Helicobacter pylori Infection: Beyond Gastric Manifestations

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Received: 4 April 2024

Accepted: 19 May 2024

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DOI 10.5001/omj.2027.06

Abstract

Despite the progress made in medical science, the occurrence of *Helicobacter pylori (H. pylori)* infection remains high in children globally, highlighting the importance of this infection. The presence of *H. pylori* infection has been associated with headaches; nonetheless, there is a notable deficiency of research in this specific field. Here we report a 6-year-old girl who presented to a specialized hospital in Muscat, Oman, with a one-year history of headaches and non-specific epigastric abdominal pain. The headache was interrupting her sleep. An exhaustive assessment of the headache did not uncover any underlying reason. Upon conducting more tests, it was determined that she tested positive for fecal *H. pylori* antigen. She underwent a two-week eradication therapy, which effectively eliminated her symptoms. Gaining a more comprehensive understanding of the correlation between headaches and *H. pylori* infection in children is of utmost importance for expeditious diagnosis and treatment.

Keywords: Headache, children, *H. pylori*

Introduction

Helicobacter pylori infection is a prevalent bacterial infection that impacts around 50% of the world's population.[1] A recent meta-analysis revealed that the combined prevalence of *H.pylori* infection in children is 42%, with a range of 41% to 44%.[1] Chronic gastritis occurs in nearly all patients who are consistently colonized, with 90% of them remaining asymptomatic.[2] The progression of *H. pylori* infection in patients might vary greatly based on factors related to the bacteria and the host.[3] The presence of *H. pylori* infection is associated with headaches, however, there is a notable lack of data regarding this matter in the juvenile population.[4] In this report, we present the case of a 6-year-old girl who has been experiencing headaches for one year, which were probably related to an *H. pylori* infection. We also explore in this report the potential connection between headaches in children and infection with *H.pylori*.

Case Report

A 6-year-old previously healthy Omani girl presented to the pediatric outpatient clinic at one of the tertiary hospitals in Oman for evaluation of headache and abdominal pain of a one-year duration. The headache was daily, intermittent, compressing type, all over her head, lasting for a few hours, and it was not associated with any neurological deficits, photophobia, nausea, vomiting, anorexia, or any other associated symptoms. It has no diurnal variation, and sometimes it wakes her up from sleep. It was getting better with paracetamol. She also complained of epigastric abdominal pain, which was associated with reduced appetite. The abdominal pain was moderate in severity and happened independently of the headache episodes. She reported no sick contacts, travel, chronic illness, or a family history of chronic headaches or migraines. She has been thoroughly investigated to look for the underlying cause of her headache including full blood count (FBC), urea, electrolytes and creatinine (UEC), liver function tests (LFTs), amylase, coeliac

serology, comprehensive metabolic panel (CMP), and urine culture which were all normal. Her magnetic resonant image (MRI) of brain revealed normal brain structure with no abnormalities seen. Ophthalmology assessment was normal. Her parents gave a history of having had an *H. pylori* infection in the past, but she did not complete the course of eradication therapy. A stool antigen test for *H. pylori* using ELISA with monoclonal antibody was sent this time, and the results came back positive. The patient was started on triple therapy for *H. pylori* eradication (clarithromycin 125mg twice daily for 7 days, amoxicillin 300mg twice daily for 14 days, and esomeprazole 10mg twice daily for 30 days) as a "test-and-treat" strategy with a plan to do oesophagogastroduodenoscopy (OGD) if she does not improve with treatment. On the two months follow-up, she was symptom-free, and the repeat *H. pylori* stool antigen test came back negative, which suggests a successful eradication. Consent has been taken for publication purpose.

Discussion

The acquisition of *H. pylori* infection typically occurs throughout childhood. *H. pylori* is a gram-negative, microaerophilic, and has a spiral shape. It produces urease and forms colonies in the mucus layer next to the gastric mucosa.[4] It causes gastrointestinal issues such as persistent active gastroenteritis, infection, gastric and duodenal ulcers, and stomach cancer. It has also multiple extra-intestinal involvements such as neurological, cardiovascular, metabolic, hematologic, ophthalmic, or dermatological problems.[4]

Several studies have looked into headache prevalence, especially in school-based cross-sectional studies, and concluded that headaches are common among children and adolescents around the world.[4,5] A study in Kuwait revealed a 1-year headache prevalence of 19.4% among 6-17-year-old children and adolescents, with primary headache problems being higher in the 12-17 age group. There is no data on the prevalence of headaches among Omani children. Sleep difficulties, heredity, environmental variables, acute trauma, and menstruation have all been identified as risk factors and potential causes for migraines.[4] Our patient had a thorough assessment done for the headache which failed to uncover any underlying reason except the positive *H. pylori* fecal antigen testing. We think the headache in our patient is related to the *H. pylori* infection. The presence *H. pylori* infection has been associated with headaches, however, there is a notable lack of information about this connection specifically in children.[4] H. pylori infection might be linked with increased intensity and duration of migraine headaches, but not with non-migranous headaches.[6] A study was conducted on 1757 children who were admitted to a pediatric gastroenterology department at "St. Maria" Emergency Hospital for Children in Iasi, Romania, over a period of 3 years found a significant correlation between headache and *H. pylori* infection, with 41.5% of children experiencing headache also being diagnosed with *H. pylori* infection.[4] Gasbarrini et al. discovered a comparable result, reporting that 40% of patients with primary headache, including migraine headache, were infected with *H. pylori.* Furthermore, in this study, they documented that the elimination of *H. pylori* resulted in a considerable decrease in the frequency, intensity, and length of clinical headache episodes (completely disappeared in 17% of patients and reduced frequency in 69%).[7] Tunca A et al conducted a comparative study between 70 patients with migraine who attended the clinic and 60 matched control individuals. They discovered that *H. pylori* infection was more prevalent among patients with migraine compared to the control group. Furthermore, 84.6% of patients showed significant improvement with the eradication medication. The researchers reached the conclusion that it is necessary to investigate the presence of *H. pylori* in patients with migraines, and that eradicating *H. pylori* may have positive effects on treatment.[7] While we cannot definitively establish a causal relationship between the *H. pylori* infection and our patient's headache, we believe there is probably a correlation, particularly given the headache's total resolution following eradication medication.

Genetic factors probably play a role in the association between *H.pylori* infection and migraine. Subgroup analysis in a systematic review found a significantly greater infection rate of *H. pylori* among Asian patients with migraine compared to patients from Europe but did not reach statistical significance.[7]

The development of extra-intestinal symptoms is mostly caused by systemic sub-clinical inflammation associated with *H pylori*.[8] Multiple studies have been discussing the importance of gut-brain axis, which is a bidirectional interaction between the gastrointestinal and central neurological system. They suggested that there is an association between migraine and some gastrointestinal problems such as *H.pylori*, inflammatory bowel syndrome, and celiac disease. Inflammatory mediators, gut flora, neuropeptides, stress hormones, and dietary components all have an impact on this link and the treatment of *H.Pylori* infection may relieve migraine headaches.[8]

Conclusion

H. pylori infection is not uncommon among children, and it can be associated with headaches. A better understanding of this association between headache and infection with *H. pylori* in children is crucial for prompt diagnosis and treatment. *H. pylori* testing and treatment, if required, among children with headaches especially in presence of gastrointestinal symptoms is warranted.

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