Helicobacter Pylori Infection in Dyspeptic Children: Endoscopic and Histological Features

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ABSTRACT

Objectives: In order to study helicobacter pylori infection in children with chronic dyspepsia in respect to prevalence, endoscopic and histological findings.

Methods: A total of 163 dyspeptic children (below the age of 14 years) were included in this prospective study over two years duration in Prince Rashid Bin Al-Hassan military hospital in Irbid in North of Jordan. All those children underwent esophagogastroduodenoscopy and helicobacter pylori infection was detected histopathologically from gastric biopsies.

Results: Helicobacter pylori chronic gastritis was found in 82% of patients. Normal endoscopy was shown in 47% of the helicobacter pylori positive patients. The most common endoscopic finding was antral nodularity (38%) which significantly indicated helicobacter pylori infection. Prevalence of helicobacter pylori infection increased with age but it showed no significant difference with sex.

Conclusion: The prevalence of helicobacter pylori infection was frequent in dyspeptic children presenting to our hospital. Although some endoscopic findings such as gastric antral hyperemia and nodularity significantly indicated helicobacter pylori infection, biopsies are mandatory to confirm diagnosis and to rule out the infection in normal upper endoscopies.

Key words: Children, dyspepsia, Esophagogastroduodenoscopy, Helicobacter pylori.

JRMS March 2015; 22(1): 52-57 / DOI: 10.12816/0009787

Introduction

In 2005 Marshal and Warren won Nobel Prize in medicine for their valuable researches in 1980's for the discovery of the organism campylobacter which thereafter was called helicobacter pylori (HP) in 1989.[1] HP is a gram negative, spiral, curved microaerophilic bacillus. HP has been only isolated from humans and other primates. HP is responsible for the commonest infection worldwide and it is well recognized that infection occurs during childhood.[2] HP is considered the most common cause of chronic gastritis and peptic ulcer disease in children as well as in adults.[3] HP infection also increase the risk of gastric adenocarcinoma and lymphoma.[4,5] Epidemiological evidence indicates that HP is transmitted by fecal-oral, oral-oral or gastro-oral routes .[6] It is highly correlated with low socioeconomic status and high-density living.[7] Within developing countries, HP infection is generally more common and occurs at an earlier age.[8]

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Manuscript received July 25, 2013. Accepted January 9, 2014

Dyspepsia is one of the most common referral symptoms that need evaluation in pediatric gastroenterology clinic. The term dyspepsia has been used inconsistently by healthcare professionals to describe symptoms related to the upper gastrointestinal tract including epigastric pain, nausea, vomiting, and fullness, early satiety, bloating, belching and retching. Most guidelines accept the Rome II definition: dyspepsia refers to pain or discomfort centered in the upper abdomen.[9] Chronic dyspepsia referred to the persistence of symptoms for more than three months. Most children infected with HP have chronic gastritis which is mostly asymptomatic but dyspepsia is the most common symptom whether peptic ulcer disease is present or absent.[10,11] There is a growing evidence that HP gastritis is related to non-ulcer dyspepsia (NUD) or recurrent abdominal pain (RAP) in children.[12-15]

Esophagogastroduodenoscopy (EGD) and biopsy remains the 'gold standard' in the diagnosis and identification of HP infection and its consequences in childhood.[16,17] It allows visualization of the upper gastrointestinal tract and also facilitates the diagnosis of diseases other than those related to HP infection. Nodular gastritis is the most characteristic endoscopic finding seen in HP infection. Most often seen within gastric antrum and is frequently referred to as antral nodular gastritis.[18,19] Other endoscopic findings that are associated with HP infection include erosions or ulcers of the gastric or duodenal mucosa.[20]

According to the recent guidelines by the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN) and North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN)[21] the role of EGD is to determine the underlying cause of the symptoms and not solely the presence of HP infection and other reliable noninvasive tests like the 13C-urea breath test (UBT) and the HP stool antigen test should be considered but unfortunately they are unavailable in our hospital settings.

This study was carried out to investigate the prevalence of HP infection in children referred with chronic dyspepsia and the correlation between the endoscopic and histopathological features.

Methods

A prospective study estimating the frequency of HP infection in all children patients referred with chronic dyspepsia and presented to pediatric gastroenterology clinic at Prince Rashid Bin Al-Hassan Hospital between January 2011 and December 2012. The sample consisted of 163 children aged less than 14 years (range 2.5 -14).

All patients underwent EGD examination using the Pentax EG 280 KP fibroscope. At least three biopsies were taken from the gastric antral mucosa as well as from any grossly abnormal areas, during endoscopy when indicated according to patients' medical history. Endoscopic diagnosis of a finding was based on the presence of macroscopic lesions and confirmed by histopathology in most of the times. EGD was done after clinical, laboratory or radiological evaluation when indicated. All the procedures were done by two endoscopists (senior consultant and fellow of pediatric gastroenterology) to eliminate the inter-observer variations. Patients were not given antibiotics or acid suppressor therapies within the last month before the procedure.

