Evidence Against A Fecal-Oral Route Of Transmission For Helicobacter Pylori Infection In Children Living In Manisa Region Of Western Anatolia, Turkey

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Citation

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Abstract

Background. Acquisition of Helicobacter pylori (H. pylori) occurs mainly in childhood. However, little is known about the mode of transmission of H. pylori. Therefore the role of fecal-oral transmission in the spread of H. pylori was evaluated.
Materials and Methods. Blood samples taken from healthy children (n= 90) 1-16 years old were studied for anti-H. pylori and anti-hepatitis A antibodies by enzyme immunoassay.
Results. Of the 90 children, 33.3 % were seropositive for both H. pylori and hepatitis A virus (HAV), 33.3 % were seronegative for both, 8.9 % were seropositive for H. pylori only, and 24.4 % were seropositive for HAV only. The percentage of seropositive children increased with age for H. pylori and HAV. There was no significant relationship in seroprevalence between H. pylori and HAV.
Conclusion. This study indicated that the transmission routes of H. pylori and HAV are independent of each other. Therefore, we suggest that the fecal-oral route may not be an important mode of transmission for H. pylori in children living in Manisa Region of Western Anatolia, Turkey.

INTRODUCTION

Helicobacter pylori (H. pylori) infection is mainly acquired in early childhood, particularly in developing countries, although the precise mode of transmission of H. pylori is still unclear ([1], [2]). As suggested by a high prevalence of infection amongst those living in institutions and by familial clustering, person-to-person contact is considered the most likely transmission route of H. pylori ([3], [4]). Because H. pylori has been isolated from dental plaque, feces, and vomitus, the transfer of organism from the stomach of one person to that of another is thought to be by oral-oral fecal-oral and gastro-oral routes ([5],[6],[7]).

There is seroepidemiological evidence both for and against the fecal-oral route in the transmission of H. pylori, as shown by studies comparing the seroprevalence of H. pylori with known fecal-oral spread pathogens such as hepatitis A virus (HAV) ([1], [2]).

The aim of this study was to assess the route of transmission of H. pylori in comparison with that of HAV in children living in Manisa Region of Western Anatolia Turkey.

MATERIALS AND METHODS

Ninety children in the Manisa Region of Western Anatolia aged between 1-16 years were randomly picked for the study. The children were from the middle socioeconomic background. Informed consent was obtained from the children or parent. The study population consisted of 46 males (age mean ± SD: 10.47 4.86 years) and 44 females (age mean ± SD: 9.04 4.35 years). Blood samples were obtained from subjects by standart venipucture. After centrifugation serum samples were stored at - 20 C until measurement. Anti-HAV IgG and anti-H. pylori IgG antibodies were measured by enzyme immunoassay kit (Dia Pro Diagnostics Italy).

STATISTICAL ANALYSIS

The statistical significance of seropositivity for HAV and H. pylori was performed by means of Fisher's exact test. The Mantel-Haenszel chi-square test was used to examine the relation of the two infections with age and sex. The statistical significance of the difference in mean age was examined by Student's t test. The factors affecting

seropositivity for H. pylori and for HAV were evaluated by logistic regression analysis. P values < 0.05 were considered statistically significant.

RESULTS

Overall seropositivity was found in 42 % (38/90) and 58 % (52/90) of the subjects for H. pylori and HAV respectively. The seropositivity rates for H. pylori and HAV increased significantly with age and did not differ according to sex (Table1). Of the 90 subjects 8 (8.9 %) were seropositive for H. pylori 22 (24.4 %) were seropositive for HAV and 30 subjects (33.3 %) were seropositive and 30 subjects (33.3 %) seronegative for both infections (p= 0.0006) (Figure 1).

Figure 1

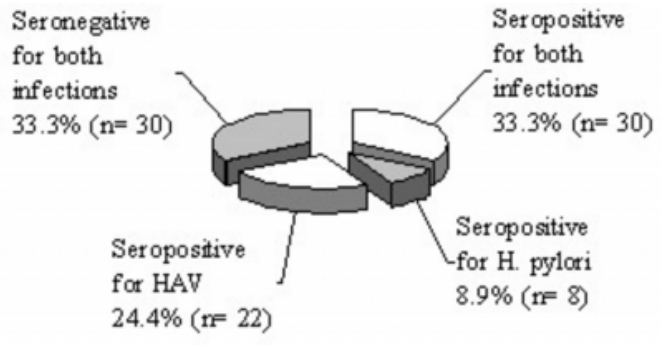
Table 1: Number (%) of subjects seropositive for H. pylori and HAV by age and sex.

