

## PREVALENCE OF COMMON INTESTINAL PARASITES IN ADULT PATIENTS WITH CHRONIC LIVER DISEASES ASSOCIATED WITH HELICOBACTER PYLORI INFECTION

By

AHMED ALI SABAH<sup>1\*</sup> AND FATMA MOHAMAD EBRAHEM EL-LESSI<sup>2</sup>

Departments of Parasitology, Faculties of Medicine, Al-Azhar University for (Boys<sup>1</sup>) and (Girls<sup>2</sup>), Nasr City, Egypt (\*Correspondence: drasabah@gmail.com)

### Abstract

The present study investigated the prevalence of common intestinal parasites in association with *H. pylori* infection among a group of patients with the most common chronic disease prevalent in Egypt. These patients were known to be chronic liver disease with different etiology and followed up in gastroenterology out-patients clinic. They were 77 complaining of various abdominal symptoms either some or all symptoms such as; nausea, vomiting, abdominal pain, heart burn, flatulence, constipation, distension, melena and sometimes diarrhea. The diagnosis of chronic liver disease was confirmed by the history, clinical examination, laboratory investigations, and sonographic images. There were 37 males and 40 females with mean age (48.5±14.2). Types of liver diseases were liver cirrhosis in 28 patients and fatty liver in 49 patients (Non Alcoholic Fatty liver disease; NAFLD). None of the patients was diabetic. A fresh single fecal sample was collected from both patients and controls. Each sample was divided into two parts; one for examination of common intestinal parasites, and the other part for detection of *H. pylori* antigen by Copro-immunoassay. The results showed no significant difference among intestinal parasites in patients and controls. But, *E. histolytica* was the commonest parasite (48%) compared to; *G. lamblia* (4%), *A. lumbricoides* (5.3%), *E. vermicularis* (2.7%), *S. mansoni* (1.3%), 2/3 of patients with *E. histolytica* were co-infected with *H. pylori* infection. The prevalence of *H. pylori* infection was (81.8%) compared to controls (63%), with significant difference.

**Key words:** Chronic liver diseases, *Entamoeba histolytica*, *Giardia lamblia*, *Ascaris lumbricoides*, *Enterobius vermicularis*, *Schistosoma mansoni*, *Helicobacter pylori*.

### Introduction

In a systemic review and meta-analysis to assess the prevalence of *Helicobacter pylori* infection, more than half the world's population was infected (Houi *et al*, 2017). *H. pylori* is an important cause of peptic ulcer disease and gastric cancer. *H. pylori* may also have a role in uninvestigated and functional dyspepsia, ulcer risk in patients taking low-dose aspirin or starting therapy with a non-steroidal anti-inflammatory medication, unexplained iron deficiency anemia and idiopathic thrombocytopenic purpura (Chey *et al*, 2017).

In Egypt, Sabah and Temsah (2015) investigated the prevalence of some intestinal parasites in diabetic patients in association with *Helicobacter pylori* infection (*H. pylori*). They showed that *Entamoeba histolytica* (*E. histolytica*) was the commonest parasite prevalent compared to other parasites. But,

there was no statistical difference from controls. On the other hand, there was statistical difference between patient and controls regarding *H. pylori* infection. Intestinal parasites usually create benign diseases, though they may induce complications with high morbidity and mortality to the immunocompromised patients. Also, *E. histolytica* modulated the virulence of certain human viruses and itself a host for its own viruses. For example, AIDS accentuates the damage and pathogenicity of *E. histolytica* (Hung *et al*, 2005). Infective HIV was viable within the amoeba (Brown *et al*, 1991). In children, Hegab *et al*. (2003) in Egypt found that the incidence of opportunistic intestinal parasites with chronic liver disease was (92.5%) compared to the immuno-compromised children (90%); the commonest parasites were *G. lamblia*, *E. histolytica* and *Cryptosporidium parvum*. Also, Baiomy *et al*. (2010) in

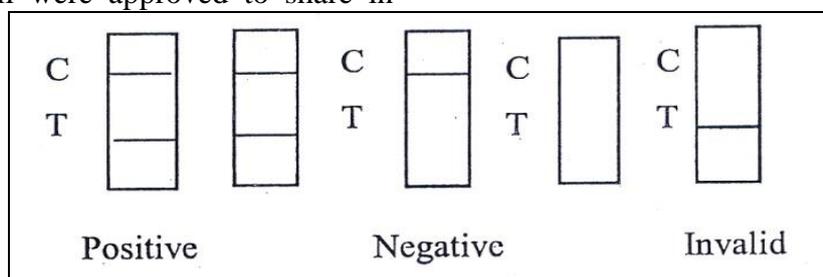
Egypt investigated the opportunistic parasitic infections among the immunocompromised children with malignancy, diabetic, and chronic renal failure and *Giardia lamblia* was the most common parasite. El-Shazly *et al.* (2015) reported that liver diseases affected the immunity of the patients and were often highly susceptible to parasitic infection. Most of the previous studies were conducted on children with chronic diseases including liver diseases.