We considered the definition of dyspepsia according to the Rome II criteria. Positive endoscopy was defined as the presence of macroscopic findings that may indicate HP infection which include antral hyperemia, antral edema, antral nodularity and erosions or ulcers of gastric or duodenal mucosa.

To identify the presence of HP infection and classify the mucosal inflammation, samples were fixed in 5% formaldehyde solution, then cut and stained with both hematoxyllin and eosin (H&E) and modified 2% Giemsa stains and examined by a single senior histopathologist who was unaware about the study.

Data collected included age, sex, symptoms, signs, EGD findings, complications and histopathological reports. The total patients were divided into groups according to age and sex with correlations to endoscopic and histopathological reports.

The statistical analyses were performed using the SPSS software (version 15) and p value <0.05 was considered as statistically significant.

Table I: characteristics of patients according to age and sex

Age (year)	Male (%)	Female (%)	Total (%)
0- 7	9 (43)	12 (57)	21 (13)
7-11	20 (38)	32 (62)	52 (32)
11-14	28 (31)	62 (69)	90 (55)
Total	57 (35)	106 (65)	163 (100)
Median age (year)	9.8	10.5	10.3

Table II: HP status and relation to age and sex groups

H. pylori status	H. Pylori positive			H. Pylori negative		
Sex (total number)	Male (57)	Female (106)	Total (163)	Male (57)	Female (106)	Total (163)
0-7(%)	5 (55%)	9 (75%)	14 (67%)	4 (45%)	3 (25%)	7 (33%)
7-11 (%)	17 (85%)	25 (78%)	42 (81%)	3 (15%)	7 (22%)	10 (19%)
11-14 (%)	26 (93%)	51 (82%)	77 (86%)	2 (7%)	11 (18%)	13 (14%)
Total (%)	48 (84%)	85(80%)	133(82%)	9(16%)	21(20%)	30(18%)

Table III: HP status in all ages and the median age

Variable		H. Pylori positive	H. Pylori negative
Sex	Male (n=57)	48	9
	Female (n=106)	85	21
	Total (n=163)	133	30
Age in years (Median)	Male	10.2	7.5
	Female	10.5	10.4
	Total	10.4	9.5

Table IV: HP status and endoscopic findings*

	H. Pylori positive	H. Pylori negative	Total (%)
Positive endoscopy (%)	70 (91%)	7 (9%)	77 (47%)
Negative endoscopy (%)	63 (73%)	23 (27%)	86 (53%)
Total	133(82%)	30 (18%)	163 (100%)

*findings that may indicate HP infection

Results

From a total of 163 children who were referred to our gastroenterology clinic for the evaluation of chronic dyspepsia, 106 patients were females. Ninety patients (55%) belonged to the age group 11-14 years. The median age for all patients was 10.3 years (9.8 years for males and 10.5 for females) (Table I).

One hundred and thirty three children (82%) showed histopathological evidence of HP chronic gastritis ranging from mild to severe. The prevalence of HP gastritis showed no significant difference in both sex groups (84% in males and 80% in females; p=1.0). But it was more common in older age groups (67% in ages below seven years and 86% in ages above 11 years, p>0.5) (Table II). In both sexes, the median age of HP positive patients was 10.4 years, almost a one year higher than HP negative group (9.5 years). This difference was almost absent in females but more obvious in males although of no significant value due to the small number of HP negative male patients (9 children with median age of 7.5 years) (Table III**)**.

Almost half of the total 163 children (53%) showed normal endoscopy and the other showed positive endoscopic findings (Table IV**)**. Normal endoscopy was shown in 47% of HP positive patients and no differences in both sex groups (Table V).

On the other hand, as shown in Table IV, HP infection was found in 91% of children who showed positive endoscopic findings while the percentage is 73% in patients with normal endoscopy. Statistically, those percentages indicate that EGD is sensitive in 91% in diagnosing HP infection with histopathological examination while the sensitivity is only 53% on endoscopic findings if we considered them 100% specific.

