ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN — POLONIA
VOL. LV, 11 SECTIO D 2000

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Results of urease tests in children with evidence of esophageal mucosa pathology

Wyniki testu ureazowego u dzieci z endoskopowymi zmianami śluzówki przełyku

INTRODUCTION

Helicobacter pylori (*H.p.*) infection is widespread, and its role in the pathogenesis of chronic gastritis and duodenal ulcer generally accepted. In the literature there is agreement that infection with this bacterium takes place in childhood, and frequency of the infection increases with age. *H.p.* colonizes gastric epithelium, and its presence in the esophagus is very rare and dependent on the presence of gastric and/or intestinal metaplasia [4, 12]. However, the role of *H.p.* infection in the pathogenesis of gastro-esophageal reflux disease (GERD) has not been finally defined, especially in children [6].

The aim of the present study was to estimate the prevalence of *H.p.* infection in children with abdominal pain and endoscopically apparent esophageal mucosa changes, as well as in children with pathological acid gastro-esophageal reflux (GER).

MATERIAL

This prospective study was performed in the period of three years, between 1997 and 1999. Children of age from 4 to 14 years who were treated because of abdominal pain in the Gastroenterological Outpatient Clinic of the Children Hospital in Lublin, were included in the study.

METHOD

In all children upper gastro-intestinal endoscopy was done, and special attention was paid to esophageal mucosa appearance. Additionally a biopsy was always taken from gastric antrum in order to perform urease test. *H.p.* infection was diagnosed based on positive result of the urease test. Out of every seven children with endoscopically apparent esophageal mucosa changes (reddening, erosions, ulceration) one was randomly selected for esophageal 24 hour esophageal pH monitoring. This investigation was done using *Digitrapper MK III* device (Synectic Medical, Sweden). Interpretation of the results were done based on criteria proposeed by ESPEGAN [11].

RESULTS

Observations were made in one thousand and seven children: 437 (43.4%) males and 570 (56.6%) females. On endoscopy, inflammatory changes of the esophageal mucosa were recognised in 554 (55.0%) patients: 238 (43%) males and 316 (57%) females. Percentages of children with inflammatory esophageal changes in consecutive years of the study were 57%, 56%, and 52%, respectively. Over the three years of the study, two cases of Barrett's esophagus were recognised based on endoscopy and pathological results (intestinal metaplasia with the presence of goblet cells on H&E stain) of the endoscopic biopsy. These were two males in age of 4 and 5 years in whom endoscopically apparent lesions were associated with negative urease tests.

In the group of male patients, inflammatory changes in esophageal mucosa were found in 238 (54.5%) cases, whereas in the group of female patients these changes were found in 316 (55.5%) cases. H.p. infection was recognised in 104 (36.1%) patients in 1997, in 143 (38.2%) patients in 1998, and in 126 (35.9%) patients in 1999. Totally, prevalence of *H.p.* infection was 37% (373/1007). In the group of *H.p.*-positive children, there was 45.3% of male and 54.7% of female cases. Comparison of *H.p.* prevalence in children with normal endoscopic appearance of the esophagus and in children with inflammatory esophageal mucosa changes is presented in Table 1. *H.p.* infection occurred with similar frequency in both groups of children, 37.8% and 36.5% respectively ($p = 0.734$; chi^2 test). pH-metry was done in 79 randomly selected children in whom inflammatory esophageal mucosa changes were found on endoscopy (Table 2). In this group of children acid gastro-esophageal reflux was diagnosed in 40 patients (50.6%). GER occurred with similar frequency in the group of children with positive or negative urease test, 51.9% and 50.0% respectively. Conversely, *H.p.*

Table 1. Incidence of *H.p.* infection in children with abdominal pain

Esophageal pathology* (on endoscopy)	n	%	Urease test			
			positive		negative	
			n	%	n	%
present	554	55.0	202	36.5 [a]	352	63.5
absent	453	45.0	171	37.8 [a]	282	62.3
Total	1007	100.0				

*mucosal abnormalities visible on endoscopy: reddening, erosions, ulcerations
[a] p = 0.723; chi² test

Table 2. Incidence of *H.p.* infection in children with or without gastro-esophageal reflux on pH-metry

Gastro-Esophageal Reflux	n	%	Urease test			
			positive		negative	
			n	%	n	%
present	40	50.6	14	51.9 [b]	26	50.0 [b]
absent	39	49.4	13	48.1	26	50.0
Total	79	100.0	27	100.0	52	100.0

[b] p = 0.935; chi² test

infection occurred in 35.0% (14/40) of children with GER, and in 36.5% (13/40) of children without GER (p = 0.935; chi² test).

