

HELICOBACTER PYLORI INFECTION IN CHILDREN PRESENTING WITH RECURRENT ABDOMINAL PAIN

Muhammad Punhal, Qudratullah Malik*, Amjad Iqbal**

Combined Military Hospital Murree Pakistan, *Combined Military Hospital Rawalpindi Pakistan, **Military Hospital Rawalpindi, Pakistan

ABSTRACT

Objective: To determine the frequency of *Helicobacter Pylori* (*H. pylori*) infection in children presenting with recurrent abdominal pain (RAP).

Study Design: Descriptive cross-sectional study.

Place and Duration of Study: This study was conducted at Combined Military Hospital (CMH) Quetta over a period of 10 months from 01-08-2011 to 31-05-2012.

Material and Methods: A total of 83 children with recurrent abdominal pain were included in this study. Blood samples of patients were analyzed in laboratory of CMH Quetta for *H. pylori* Antibody (Ab) titers.

Results: Mean age of the patients was 8.12±3.46 years. Distribution of gender showed that 44 patients (53.1 %) were male while 39 patients (46.9 %) were female. Mean duration of symptoms was 15.8±3.7 months. *H. pylori* infection was present in 27 (32.5%) patients. Topical ciprofloxacin is more effective in earlier control of congestion and discharge of ear in CSOM; (*p* value <0.001 and <0.005 respectively) as compared to Neomycin.

Conclusion: *H. pylori* infection is common in children with RAP and presentation of epigastric pain in these patients can be considered as a warning sign to screen for *H. pylori* infection.

Keywords: *H. pylori* infection, recurrent abdominal pain, Anti *H. pylori* IgG Chronic.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Recurrent abdominal pain (RAP) in children is defined as at least three episodes of abdominal pain during three month period and severe enough to affect their activities. RAP affects 34% of world's population and represents one of the most common complaints seen in general paediatric practices. RAP has been widely reported to affect at least 10% of children over the age of 5 years¹. *Helicobacter pylori* (*H. pylori*) related gastritis has been suggested as a cause of recurrent abdominal pain.

H. pylori is a micro aerophilic bacterium² which was discovered by Warren and Marshall in 1983³. Since its discovery, it has opened a new era of discovery and understanding of gastro-duodenal pathology. Approximately 50% (over 3 billion) of the world

populations are known to be infected with *H. pylori*, mainly in the developing countries. This has been attributed to the poor socioeconomic status and overcrowded conditions^{4,5}. It is acquired early in life in developing countries and most of the population is infected by the age of 10 years^{6,7}.

Diagnosis of *H. pylori* infection is possible by non-invasive testing like quantitative or qualitative serology (anti *H. pylori* IgG) which can be done with either lab ELISA or office kits. Ideally culture is usually the gold standard when dealing with bacterial infections, but culturing *H. pylori* is a tedious procedure and is subject to errors in storage and handling. *H. pylori* IgG is easy and can be done in peripheral hospitals. This test has both sensitivity and specificity of around 86%⁸.

Different studies were done globally about the serological prevalence rates of *H. pylori* infection in children. In one study serological prevalence rates of *H. pylori* infection were 15% and 46% in Gambian children younger than 20

Correspondence: Dr Muhammad Punhal, Departments of Paediatrics Combined Military Hospital, Murree, Pakistan
Email: muhammadpunhal75@yahoo.com

Received: 09 Mar 2015; revised received: 17 Apr 2015; accepted: 29 Apr 2015

months and age 40-60 months respectively⁹. In another study done in Iran, the age specific seropositive rate of anti *H. pylori* IgG was 37.6% at age 1-5 years, 46.9% at age 6-10 years and 54.9% at age 11-15 years⁷.

Despite the fact of high prevalence of *H. pylori* infection around the world, data about its prevalence in Pakistan are scanty and derived mostly from hospital based studies of symptomatic adults. A study conducted in Civil Hospital Karachi showed *H. pylori* as the cause of RAP in 31% of the children¹. The aim of this study was to find out the frequency of *H. pylori* infection in children presenting with RAP. This helped in early diagnosis and management of patients having *H. pylori* gastritis who present with RAP.

