SEROPREVALENCE OF *Helicobacter pylori* INFECTION IN CHRONIC CHAGASIC PATIENTS, AND IN THE RURAL AND URBAN POPULATION FROM UBERLÂNDIA, MINAS GERAIS, BRAZIL

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SUMMARY

As patients with chronic Chagas disease exhibit morphological and functional changes of the stomach (hypomotility and hypochlorhydria), malnutrition, immunological deficiency and high prevalence of peptic disease associated to *Helicobacter pylori* infection, the purpose of this study was to evaluate if the prevalence of *H. pylori* infection in chronic chagasic is higher than in non-chagasic individuals in the urban and rural population from Uberlândia, MG, Brazil. Serological determination of IgG antibodies to *H. pylori* was performed using a second-generation ELISA. Thus, 598 people were evaluated: 128 chagasic (CG), 222 non-chagasic living in urban area (U-NCG) and 248 non-chagasic living in rural area (R-NCG). Regarding the age range from 21 to 50 years, the prevalence of *H. pylori* infection in the CG (85.1%) was significantly higher than in the U-NCG (56.3%, p < 0.01) and the R-NCG (67.4%, p < 0.05). In the patients over 50 years, the prevalence in the CG (86.4%) was similar to the U-NCG (78.8%) and R-NCG (86.1%). Similar results were also found between the U-NCG and R-NCG for all age ranges, with prevalence rates of 29.1% and 35.3% for the age range from 5 to 13 years, and 47.2% and 40% for that from 14 to 20 years, respectively. We conclude that chagasic patients showed a higher seroprevalence of *H. pylori* infection than non-chagasic individuals, in the age range from 21 to 50 years, and that the prevalence of this infection was similar in the studied urban and rural non-chagasic population.

KEYWORDS: Chagas disease; *Helicobacter pylori*; Prevalence; Epidemiology; Minas Gerais; Brazil.

INTRODUCTION

Chagas disease is caused by the protozoan parasite *Trypanosoma cruzi*, which is transmitted to humans mainly by triatome bugs and blood transfusion. In the chronic Chagas disease, the patients can be asymptomatic and present conventional electrocardiogram as well as radiological studies of the heart and digestive tube without changes. This disease form is recognized as indeterminate and can develop to the cardiac (arrhythmias and/or congestive heart failure) and/or digestive (megaesophagus and/or megacolon) forms. In the stomach, the degeneration of the intra-mural ganglionic nerve cells causes a wide variety of motor and secretory disturbances of the organ.

It has been demonstrated that individuals with chronic Chagas disease present high prevalence of peptic disease associated to *Helicobacter pylori* infection. *H. pylori* is a Gram-negative spiral bacterium described in 1983 and recognized as etiological agent of chronic gastritis, peptic ulcer and gastric cancer. This microorganism is worldwide distributed with high prevalence in developing countries and the childhood is the most important period of acquisition of this infection, affecting mainly children with low socioeconomic level, and its horizontal transmission can occur by fecal-oral or oral-oral routes.

Since no controlled study has been reported showing that chagasic patients have higher prevalence of *H. pylori* infection than non-chagasic individuals, the purpose of this study was to evaluate the prevalence of this infection in patients with chronic Chagas disease and in non-chagasic individuals living in urban or rural area of Uberlândia, state of Minas Gerais, a Southeast region of Brazil.

PATIENTS AND METHODS

We evaluated the prevalence of *H. pylori* infection in a total of 598 individuals aged 5 to 86 years, from which 322 (53.8%) were male and 276 (46.2%) female, from July 1997 to January 1999. From these, 128 had Chagas disease (chagasic group - CG), age ranging from 21 to 77 years and all of them were coming from a rural area. These patients were seen as in- or outpatients for a large range of complaints, except for dyspepsia as a major complaint, or were referred from the blood bank because of testing positive for Chagas disease. The 470 remaining individuals had negative serological results for Chagas disease and comprised the non-chagasic groups (NCG). From these, 222 were individuals living in the urban area (U-NCG) including students and blood donors of Hemocentro Regional of Uberlândia, and 248 were children from the rural schools and adults living in the rural area (R-NCG).
Serological tests for Chagas disease included the indirect immunofluorescence reaction and the immunoenzymatic assay (ELISA), considering as chagasic the individuals with both positive tests and excluding those with only one single positive test, thus eliminating positive or negative false results. Serological diagnosis of H. pylori infection was carried out through the determination of IgG antibodies to H. pylori, by using a second-generation ELISA (Alexon Inc., Sunnyvale, California, USA) according to manufacturer’s instructions. Such method was chosen due to its easiness in population studies.

Statistical analysis of the prevalence of H. pylori infection in the different subgroups was performed by non-parametric methods, including the chi-square test and Fisher’s exact test. The level of significance was set at p < 0.05.

DISCUSSION

The rural origin of the chagasic patients, where factors such as low socioeconomic level, precarious living conditions, and ingestion of untreated water, especially during childhood, which are considered as important determinants for the risk of H. pylori infection, did not appear to be responsible for the higher prevalence of this infection in the chagasic patients, aged 21 to 50 years, as compared to rural non-chagasic subgroup from same age range. However, this difference should be carefully analyzed, since the p value found (p = 0.047) in the used statistical tests represented a borderline value. On the other hand, H. pylori when gaining entry to the stomach of chagasic patients could encounter favorable conditions for its installation, such as hypochlorhydria, hypomotility, malnutrition and immunological deficiency.

Hypochlorhydria, a probable facilitating factor of H. pylori infection, has been described in chagasic patients and can be due to a decreased sensitivity of the parietal cells, as a consequence of the destruction of intramural innervation which is described in these individuals.