The aim of this study was to investigate the prevalence of common intestinal parasites and *Helicobacter pylori* co-infection among adult patients with chronic liver diseases.

### Subjects and Methods

A total number of 77 patients were known to suffer from chronic liver diseases. They were 37 males and 40 females with mean age of ( $\bar{x}$  48.5±14.2). 28 patients out of 77 were having liver cirrhosis with various degrees the remainders 49 patients were suffering from non-alcoholic fatty liver diseases but there were not known diabetic. All patients were attending out-patient clinic complaining of different gastrointestinal symptoms. All patients were subjected to clinical, biochemical and ultrasonographic investigations. They all were approved to share in

accordance with the ethical standards. The controls were cross-matched individuals suffered from various gastrointestinal symptoms. A single fresh fecal sample was collected from all participants, and examined through two hours. Each sample was divided into two parts: one prepared for examination of common intestinal parasites using the Kato-thick smear method (Katz *et al.*, 1970), simple sedimentation (Garcia, 2001), then stained by iodine and microscopic examined. In patients with diarrhea, the stool sample was stained by modified Ziehl-Nelsen (MZN) for the suspected *Cryptosporidium parvum* (El Naggar *et al.*, 2006). The other part of the sample was prepared for the qualitative detection of *H. pylori* antigen using chromatographic immunoassay (On Site *H. pylori* Ag Rapid Test) with the sensitivity 94.4%, and specificity 100%, with an overall predictive value of 97.8%. Preparation of the test was done according to the company's instructions (CTK Biotech. Inc. 10110 Misa Rim Road. San Diago, CA 92121, USA). The test detected antigen present in feces, which indicated an active *H. pylori* infection. The interpretation of the test was according to the rules given by the company as follow:



Where C= control, T= tests

### Results

Table 1: Prevalence of intestinal parasites and *H. pylori* infection in chronic liver disease.

Item	<i>E. histolytica</i>	<i>G. lamblia</i>	<i>A. lumbricoides.</i>	<i>E. vermicularis</i>	<i>H. pylori</i>
Total No. 77	37/77	3/77	4/77	3/77	63/77
%	48%	4%	5.2%	3.9%	81.8%
Controls	48%	3.3%	5.3%	4%	63%

*E. histolytica* was the commonest parasite compared to others. But difference was not significant compared to controls in all parasites. For *H. pylori* infection, the prevalence

of infection was significantly high compared to controls (81.8% & 63% respectively). Almost one third of patients suffered from *E. histolytica* and *H. pylori* co-infection.

## Discussion

Intestinal parasites usually create benign diseases in immuno-competent host. But, hosts with abnormal or compromised responses are at high risk for severe disease manifestations, such as the reactivation of subclinical leishmaniasis infection with development of advanced visceral leishmaniasis in human immunodeficiency virus infected patients (Schiff, 2003). Moreover, they may induce complications with high risk of morbidity and mortality (El-Nady *et al*, 2015). In an experimental study, Cislak *et al*. (1992) used the severe combined immunodeficient mice to evaluate resistance to invasive with *E. histolytica*. They found that all the mice developed severe liver abscesses when challenged intra-hepatic with virulent strain of *E. histolytica*. Several studies have demonstrated the incidence of intestinal parasites among immunocompromised children including those with chronic liver diseases (Hegab *et al*, 2003; Hung *et al*, 2005; Antonios *et al*, 2010; Bayoumy *et al*, 2010; El-Shazly *et al*, 2015).

*H. pylori*, is a gram-negative, microaerophilic bacterium found usually in the stomach. It is present in a person with chronic gastritis and gastric ulcers (Marshall and Warren, 1984; Graham and Graham 1999). It is also linked to the development of duodenal ulcers and stomach cancer. More than 50% of the world's population harbor *H. pylori* in their upper gastrointestinal tract (Aieva *et al*, 2016). The present study investigated the prevalence of common intestinal parasites in patients suffered from chronic liver diseases with different etiology in association with *H. pylori* infection. Ultrasound of the liver has a high sensitivity and specificity (both approaching 90%) for detection of fatty infiltration but does not allow assessment for the presence or degree of inflammation and fibrosis (Mauss *et al*, 2014). Ultrasonography proved to be quick, widely available and inexpensive modality for hepatic imaging and is often the initial imaging test ordered (Ahmed *et al*, 2007).