MATERIAL AND METHODS

This cross-sectional study was conducted at department of Paediatrics, Combined Military Hospital (CMH) Quetta over a period of 10 months from 01-08-2011 to 31-05-2012. Eighty three children were included in the study using non-probability consecutive sampling. Sample size was calculated by using WHO sample size calculator with confidence level 95%, anticipated population proportion (p) = 0.31¹ and absolute precision required (d) = 0.10. Children of either sex, from 3 to 15 years of age, fitting in RAP definition were included in the study. Children with abdominal surgical conditions, inflammatory bowel disease,

consent was taken from parents. All patients who were reported with recurrent abdominal pain in CMH Quetta, (indoor/outdoor) were part of this study. History and complete clinical examination was performed by trainee researcher and blood samples were analyzed in laboratory of this hospital for *H. pylori* (Ab) titers by ELISA and the result was verified by pathologist. All the data was entered and analyzed using SPSS version 20.0 Frequency of percentage was calculated for qualitative variables like gender and *H. pylori* infection. Mean \pm SD was calculated for quantitative variables, age, duration and frequency of symptoms.

RESULTS

A total of 83 children were selected during the study period. Overall, the mean age of the patients was 8.12 ± 3.46 years. The mean age of *H. pylori* positive patients was 9.40 ± 3.54 years while of *H. pylori* negative patients was 7.12 ± 3.12 years. Distribution of gender showed 39 patients (46.9%) were female and 44 patients (53.1%) were male (table-1). The mean duration of symptoms was 15.8 ± 3.7 months. Out of 83 patients, 75 patients (90.3%) had 1-2 frequency of symptoms in a month, and remaining 8 patients (9.7%) had 3-4 frequency of symptoms in a month. While studying the distribution of cases by age it was found that 25 patients (30.1%) were < 5 years of age, 21 patients (25.3%) were 5-10 years old while 37 patients (44.6%) were 11-15 years old. *H. pylori* infection

Table-1: Demographic characteristics of the study population.

		Number N=83	H pylori IgG positive N=27	H pylori IgG Negative N=56
Gender	Male	44 (53.1 %)	15 (55.55%)	29 (51.79%)
	Female	39 (46.9 %)	12 (44.45%)	27 (48.21%)
Mean age \pm SD		8.12 ± 3.46	9.40 ± 3.54	7.12 ± 3.12

urinary tract infection, chronic constipation and who were suffering from mental retardation were excluded from the study.

RAP in children was defined as the presence of at least three episodes of abdominal pain over period of three months severe enough to affect their activities. *H. pylori* infection was considered when *H. pylori* anti-bodies were present in a patient with RAP. Informed

was present in 27 (32.5%) patients. The seroprevalance in children less than 5 years of age was 20.0 %. The seroprevalance in children between 5 to 10 years was 33.33% and for children above 10 years was 40.54% (fig-1).

DISCUSSION

RAP in children is a common problem and poses a diagnostic challenge to treating physician. *H. pylori* has been suggested as a

possible cause of RAP but its role as a cause of RAP has been controversial. Frequency of *H. pylori* infection has been variously reported in different studies depending on the dietary habits, water quality, personal hygiene, socioeconomic status and ethnic background¹.

The overall sero-prevalence of *H. pylori* infection found in the studied population with RAP was 32.5%. This figure is similar to other studies in the region. Memon et al in a study conducted in Civil Hospital Karachi showed *H. pylori* as the cause of RAP in 31% of the children¹. In a study conducted in Brazil by Dattoli et al the seroprevalence of *H. pylori* infection found in the studied population was 28.7%¹⁰. Although the prevalence of *H. pylori* infection has decreased in some countries, it varies from country to country¹¹, affecting mainly the less affluent population¹². Thus, Elitsur et al. have shown that *H. pylori* infection affected 12% of children in United States of America¹³, whereas, in developing countries, this infection has shown sero-prevalence rates higher than 40% in children¹⁴.

As the prevalence of *H. pylori* infection varies in different countries and also the clear effects of ethnic and racial factors, socio-economic status, and living conditions on this prevalence, the exact relationship between RAP and positive *H. pylori* infection is ambiguous and *H. pylori* seropositivity has ranged between 11% and 75% in different studies¹⁵⁻¹⁸. One of the reasons resulting in sero-prevalence might be difference in diagnostic tools for the detection of *H. pylori* infection in RAP patients. In some studies with reports of high prevalence of *H. pylori* infection in RAP, histo-pathological methods were generally used^{17,5} whereas, non-invasive methods such as serology were used in studies that reported lower prevalence of *H. pylori* infection in RAP cases^{19,20}.

In current study, the mean age of the patients was 8.12 ± 3.46 years which is comparable with a study carried out by Mansour et al at in which they demonstrated a mean age 7.76 ± 3.38 years²¹. However, the mean age of the patients described by Hestvik et al and Dattoli et al was 4.8 ± 3.6 years and 6.8 ± 0.5 years respectively^{10,22}. This difference of

age in different studies is due to difference in epidemiological conditions as already described^{1,4-7}.

