Helicobacter Pylori IgG Antibodies in Association with Secondary Hyperparathyroidism in End-stage Renal Failure Patients Undergoing Regular Hemodialysis

Hamid Nasri and Azar Baradaran
1Department of Internal Medicine, Shahrekord University of Medical Sciences, Hajar Medical, Educational and Therapeutic Center, Shahrekord, Iran
2Department of Biochemistry, Center of Research and Reference Laboratory of Iran, Hospital Bu Ali, Damavand st., P.O. Box: 17115-365, Tehran, Iran 17117

Abstract: The aim of present study was the assessment of relationships between PTH abnormalities and the parameter of Helicobacter pylori (H. pylori) infection as expressed by concentration of IgG antibodies against H. pylori. The study was carried out on 44 (F = 17, M = 27) stable hemodialysis (HD) patients with upper gastrointestinal symptoms. A significant positive correlations of H. pylori IgG antibody titers with serum iPTH and phosphorus also a significant inverse correlation of H. pylori IgG antibody titers with serum alkaline phosphatase was found. It is known that hyperparathyroidism is connected with stimulation of gastrin synthesis as well with increased acidity of gastric juice. Hypergastrinemia induced stimulation of gastrin synthesis and resultant increased acidity of gastric juice could intensify the H. pylori infection in hemodialysis patients. We strongly propose to more study on the association of secondary hyperparathyroidism with H. pylori infection, because both dyspeptic symptoms and secondary hyperparathyroidism are quite common in chronic hemodialysis patients and in the meantime needs more attention toward control of high levels of parathormone in HD patients.

Keywords: Secondary hyperparathyroidism, hemodialysis, Helicobacter pylori infection, parathormone, end-stage renal failure, H. pylori IgG specific antibodies

INTRODUCTION

Helicobacter pylori has been shown to play an important role in the development of gastritis and gastric ulcer[1]. End-stage renal failure patients often have dyspeptic symptoms and may develop peptic disease or digestive disorders leading to severe gastrointestinal complications[2]. Studies on the relationship between high serum urea nitrogen, creatinine and H. pylori infection in hemodialysis patients still give conflicting results[3]. While the precise nature of the gastrointestinal involvement in these patients remains unclear, the link between H. pylori, chronic gastritis and peptic ulcer disease has grown stronger[4]. It has been reported that patients with chronic renal failure have a tendency toward increased incidences of peptic ulcer diseases, however, it is yet unclear whether the increased incidence is due to altered gastric acidity, hypersecretion of gastrin, or increased colonization of H. pylori[3-6] and quite few reports are available regarding the promoting factors affects H. pylori infection in hemodialysis patients.

Excess Parathyroid Hormone (PTH) has long been considered detrimental to the health of patients with end-stage renal disease. PTH has been implicated as a multisystem uremic toxin and hyperparathyroidism can be a debilitating complication in dialyzed patients[3]. It is known that hyperparathyroidism is connected with stimulation of gastrin synthesis as well with increased acidity of gastric juice[9] and it is possible that a connection between susceptibility to H. pylori infection and secondary hyperparathyroidism be existed. The aim of present study was the assessment of relationships between PTH abnormalities and the parameter of H. pylori infection as expressed by concentration of IgG antibodies against H. pylori.

MATERIALS AND METHODS

This is a cross-sectional study that was conducted on patients with end-stage renal disease undergoing maintenance hemodialysis treatment with acetate basis dialysate and polysulfone membranes. The study carried...
out from July to August of 2005. All patients had various upper gastrointestinal complaints consisting of epigastric pain, epigastric burning, postprandial fullness, early satiety, bloating and belching. Exclusion criteria for patients were using of proton pump inhibitors, antibiotics and aluminum hydroxide jells as well as active or chronic infection before the study. According to the severity of the secondary hyperparathyroidism, each patient was under treatment for SHPTH with oral 1,25 Dihydroxy-Vitamin D (Rocaltril), calcium carbonate and Rena-Gel capsules at various dosages. After an overnight fast, blood samples were obtained. Intact serum PTH (iPTH) was measured by the Radioimmunoassay (RIA) method using DSL-8000 of USA (normal range of values is 10-65 pg mL\(^{-1}\)). Serum \(H. pylori\) specific IgG antibody titers (titer > 10 U mL\(^{-1}\)) was interpreted as positive according to the manufacturer's instructions) was measured by Enzyme-Linked Immunosorbent Assay (ELISA) method using Trinity Biotech Kits (USA). Also peripheral venous blood samples were collected for biochemical analysis including serum calcium, phosphorous, albumin, creatinine, uric acid, sodium, potassium, total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol, uric acid, alkaline phosphatase, total bilirubin, direct bilirubin, alanine transaminase, aspartate transaminase, total protein, albumin, hemoglobin, hematocrit, urea nitrogen, Creatinine, BUN, calcium, phosphorus, sodium, potassium, cholesterol, triglycerides, and glucose. Body Mass Index (BMI) was calculated using the standard formula (postdialyzed weight in kilograms/height in square meters; kg m\(^{-2}\)). The duration of each hemodialysis session was 4 h. For statistical analysis, the data are expressed as the Mean±SD and median values. Statistical correlations were assessed using partial correlation test. All statistical analyses were performed using SPSS (version 11.5.00). Statistical significance was determined at a p<0.05.

