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

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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 alkalin phosphatase was found. It is known that hyperparathyroidism is connected with stimulation of gastrin synthesis as well with increased acidity of gastric juice. 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.

Key words: 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 gastroduodenal involvement in these patients remains unclear, the link between *H. pylori*, chronic gastritis and peptic ulcer disease has grown stronger[4-6]. 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*[2,7] 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[8]. 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

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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 pomp 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 (Rocaltrol), 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 post and predialysis, Blood Urea Nitrogen (BUN), Serum Calcium (Ca), Phosphorus (P), Alkaline Phosphatase (ALP), serum and Magnesium (Mg), Albumin(Alb), C-reactive Protein (CRP) were measured using standard kits. For the efficacy of hemodialysis the Urea Reduction Rate (URR) was calculated from pre- and post-blood urea nitrogen (BUN) data[10]. Body Mass Index (BMI) calculated using the standard formula (postdialyzed weight in kilograms/height in square meters; kg m^{-2})[11]. Duration and doses of hemodialysis treatment were calculated from patients' records. The duration of each hemodialysis session was 4 h. For statistical analysis, the data are expressed as the Mean±SD and madian 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 μ mL^{-1} (median: 2 μ mL *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 logarithm of *H. pylori* IgG antibody titers with serum iPTH was seen (R = 0.33, p = 0.042; Fig. 1) (adjusted for age dialysis duration and sessions, BMI, URR, Mg and Alb). A significant positive correlation of logarithm of *H. pylori* IgG antibody titers with serum phosphorus (R = 0.32, p = 0.050; Fig. 2) (adjusted for age dialysis duration and sessions, DM,BMI, URR, Mg and Alb) was seen too. Moreover a significant inverse

Table 1: Mean±SD and median values of laboratory values, age and duration of hemodialysis of all patients

N = 44	Mean±SD	Median
Age years	43.0±17	40.0
DH* months	29.0±34	17.5
Dialysis dose sessions URR%	259.0±366	121.5
BMI kgm^{-2}	21.0±3.7	20.5
iPTH Pg mL	390.0±422	244.0
Ca mg dL^{-1}	7.7±0.9	7.9
P mg dL^{-1}	6.5±2	6.4
AlP IUL	595.0±817	414.0
CRP mg L^{-1}	9.5±8	8.0
Mg mgd L^{-1}	2.45±0.4	2.4
Alb gd Ll^{-1}	3.7±0.5	3.8
H. pylri-IgG u mL^{-1}	7.7±10	2.0

*Duration of hemodialysis

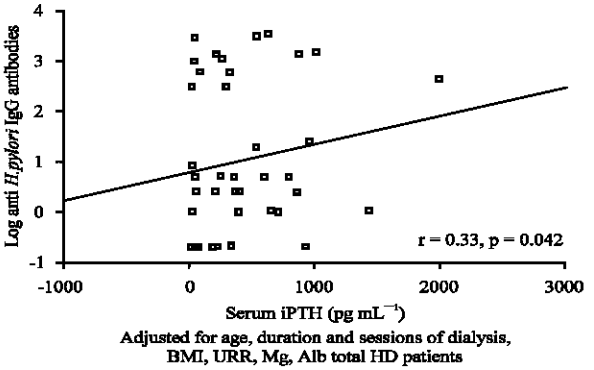

Fig. 1: Significant positive correlation of logarithm of *H. pylori* IgG antibody titers with serum iPTH

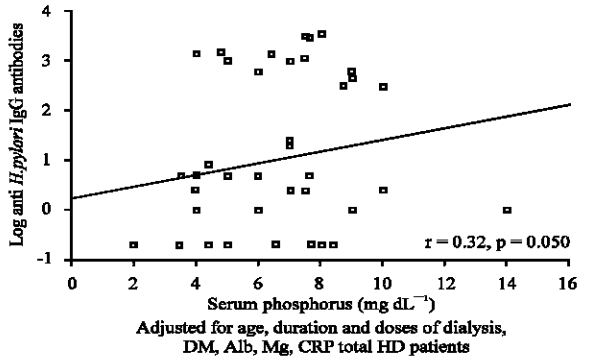

Fig. 2: Significant positive correlation of logarithm of *H. pylori* IgG antibody titers with serum phosphorus

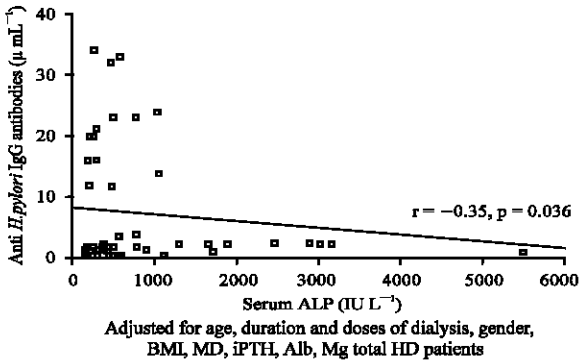

Fig. 3: Significant inverse correlation of *H. pylori* IgG antibody titers with serum ALP

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-Skublewska *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[15]. 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.

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