In our study the sero-prevalance for *H. pylori* infection increased with advancing age. The mean age of *H. pylori* positive patients was 9.40 ± 3.54 years while of *H. pylori* negative patients was 7.12 ± 3.12 years. Early colonization was common with a prevalence of 20.0% in children younger than 5 year of age. There was a steady increase with increasing age. The seroprevalance in children between 5 to 10 years was 33.33% and for children above 10 years was 40.54%. This fact has been highlighted in different studies including the ones by Dattoli et al and Hestvik et al^{10,22}. Once acquired, an untreated *H. pylori* infection can

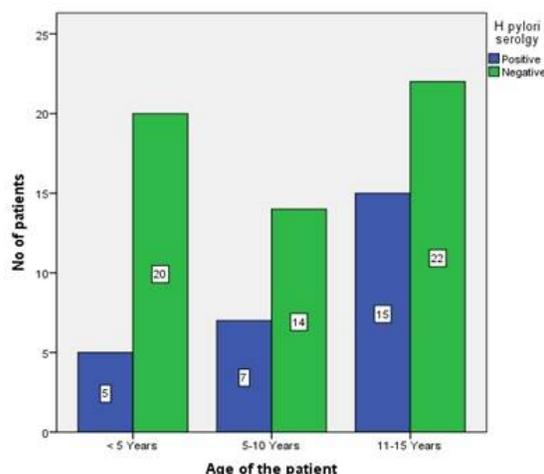


Figure-1: Showing Helicobacter pylori serology, positively in different age group.

become lifelong²³ and lead to the development of atrophic gastritis and metaplasia, which are risk factors for the development of gastric cancer.

There was no statistically significant difference in gender of *H. pylori* positive patients. Gender has not been identified as a relevant characteristic for *H. pylori* acquisition in this or in many other studies which have investigated this infection in childhood^{10, 24, 25}. On the contrary, in adult populations, male gender has been significantly associated with *H. pylori* infection²⁶. However, Hestvik et al demonstrated that even in pediatric population

male gender is a risk factor for acquiring *H. pylori* infection²².

Our study investigated the seroprevalence of *H. pylori* infection in children with RAP which was not studied in Baluchistan province in particular and Pakistan in general. However, the study has its limitations. Due to financial constraints we had no control group of asymptomatic children to ascertain seroprevalence of *H. pylori* infection in asymptomatic children of the same region. Moreover our study did not study the risk factors associated with *H. pylori* infection in our population.

CONCLUSION

The prevalence of *H. pylori* colonization among our children is high and increases with age. *H. pylori* infection is commonly found in children with RAP, and presentation of epigastric pain in these cases can be considered as a warning alarm to screen for *H. pylori* infection.

CONFLICT OF INTEREST

This study has no conflict of interest to declare. Abstract and results of this study were accepted and presented in an oral presentation at the International conference on Medical Education, organised by Association for Excellence in Medical Education (AEME) and held on 07th - 09th March 2014 at University of Health Sciences (UHS) Lahore, Pakistan. No funding was received from any agency or institution.