		Seropositive for H. pylori		Seropositive for HAV	
Age range (years)	No. of subjects	Males	Females	Males	Females
2-6	32	2/14 (14)	3/18 (16)	3/14 (21)	5/18 (27)
7-11	22	4/10 (40)	5/12 (41)	7/10 (70)	8/12 (66)
12-16	36	15/22 (68)	9/14 (64)	17/22 (77)	12/14 (85)
Total	90	21/46 (45)	17/44 (38)	27/46 (58)	25/44 (56)

Chi-squared for trend: 18.112 p< 0.0001 for age 1.296 p= 0.2549 for sex 21.110 p< 0.0001 for age 1.347 p=0.2459 for sex respectively in the two groups.

Figure 2

Figure 1: Seropositivity for H. pylori and HAV in the study group. The eroprevalence of H. pylori and HAV was 42 % and 58 % respectively.



The mean age of subjects seropositive for H. pylori was also higher than that of subjects seronegative for H. pylori (mean ± SD; 12.47 ± 3.99 versus 7.80 ± 4.09 years t= 5.39 p= 0.000). The mean age of subjects seropositive for HAV was significantly higher than that of subjects seronegative for HAV (mean ± SD; 11.86 ± 4.07 versus 6.92 ± 3.82 years t= 5.84 p= 0.000).

The seropositivity rate for HAV increased with age irrespective of H. pylori status. Although age was a significant factor which affected the seropositivity rate for H. pylori (p= 0.0006) HAV status did not affect the seropositivity rate for H. pylori (p= 0.178).

DISCUSSION

H. pylori has been documented as the major cause of gastritis peptic ulcer gastric adenocarcinoma and primary B cell lymphoma ([8]). Recent studies have also demonstrated the possibility that H. pylori also associated with chronic diarrhea, malnutrition and growth failure ([9], [10]). Although H. pylori is one of the most common human bacterial infections worldwide public-health measures for the prevention and control of this infection are not yet obvious ([1], [2]). Therefore understanding the transmission routes of H. pylori is essential to prevent children from being infected with this organism.

Several studies have investigated the association between H. pylori and HAV. As hepatitis A is known to be a sensitive marker of fecal-oral exposure the prevalence of antibodies to HAV has been compared with that of H. pylori in these studies ([1], [2]). Although some studies have indicated that the significant concordance of age-specific seroprevalence between H. pylori and HAV infections ([11], [12], [13], [14]) results from the other studies have been contradictory ([15] [16] [17], [18]). In USA Rudi et al reported a significant correlation between the seroprevalence of H. pylori and hepatitis A suggesting that fecal-oral transmission was likely ([11]). In South Africa Sathar et al reported that a significant association between the seroprevalences of H. pylori and HAV infections suggesting similar modes of transmission ([12]). In accordance to these studies Bohmer et al showed that employees in instutions caring for intellectually disabled patients have a higher incidence of H. pylori infection than the general population ([3]). Further supportive evidence for fecal-oral spread comes from the San Marino study ([13]). However another Italian study found evidence against a common mode of transmission ([15]). Two contradictory Japan studies found evidence for and against a common mode transmission. ([14], [16]). In the UK a study of 467 subjects, there was no correlation between seropositivity of H. pylori and HAV ([17]).

In this present study the seropositivity rates for both H. pylori and HAV increased with age and the seropositivity

rate for HAV increased with age irrespective of H. pylori status. Therefore our study has failed to provide evidence of a fecal-oral transmission of H. pylori. Our findings are in agreement with those of Luzza et al ([15]) Furuta et al ([16]) and Webb et al ([17]) but contrast with those of Sathar et al ([12]) Pretolani et al ([13]), and Fujisawa et al ([14]). These conflicting seroepidemiological findings on the fecal-oral transmission of H. pylori may be explained by differences in the geographical location, or serum ELISA test kits.

On the other hand, H. pylori has been cultured from feces ([6]) but the attempts to reproduce the results of these studies have not been easily accomplished. Moreover, it has been suggested that transmission of H. pylori via feces may be restricted to individuals with accelerated intestinal transit time, such as malnourished Gambian children ([6]) or adults with induced diarrhea ([19]). Thus, although, further studies are needed for a better understanding of the transmission of H. pylori infection, it can be speculated that feces may not be a significant factor in transmission of H. pylori.

In conclusion these results provide evidence against fecal-oral route of transmission for H. pylori in children living in Manisa Region of Western Anatolia Turkey.

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