DISCUSSION

Clinical implications of the *H.p.* infection both in adults and in children have been topic of many recent reports. *H.p.* infection usually appears in childhood and prevalence of the infection increases with age. It is extremely rare before age of 3 years. In various age intervals, *H.p.* infection prevalence is estimated from 30% to 75% [3, 4]. In the present study *H.p.* infection was diagnosed in 37% of children with abdominal pain. Relatively low *H.p.* infection rate may result from young age of children (from 4 to 14 years) and it was similar in both genders.

Inflammatory changes in esophageal mucosa may be result of many factors, like acid or alkaline (biliary) reflux, infections, physical or chemical agents [1]. In the present study an effort was made to investigate the role of *H.p.* infection in the pathogenesis of reflux esophagitis. Similar prevalence of *H.p.* infection in children with and without inflammatory changes of esophageal mucosa suggest that *H.p.* does not play any role in GERD. This is in agreement with the report by Newton et al., however this study concerned adults [8]. Coexistence of GER with the inflammatory esophageal mucosa changes was found in 50% of cases in the present study. There are suggestions that *H.p.* may play a protective role in the pathogenesis of GERD. Roughly, some authors indicate that incidence of GERD and of *H.p.* infection, as well as intensity of both, are inversely related [2, 7]. Results of the present study show that GER was diagnosed less frequently in *H.p.*-positive children than in *H.p.*-negative children. However this difference was not statistically significant. No role of *H.p.* in the pathogenesis of GERD is suggested by Werdmuller et al. [10]. So far literature data do not clearly indicate whether *H.p.* is causal or protective factor in the pathogenesis of GERD [5, 9].

CONCLUSIONS

1) Prevalence of *H.p.* infection, as assessed on urease test, in children with normal endoscopic appearance of the esophageal mucosa, in children with inflammatory changes of esophageal mucosa, and in children with gastro-esophageal reflux is similar.

2) There is no difference in the prevalence of gastro-esophageal reflux in children with positive or negative urease test.

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STRESZCZENIE

Rola zakażenia *Helicobacter pylori* (*H.p.*) w patogenezie choroby refluksowej przełyku (GERD) nie została ostatecznie zdefiniowana, zwłaszcza u dzieci. Celem pracy było ustalenie częstości zakażenia *H.p.* (na podstawie testu ureazowego) u dzieci z bólami brzucha i zmianami endoskopowymi w przełyku oraz z patologicznym kwaśnym refluksem żołądkowo-przełykowym (RŻP). Badania prospektwne przeprowadzono w latach 1997–1999, u dzieci w wieku od 4 do 14 lat, u których bóle brzucha były wskazaniem do wykonania badania endoskopowego wraz z testem ureazowym. Co siódme dziecko z makroskopowymi zmianami w obrbie śluzówki przełyku (zaczerwienienie, nadżerki, owrzodzenie) było kierowane do badania pH-metrycznego przełyku. Badaniami objęto 1007 dzieci: 437 płci męskiej i 570 płci żeńskiej. Zmiany zapalne w śluzówce przełyku stwierdzono u 554, natomiast zakażenie *H.p.* u 373 pacjentów. Przełyk Barretta rozpoznano w oparciu o badanie histopatologiczne u dwojga dzieci. Spośród 79 dzieci, u których wykonano badanie pH-metryczne przełyku patologiczny RŻP wykryto w 40 przypadkach. Częstość dodatniego testu ureazowego była podobna u dzieci bez zmian makroskopowych w przełyku (171/453) oraz u tych ze zmianami zapalnymi śluzówki (202/554) ($p = 0{,}723$; test chi^2). Podobną częstość dodatniego testu ureazowego stwierdzono u dzieci z RŻP (14/40). W grupie dzieci z dodatnim testem ureazowym częstość patologicznego RŻP wynosiła 52% (14/27) i była podobna jak w grupie dzieci z ujemnym testem ureazowym — 50% (26/52) ($p = 0{,}935$; test chi^2).

Wnioski: 1) Częstość dodatniego testu ureazowego u dzieci z prawidłowym obrazem endoskopowym przełyku, u dzieci ze zmianami śluzówki przełyku oraz u dzieci z RŻP nie różni się między sobą w sposób istotny statystycznie. 2) Nie stwierdzono istotnych statystycznie różnic pomiędzy częstością występowania RŻP u dzieci z dodatnim i ujemnym testem ureazowym.