REFERENCES

- Memon IA, Lal MN, Murtaza G, Jami A, Bhatti RN, Tariq S, et al. Recurrent Abdominal Pain in Children. *Pak J Med Sci* 2009;25:26-30.
- Rosenberg JJ. Helicobacter pylori. *Pediatr Rev* 2010;31:85-6.
- Malaty HM. Epidemiology of Helicobacter pylori infection. *Best Pract Res Clin Gastroenterol* 2007;21:205-14.
- Salih BA. Helicobacter pylori infection in developing countries: The burden for how long? *Saudi J Gastroenterol* 2009;15:201-7.
- Goldman C, Barrado A, Janjetic M, Balcarce N, Cueto Rua E, Oshiro M, et al. Factors associated with *H. pylori* epidemiology in symptomatic children in Buenos Aires, Argentina. *World J Gastroenterol* 2006; 12: 5384-8.
- Imanzadeh F, Sayyari AA, Iqbali A, Javaherzadeh H. Study of the risk factors related with helicobacter pylori infections in children with peptic ulcer disease. *Pak J Med Sci* 2007;23: 446-8.
- Jafarzadeh A, Rezayati MT, Nemat M. Specific serum immunoglobulin G to H pylori and CagA in healthy children and adults (south-east of Iran). *World J Gastroenterol* 2007;13: 3117-21.
- Safaei HG, Fazeli A, Tamizifar H, Rashidi N. Comparison of Salivary Anti Helicobacter pylori IgG with Serum IgG and Bacteriological Tests in Detecting Helicobacter pylori infections. *J Res Med Sci* 2005;1:1-5.
- Sullirvan PB, Thomas JE, Wight DG, Neale G, Estham EJ, Corrah T, et al. Helicobacter pylori in Gambian children with chronic diarrhea and malnutrition. *Arch Dis Child* 1990 ; 65 (2): 189-91.
- Dattoli VC, Veiga RV, da Cunha SS, Pontes-de-Carvalho LC, Barreto ML, Alcântara-Neves NM. Seroprevalence and potential risk factors for Helicobacter pylori infection in Brazilian children. *Helicobacter* 2010;15:273-8.
- Tkachenko MA, Zhannat NZ, Erman LV, Blashenkova EL, Isachenko OB, Graham DY, et al. Dramatic changes in the prevalence of Helicobacter pylori infection during childhood: a 10-year follow-up study in Russia. *J Pediatr Gastroenterol Nutr* 2007;45:428-32.
- Malaty HM. Epidemiology of Helicobacter pylori infection. *Best Pract Res Clin Gastroenterol* 2007;21:205-14.
- Elitsur Y, Dementieva Y, Rewalt M, Lawrence Z. Helicobacter pylori infection rate decreases in symptomatic children: a retrospective analysis of 13 years (1993-2005) from a gastroenterology clinic in West Virginia. *J Clin Gastroenterol* 2009;43:147-51.
- Rodrigues MN, Queiroz DM, Bezerra Filho JG, Pontes LK, Rodrigues RT, Braga LL. Prevalence of Helicobacter pylori infection in children from an urban community in north-east Brazil and risk factors for infection. *Eur J Gastroenterol Hepatol* 2004;16:201-5.
- Cinquetti M, Pavan M, Zoppi G. Helicobacter pylori infection as a cause of recurrent abdominal pain in children. *Pediatr Med Chir* 1997;19:17-21.
- Gulcan EM, Varol A, Kutlu T, Cullu F, Erkan T, Adal E, et al. Helicobacter pylori stool antigen test. *Indian J Pediatr* 2005;72:675-8.
- Mendoza-Ibarra SI, Perez-Perez GI, Bosques-Padilla FJ, Urquidi-Rivera M, Rodríguez-Esquivel Z, Garza-González E, et al. Utility of diagnostic tests for detection of Helicobacter pylori in children in northeastern Mexico. *Pediatr Int* 2007;49:869-74.
- Yang YJ, Sheu BS, Lee SC, Wu JJ. Short-term recurrent abdominal pain related to Helicobacter pylori infection in children. *J Gastroenterol Hepatol* 2005;20:395-400.
- Andersen LP, Wewer AV, Christiansen KM, Tvede M, Hansen JP, Henriksen FW, et al. The humoral immune response to Helicobacter pylori infection in children with recurrent abdominal pain. *APMIS* 1994;102:457-64.
- Bansal D, Patwari AK, Malhotra VL, Malhotra V, Anand VK. Helicobacter pylori infection in recurrent abdominal pain. *Indian Pediatr* 1998;35:329-35.
- Mansour MM, Al Hadidi KhM, Omar MA. Helicobacter pylori and recurrent abdominal pain in children: Is there any relation? *Trop Gastroenterol* 2012;33:55-61.
- Hestvik E, Tylleskar T, Kaddu-Mulindwa DH, Ndezi G, Grahnquist L, Olafsdottir E, et al. Helicobacter pylori in apparently healthy children age 0-12 years in urban Kampala, Uganda: a community-based cross sectional survey. *BMC Gastroenterol* 2010; 10:62.
- Suarez G, Reyes VE, Beswick EJ. Immune response to H. pylori. *World J Gastroenterol* 2006;12:5593-8.
- Nabwera HM, Nguyen-van-Tam JS, Logan RF, Logan RP. Prevalence of Helicobacter pylori infection in Kenyan schoolchildren aged 3-15 years and risk factors for infection. *Eur J Gastroenterol Hepatol* 2000;12:483-7.
- Cardinali LCC, Rocha GA, Rocha AM, Moura SB, Soares TF, Esteves AM et al. Evaluation of [13C] urea breath test and Helicobacter pylori stool antigen test for the diagnosis of *H. pylori* infection in children from a developing country. *J Clin Microbiol* 2003;41:3334-5.
- de Martel C, Parsonnet J. Helicobacter pylori infection and gender: a meta-analysis of population-based prevalence surveys. *Dig Dis Sci* 2006;51:2292-301.