Prevalence of CagA and VacA Antibodies in Children with *Helicobacter pylori*-Associated Peptic Ulcer Compared to Prevalence in Pediatric Patients with Active or Nonactive Chronic Gastritis

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VacA and CagA serological responses were detected in pediatric patients: 44 and 56%, respectively, in peptic ulcer (PU) patients, 33.3 and 44.4% in active chronic gastritis (ACG) patients, and 23.2 and 39.2% in non-ACG patients. Higher seroprevalence to CagA+VacA and to CagA+VacA+35-kDa antigen was found among PU patients. However, a low level of sensitivity and specificity was found for indirect detection of PU patients.

**TABLE 1. Antibody response against each antigen in the three groups of pediatric patients included in this study**

<table>
<thead>
<tr>
<th>Patient group</th>
<th>No. of patients</th>
<th>% of patient group with antibody response at kDa:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>19.5</td>
</tr>
<tr>
<td>NACG</td>
<td>56</td>
<td>50</td>
</tr>
<tr>
<td>ACG</td>
<td>36</td>
<td>50</td>
</tr>
<tr>
<td>PU</td>
<td>25</td>
<td>36</td>
</tr>
</tbody>
</table>

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**Helicobacter pylori** is associated nowadays with different digestive diseases, such as gastritis, gastric and duodenal ulcer, and mucosa-associated lymphoid tissue lymphoma, and is considered to be a risk factor for the development of gastric cancer (16). The reasons for developing one or another disease are not well understood and several factors are possibly involved (1).

Some virulence factors in *H. pylori* clinical isolates (such as CagA or VacA) have been proposed as related to more severe gastric diseases in adults (4, 18), although some reports indicate that a high prevalence of cagA gene is found irrespective of the disease developed (5, 13, 15). Little information exists as to the prevalence of infection by CagA- and VacA-positive bacteria among asymptomatic or symptomatic children suffering different levels of lesions (6). Overall, very few data exist on the prevalence of these virulence markers in children with duodenal or gastric ulcer (10).

The aim of this study was to determine the antibody response to six different antigens in pediatric patients infected with *H. pylori* who had a peptic ulcer (PU) (gastric or duodenal), compared with the response in patients who had non-active chronic gastritis (NACG) or active chronic gastritis (ACG).

A total of 117 *H. pylori*-positive children submitted to gastroscopy due to exhibiting different clinical symptoms were selected for the study according to the gastric lesion. Patients were enrolled in a prospective study to test two different eradication therapies from November 1996 to April 1999. The ethics committee of each hospital approved the study. A total of 56 patients had NACG (age, 3 to 17 years; mean age, 9.7 ± 3.4; 58.3% males), 36 patients had ACG (age, 3 to 18 years; mean age, 9.7 ± 3.4; 58.3% males), and 25 patients had PU (age, 4 to 18 years; mean age, 10.2 ± 4.1; 64% males; 17 with duodenal, 7 with gastric, and 1 with both duodenal and gastric ulcers). Serum from each patient was taken at the time of the endoscopy and stored at −20°C until used. *H. pylori* infection was determined by culture or histology as soon as possible after the endoscopy. The antibody response to specific antigens (19.5, 26.5, 30, 35, 89, and 116 kDa) was determined by immunoblot (Helicoblot 2.0; Genelabs Diagnostics, Singapore) following the manufacturer’s recommendations and previously described methodology (6, 19). A serum sample was considered *H. pylori* positive by immunoblot analysis if it was positive for any one band at 116 kDa (CagA), 89 kDa (VacA), or 35 kDa or any two bands from among the 30-, 26.5-, and 19.5-kDa antigens (6, 19). A lineal-trend chi square was applied to the statistical study (level of statistical significance, P < 0.05). Odds ratios for seropositivity against CagA, VacA, CagA+VacA, and CagA+VacA+35-kDa antigen in the groups of ACG and PU, referred to the NACG status, were calculated.

Western blot was positive in 107 of the 117 *H. pylori*-positive children: 91% in the NACG group, 97.1% in the ACG group, and 84.6% in the PU group. These differences were not statistically significant. The global percentages of patients with serological responses against the 19.5-, 26.5-, 30-, 35-, and 89-kDa (VacA) and 116-kDa (CagA) antigens were 47, 85.4, 80.3, 40.1, 30.7, and 44.4%, respectively. Mitchell et al. (14) studied the antibody responses to the same six antigens and found that the 26.5-, 30-, and 116-kDa antigens had the most prevalent responses (81.5, 79.6, and 76% of children, respectively). In contrast, antibody responses to the 19.5-, 35-, and 89-kDa...
CagA, VacA, and 35-kDa antigen simultaneously of 3.92. VacA of 2.6, to CagA and VacA simultaneously of 2.88, and to PU showed (in relation to patients who had only NACG) a lesion (related to NACG), are shown in Table 2. A patient with CagA simultaneous response to CagA, VacA, and the 35-kDa protein showed 44% sensitivity and 75% specificity to detect children with ulcers. VacA detection showed 44% sensitivity and 75% specificity. Detection of both CagA and VacA showed 44% sensitivity and 75% specificity to detect children with ulcers, and detection of CagA, VacA, and the 35-kDa antigen simultaneously showed 32% sensitivity and 85% specificity.

The antibody response against a specific antigen changes with the age of the patient; however, the highest response in all age groups is against the 26.5-kDa and 30-kDa antigens. The youngest group shows a lower percentage of CagA, VacA, and 35-kDa antibodies as an indirect diagnostic method to identify children with ulcers are shown in Table 3. Detection of CagA showed a sensitivity of 56% and specificity of 59% to detect children with ulcers. VacA detection showed 44% sensitivity and 73% specificity. Detection of both CagA and VacA showed 44% sensitivity and 75% specificity to detect children with ulcers, and detection of CagA, VacA, and the 35-kDa antigen simultaneously showed 32% sensitivity and 85% specificity.

The antibody response against a specific antigen changes with the age of the patient; however, the highest response in all age groups is against the 26.5-kDa and 30-kDa antigens. The youngest group shows a lower percentage of CagA, VacA, and 35-kDa antibodies as an indirect diagnostic method to identify children with ulcers. CagA antibody detection was not useful to target children for antimicrobial therapy. However, according to our results, CagA antibody detection was not useful to differentiate between patients suffering from ulcer and gastritis.

### REFERENCES