On the other hand, there was no yet proven causal association between *H. pylori* infection and gastro-esophageal reflux disease. On the geographical basis, there is a negative association between the prevalence of *H. pylori* infection and the prevalence and severity of gastro-esophageal reflux disease (Hong and Kim, 2015).

In systemic review several studies investigated prevalence of intestinal parasite in association with *H. pylori* infection in children (Torres *et al*, 2003; Bin Mohanna *et al*, 2014). These studies have done in healthy subjects. None studies investigated the relationship of *H. pylori* infections and common intestinal parasitosis in chronic diseases such as diabetes, chronic liver diseases, and other types of chronic diseases. Therefore we assume that current studies would be the first studies performed in Egypt regarding this issue. In previous study Sabah and Tem-dah (2015) studied diabetic patients and prevalence of common intestinal parasites, in a descending order: *E. histolytica* (48%), *G. lamblia* (4.8%), *E. vermicularis* (4.8%), *A. lumbricoides* (2.5%), & *S. mansoni* (2.5%). The difference compared to controls was not statistically significant. In contrast the prevalence of *H. pylori* was (88.6), significantly higher than controls (63%). The current results showed that *E. histolytica* was the commonest parasites compared to other parasites (48%). Moreover, *H. pylori* (81.8%) in patients were significantly higher (63%) than in controls.

The present study did not agree with Bayoumy *et al*. (2010) who reported that *G. lamblia* was the commonest parasite in patients with immunocompromised diseases (10%) while in the present study the prevalence of *G. lamblia* was (4%). El Nadi *et al*. (2015) also contradicted with the present data, as *E. histolytica* was (48%) and *G. lamblia* was (4%) while in that study *E. histolytica* was (7%) & *G. lamblia* was (22%). The difference between the two results could be attributed to the difference in location, type of patients, the patient's behavior, culture, med-

ication and environmental factors. Antonios *et al.* (2010) reported that *G. lamblia* was (25%) among children with renal failure while in the present study, *G. lamblia* was (4%). The differences in results might be attributed to the difference of patients ages (children and adults), and type of disease (renal failure and/or chronic liver disease). Al-Qobati *et al.* (2012) assessed the profile of intestinal parasites among patients with cancer on chemotherapy, found that *E. histolytica* was (2.4%) and *A. lumbricoids* was (1.5%) while in the present results were (48%) for *E. histolytica* and (5.2%) for *A. lumbricoids* which are contradicted with that study. Hegab *et al.* (2003) showed that *E. histolytica* was among the commonest parasites in immunocompromised children that agreed with the present results. Torres *et al.* (2003) reported that adults with intestinal parasitic infection had a significantly lower *H. pylori* prevalence than adults without parasites. Bin-Mohanna *et al.* (2014) found that amoebiasis and giardiasis were less prevalent than *H. pylori* infection in children. This result agreed with the present results but in adults with chronic liver disease, was expected that the reverse was true in the context that chronic liver disease as an immunocompromised state.

### Conclusion

*Helicobacter pylori* infection is a common worldwide infection that is an important cause of peptic ulcer disease and gastric cancer.

The common intestinal parasitosis and *H. pylori* co-infection was clarified. Such a study should be set-up to investigate the epidemiological and clinical impact of co-infection especially in the chronic diseases. Now, is there any synergistic relation between *E. histolytica* and *H. pylori* infection in immuno-compromised patients? Could *H. pylori* infection be considered as an opportunistic infection? No doubt, *E. histolytica* still the commonest parasite in adult patients with chronic liver diseases but without significant difference. In contrast *H. pylori* was

highly significant than in controls. Also, there was no particular relationship between *H. pylori* infection and other common intestinal infections.

### Recommendations

More sensitive and reliable methods to diagnose *E. histolytica* other than direct examination should be used in *H. pylori* infected patients

1- What is the role of immune system in fighting against bacterial infection in association with parasitic infection?

2- Host parasite relationship association with *H. pylori* and other gastrointestinal infections must be clarified.

3- Prompt treatment of both parasite infection and *H. pylori* especially in immunocompromised patients is a must.

Conflict of interest: the authors declared that they neither had any potential interest nor received financial support.