The neuronal destruction of the gastric intramural plexum in patients with chronic Chagas disease can produce gastric stasis, which in turn might predispose to bacterial overgrowth into the stomach and likely to H. pylori infection.

The calorico-proteic malnutrition often found in patients with the digestive form of Chagas disease is the most frequent cause of secondary immunodeficiency, compromising both the specific and the non-specific compartments of the immune response. In chronic chagasic patients, several immunological changes have been described such as leukopenia, depressed chemotactic activity of neutrophils and lymphopenia, which could lead to an increased susceptibility to H. pylori infection in these individuals. In addition, at least in children, malnutrition also can produce hypochlorhydria, and this state may predispose to H. pylori infection.

The fact that a higher prevalence of seropositivity for H. pylori infection was not found in chagasic patients with the digestive form as compared to the cardiac and indeterminate forms of the disease was not surprising. In our previous studies, a high prevalence of H. pylori infection was found in patients with the indeterminate form of Chagas

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**Table 1**

Distribution of the individuals according to age in the different groups: chagasic (CG), non-chagasic living in urban area (U-NCG), and non-chagasic living in rural area (R-NCG) of Uberlândia, MG, Brazil

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Number of individuals (mean age ± standard deviation)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CG (U-NCG)</td>
</tr>
<tr>
<td>5-13</td>
<td>86 (9.5 ± 2.0)</td>
</tr>
<tr>
<td>14-20</td>
<td>36 (17.3 ± 1.9)</td>
</tr>
<tr>
<td>21-50</td>
<td>47 (40.2 ± 7.0)</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>81 (61.6 ± 7.3)</td>
</tr>
<tr>
<td>Total</td>
<td>128</td>
</tr>
</tbody>
</table>

Seroprevalence of *Helicobacter pylori* infection in chronic chagasic patients (CG) and in the non-chagasic rural (R-NCG) and urban (U-NCG) population

<table>
<thead>
<tr>
<th>Age (yr)</th>
<th>Seropositivity a</th>
<th>U-NCG</th>
<th>R-NCG</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-13</td>
<td>25/86 (29.1%)</td>
<td>42/119 (35.3%)</td>
<td></td>
</tr>
<tr>
<td>14-20</td>
<td>17/36 (47.2%)</td>
<td>20/50 (40.0%)</td>
<td></td>
</tr>
<tr>
<td>21-50</td>
<td>40/47 (85.1%) b</td>
<td>27/48 (56.3%)</td>
<td>29/43 (67.4%)</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>70/81 (86.4%)</td>
<td>41/52 (78.8%)</td>
<td>31/36 (86.1%)</td>
</tr>
</tbody>
</table>

a: determined by ELISA; b: p < 0.01 (CG > U-NCG) and p < 0.05 (CG > R-NCG) determined by the chi-square test or Fisher’s exact test.

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The fact that a higher prevalence of seropositivity for *H. pylori* infection was not found in chagasic patients with the digestive form as compared to the cardiac and indeterminate forms of the disease was not surprising. In our previous studies, a high prevalence of *H. pylori* infection was found in patients with the indeterminate form of Chagas.
disease, thus proposing the present study. The majority of studies that evaluated motility and/or gastric secretion changes in chagasic patients were performed in patients with the digestive form of the disease, making difficult this discussion. However, it is known that a patient presenting a determine form of Chagas disease can also present lesions in other systems due to the criteria used to characterize the clinic form of the disease. Accordingly, in our previous studies, an important decrease in the pancreatic neuronal population was observed in patients with the cardiac form of the disease25, and insulin hyposecretion after a glucose stimulus was found in a group of chagasic patients presenting the cardiac or indeterminate or digestive forms26. In addition, the impairment of the cell-mediated immune response has been described even in the indeterminate form of Chagas disease1 and if gastric motility changes could occurs as already described for the esophagus in this disease form27, such facts could justify the similar prevalence of *H. pylori* infection found in the different forms of the disease in our study.

Similarly, it has been described that patients with diabetes mellitus also present a higher prevalence of *H. pylori* infection, which could be related to reduced gastric motility as a consequence of the autonomic neuropathy27,28 and/or to humoral and cellular immunosuppression often found in these individuals29.

Although the mean age of the chagasic patients from 21 to 50 years was higher than that in the urban and rural non-chagasic groups (Table 1), this fact did not seem to have influence on the results, since from seven chagasic patients with negative serology to *H. pylori* in that group, six individuals were between 39 and 47 years of age.

Regarding the age range over 50 years, a high prevalence of *H. pylori* infection was found and there was no significant difference among the studied subgroups. It is believed that this infection is acquired mainly in the determinate form of Chagas disease29, and insulin hyposecretion after a glucose stimulus was found in a group of chagasic patients presenting the cardiac or indeterminate or digestive forms30. In addition, the impairment of the cell-mediated immune response has been described even in the indeterminate form of Chagas disease and if gastric motility changes could occurs as already described for the esophagus in this disease form, such facts could justify the similar prevalence of *H. pylori* infection found in the different forms of the disease in our study.

The prevalence of *H. pylori* infection in our community was lower than those described in the above mentioned reports, probably reflecting the socioeconomic and sanitary conditions of this municipal area: in the rural area, houses have electrical energy, children have access to education and hygiene notions, and it is frequent the use of bathroom and water taps, although coming from cisterns.

The results of the present study showed a higher seroprevalence of *H. pylori* infection in patients with chronic Chagas disease than in non-chagasic individuals, in the age range from 21 to 50 years, in the studied population. Nevertheless, due to the borderline results between the CG and the R-NCG obtained in the statistical analysis, additional studies using other diagnostic methods should be conducted in other populations in order to establish definitely such association. In addition, it can be concluded that the seroprevalence of *H. pylori* infection is similar in the studied urban and rural non-chagasic population.

**REFERENCES**


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