RESULTS

The study was carried out on 44 (F = 17, M = 27) stable Hemodialysis (HD) patients with upper gastrointestinal symptoms as mentioned. Table 1 shows that mean ages of patients were 43±17 years. The length of the time patients had been on hemodialysis was 29±34 months (median: 17.5 months).

The value of serum \(H. pylori\) specific IgG antibody titers of was 7.7 ±10 μg mL\(^{-1}\) (median: 2 μg mL\(^{-1}\) \(H. pylori\)). The value of serum iPTH was 390±422 pg mL\(^{-1}\) (median: 244 Pg mL\(^{-1}\)). In this study a significant positive correlation of log of \(H. pylori\) IgG antibody titers with serum phosphorus \((R = 0.32, p = 0.050; \text{Fig. } 2)\) (adjusted for age dialysis duration and sessions, BMI, BUN, Mg and Alb) was seen too. Moreover a significant inverse

<table>
<thead>
<tr>
<th>(N = 44)</th>
<th>Mean±SD</th>
<th>Median</th>
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<tbody>
<tr>
<td>Age years</td>
<td>43.0±17</td>
<td>40.0</td>
</tr>
<tr>
<td>BMI (kg/m(^2))</td>
<td>21.0±3.7</td>
<td>20.5</td>
</tr>
<tr>
<td>iPTH (Pg/mL)</td>
<td>390±422</td>
<td>244.0</td>
</tr>
<tr>
<td>Ca mg dL(^{-1})</td>
<td>7.7±0.9</td>
<td>7.9</td>
</tr>
<tr>
<td>P mg dL(^{-1})</td>
<td>6.5±2</td>
<td>6.4</td>
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<tr>
<td>AIP U/L</td>
<td>595±81.7</td>
<td>414.0</td>
</tr>
<tr>
<td>CRP mg L(^{-1})</td>
<td>9.5±8</td>
<td>8.0</td>
</tr>
<tr>
<td>Mg mg dL(^{-1})</td>
<td>2.45±0.4</td>
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<tr>
<td>Alb g dL(^{-1})</td>
<td>3.7±0.5</td>
<td>3.8</td>
</tr>
<tr>
<td>(H. pylori) IgG3 u mL(^{-1})</td>
<td>7.7±1.0</td>
<td>2.0</td>
</tr>
</tbody>
</table>

*Duration of hemodialysis

Fig. 1: Significant positive correlation of logarithm of \(H. pylori\) IgG antibody titers with serum iPTH

Fig. 2: Significant positive correlation of logarithm of \(H. pylori\) IgG antibody titers with serum phosphorus
correlation of *H. pylori* IgG antibody titers with serum ALP (R = −0.35, p = 0.036; Fig. 3) (adjusted for age, dialysis duration and sessions, DM, BMI, gender, iPTH, Mg and Alb) was found.

**DISCUSSION**

In this study we found significant positive correlations of *H. pylori* IgG antibody titers with serum iPTH and Phosphorus also a significant inverse correlation of *H. pylori* IgG antibody titers with serum ALP was found too. Secondary Hyperparathyroidism (SHPT) is a common occurrence in patients with chronic renal failure and is characterized by excessive serum Parathyroid Hormone (PTH) levels and an imbalance in calcium and phosphorus metabolism[12]. PTH acts as an uremic toxin and may be responsible for many complications which frequently seen in hemodialysis patients[13,14]. It is known that hyperparathyroidism is connected with stimulation of gastrin synthesis as well with increased acidity of gastric juice[9]. We speculate that it should be connected with susceptibility to *H. pylori* infection in HD patients. In the accessible literature quiet few data about the connection between *H. pylori* infection and parathyroid hormone abnormalities in patients on hemodialysis was existed. In contrast to our findings in a study conducted by Bednarek-SklebleWSka et al.[9] on 65 (37 M, 28 F) stable HD patients could not show significant relationship between PTH abnormalities and *H. pylori* infection in HD patients. Hypergastrinaemia is a common finding in haemodialysis patients[35]. Hypergastrinaemia induced stimulation of gastrin synthesis and resultant increased acidity of gastric juice could intensify the *H. pylori* infection in hemodialysis patients. We strongly propose to more study on the association of secondary hyperparathyroidism with *H. pylori* infection, because both dyspeptic symptoms and secondary hyperparathyroidism are quite common in chronic hemodialysis patients and in the meantime needs more attention toward control of high levels of parathormone in HD patients.

**REFERENCES**