### References

- Ahmed, F, Cull, D, Jacobson, IM, 2007: Schiff's Diseases of the Liver. 10<sup>th</sup> Edition. Publisher Lippincott Williams and Wilkins.
- Al-Qobati, SA, Al-Maktari, MT, Bin Al-Zoa, AM, Derhim, M, 2012: Intestinal parasitosis among Yemeni patients with cancer, Sana'a, Yemen, J. Egypt. Soc. Parasitol. 42, 3:727-34.
- Amieva, M, Peek, A, Richard, M, 2016: Pathobiology of *Helicobacter pylori* induced gastric cancer. Gastroenterology 150, 1:64-78.
- Antonios, SA, Tolba, OA, Othman, AA, Saad, MA, 2010: A preliminary study on the prevalence of parasitic infections in immuno-compromised children, J. Egypt. Soc. Parasitol. 40, 3: 617-30.
- Bayoumy, AMS, Mohammad, KA, Shahat, S A, Ghannam, MM, Gazy, MSM, 2010: Role of parasites among chronic diarrheic patients, J. Egypt. Soc. Parasitol. 40, 3:679-98.
- Bin-Mohanna, MA, Al-Zobairi, LM, Sallam, A, 2014: Prevalence of *Helicobacter pylori* and parasites in symptomatic children examined for *Helicobacter pylori* antibodies, antigens, and parasites in Yemen. Saudi Med J. 11:1408-11.
- Brown, M, Reed, S, Levy, JA, Busch, M, McKerrow, JH, 1991: Detection of HIV-1 in *Entamoeba histolytica* without evidence of transmission to human cells. AIDS 5, 1:93-6.
- Chey, WD, Leontiadis, GI, Howden, CW, Mo-

- ss, SF, 2017: ACG clinical guideline: Treatment of *Helicobacter pylori* infection. Am. J. Gastroenterol. 112:212-38.
- Cieslak, PR, Virgin, HWT, Stanley, SL, 1992: A severe combined immunodeficient (SCID) mouse model for infection with *Entamoeba histolytica*. J. Exp. Med. 176, 6:1605-9.
- Elnadi, NA, Hassanien, HA, Ahmad, AM, AbdEllah, AK, 2015: Intestinal parasites in diabetic patients in Sohag University Hospitals, Egypt J. Egypt. Soc. Parasitol. 45, 2:443-9.
- El-Shazly, LB, El-Faramawy, AA, El-Sayed, NM, Ismail, KM, Fouad, SM, 2015: Intestinal parasitic infection among Egyptian children with chronic liver diseases. J. Parasit. Dis. 39, 1:7-12.
- Garcia, LS, 2001: Diagnostic Medical Parasitology. 4<sup>th</sup> ed. Washington, D.C.: A.S.M. Press.
- El-Naggar, SM, El-Bahy, MM, Abd Elaziz, J, El-Dardiry, MA, 2006: Detection of protozoal parasites in the stools of diarrhoeic patients using different techniques. J. Egypt. Soc. Parasitol. 36, 1:7-22.
- Graham, KS, Graham, DY, 1999: Contemporary Diagnosis and Management of *Helicobacter pylori*-Associated Gastrointestinal Diseases. Hand Books Health Care Co., New Town. PA, USA.
- Hegab, MH, Zamzam, SM, Khater, NM, Tawfeek, DM, Abdel-Rahman, HM, 2003: Opportunistic intestinal parasites among children with chronic liver disease. J. Egypt. Soc. Parasitol, 33, 3:969-77.
- Hong, SJ, Kim, SW, 2015: *Helicobacter elicobacter pylori* infection in gastroesophageal reflux disease in the Asian Countries. Gastroenterol. Res. Pract. 2015:985249.
- Hooijk, Y, Lai, MY, Ng, WK, Suen, MMY, et al, 2017: Global prevalence of *Helicobacter pylori* infection: Systemic review and meta-analysis. Gastroenterology 153, 2:420-9.
- Hung, CC, Deng, HY, Hsiao, WH, Hsieh, SM, Hsiao, CF, et al, 2005: Invasive amoebiasis as an emerging parasitic disease in patients with human immunodeficiency virus type 1 infection in Taiwan. Arch. Int. Med. 165, 4:409-15.
- Katz, NZ, Coelho, PMZ, Pellegrino, J, 1970: Evaluation of Kato quantitative method through the recovery of *Schistosoma mansoni* eggs added to human feces. Parasitol. 56:1032-9.
- Marsall, BJ, Warren, JR, 1984: Unidentified curved bacilli in the stomach of patients with gastric and septic ulceration. Lancet 1:1311-4.
- Mauss, S, Berg, T, Rockstroh, J, Sarrazin, C, Wedemeyer, H, 2014: Hepatology: A clinical Textbook, 2<sup>nd</sup> edition.
- Sabah, AA, Temsah, AG, 2015: Prevalence of some gastrointestinal parasites in diabetic patients in Tanta City, Gharbia Governorate, Egypt. J. Egypt. Soc. Parasitol. 45, 3:681-4.
- Schiff, ER, Sorrell, MF, Maddrez, WC, 2003: Schiff's Diseases of the Liver, 10<sup>th</sup> ed. Lippincott Williams and Wilkins Publisher, Washington. U.S.A.