The presence of the above mentioned endoscopic findings were found to have high

Table V: comparison between HP status and endoscopic findings in both sexes

H. pylori status / Endoscopic Findings	H. Pylori positive (n=133)			H. Pylori negative (n=30)		
	Male (n=48)	Female (n=85)	Total (%)	Male (n=9)	Female (n=21)	Total (%)
Positive	24 (50%)	46 (54%)	70 (53%)	2 (22%)	5 (24%)	7 (23%)
Negative	24 (50%)	39 (46%)	63 (47%)	7 (78%)	16 (76%)	23 (77%)

Table VI: histopathology of antral biopsies and relation to the different endoscopic findings

Histology / Endoscopy		Normal	H. pylori positive gastritis	H. pylori negative gastritis	Total	P-value
Normal	Male	5	24	2		
	Female	11	39	5		
	Total	16	63 (73%)	7	86	0.004
Hyperemic antrum and /or edema	Male	0	2	0		
	Female	1	14	0		
	Total	1	16 (94%)	0	17	0.159
Nodular antrum	Male	1	23	1		
	Female	4	33	0		
	Total	5	56 (90%)	1	62	0.024
Duodenal erosions and /or ulcers	Male	0	4	0		
	Female	0	12	0		
	Total	0	16 (100%)	0	16	0.045
Gastric erosions and /or ulcers	Male	0	0	0		
	Female	0	3	0		
	Total	0	3 (100%)	0	3	0.4

positive predictive value (PPV) and specificity in detecting HP infection. All children with endoscopic evidence of gastric (total 3 cases) or duodenal (total 16 cases) erosions or ulcers showed positive HP examination (PPV of 100%). Out of seventeen cases with antral hyperemia and or edema, sixteen showed positive HP examination (PPV of 94%, p=0.16). Nodular antrum was the most common endoscopic finding and was seen in 62 cases (38%) and HP was positive in 90% of them (PPV of 90%, p=0.024). Eight children (5 females) revealed evidence of chronic gastritis and absence of HP microorganism (Table VI).

Discussion

For the time being, Jordan is one of the resource-limited countries and most of our populations belong to the below average economic status and crowded living conditions. There were no published studies examining the prevalence of HP infection in dyspeptic children in Jordan. One study in 200 healthy school children using the stool antigen test to investigate HP status showed prevalence of 56 %.[22] The high prevalence of HP infection in our study is expected in comparing with the developing countries and is almost similar to other studies in dyspeptic adults in Jordan which was 82% in the North of Jordan[23] and 86% in 227 dyspeptic Jordanian patients.[24] Other studies from neighboring countries showed variable prevalence rates: 88.5% in 200 dyspeptic Kuwaiti patients,[25] 73% in Saudi children with recurrent abdominal pain (RAP),[26] 64% in 294 asymptomatic Irani children[27] and 40% in 244 Egyptian children with RAP. [28]

We cannot explain on medical basis the predominance of females in our study. In one recent study from Thailand, dyspepsia was more common in female children (27%:20%).[29] We do not know if dyspepsia is really more common in our female children, but it may be related to the fact that parents in our society are more concerned about complaints from their female children.

The increasing prevalence rates of HP infection with increasing ages in our study supports the

fact that acquisition of HP infection is increasing with age.[30,31] It may also indicate the correlation between dyspepsia and HP infection.[9-12]

The negative endoscopy in almost half of the HP positive patients significantly indicates the importance of gastric biopsies not only in detecting the presence of HP, but also the type and severity of the mucosal inflammation. Many other published studies of dyspeptic children and adults showed close percentages of normal endoscopy and evidence of HP infection. Other studies showed higher percentages: 64% in study from Jordan,[32] 91% in Kuwaiti study.[25]

As in most published studies, our study showed that some endoscopic findings significantly indicate HP infected gastric mucosa. Those include antral hyperemia and edema, antral nodularity and erosions or ulcers in the gastric or duodenal mucosa.[11,19] The most common and specific finding was antral nodularity. Peptic ulcers and erosions were not uncommon as shown in about 10% of our patients with 100% PPV for HP infection. On the other hand, the absence of those findings does not exclude HP infection.

With the high prevalence of HP infection showed in our study, eradication therapy for HP in children with chronic dyspepsia without the invasive EGD might be an option, but because of the good care at our hospital and the easy and availability of endoscopy service we prefer to confirm the diagnosis before treatment. Other considerations are the importance of EGD in diagnosing other pathologies that may need special treatment and follow up and that normal EGD can reassure the patients and their families.

Limitation of our study include not being double-blind because we do not have the facilities and resources to study the dyspepsia in the general populations. The other noninvasive methods used in diagnosing HP infection like stool antigen test and urea breath test are not available in our hospital settings, so we could not examine the prevalence of HP infection in non-dyspeptic control children.

Conclusion

According to our study, HP infection showed high prevalence in dyspeptic children. EGD is important in detecting findings which significantly indicated HP infection such as gastric antral hyperemia and nodularity. Biopsies are mandatory to rule out the infection in normal endoscopies in dyspeptic children. Normal endoscopy might reassure the patients and their families. Larger double-blind well designed study is required to evaluate prevalence and endoscopic findings of HP infection in children with chronic dyspepsia.

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