nutrition*, **31**, 490-497. http://dx.doi.org/10.1097/00005176-200011000-00007

[19] Collett, J.A., Burt, M.J., Frampton, C.M., *et al.* (1999) Seroprevalence of *Helicobacter pylori* in the Adult Population of Christchurch: Risk Factors and Relationship to Dyspeptic Symptoms and Iron Studies. *New Zealand Medical Journal*, **112**, 292-295.

[20] Razaghi, M., Boutorabi, S.M., Mirjalili, A., Norolahi, S., Hashemi, M. and Jalalian, M. (2010) Diagnosis of *Helicobacter pylori* Infection by ELISA Stool Antigen and Comparison with the Other Diagnostic Methods. *HealthMed*, **4**, 545-551.

[21] Gulcan, E.M., Varol, A., Kutlu, T., *et al.* (2005) *Helicobacter pylori* Stool Antigen Test. *Indian Journal of Pediatrics*, **72**, 675-678. http://dx.doi.org/10.1007/BF02724076

[22] Choi, J.W. (2003) Does *Helicobacter pylori* Infection Relate to Iron Deficiency Anaemia in Prepubescent Children under 12 Years of Age? *Acta Paediatrica*, **92**, 970-972. http://dx.doi.org/10.1111/j.1651-2227.2003.tb00633.x