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Brief Report

Correlation Between Thyroid Disorders and Rate of *Helicobacter Pylori* Infection

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ABSTRACT

Background:
Hyperthyroidism and hypothyroidism are common thyroid disorders. Thyroid hormones have a great role in regulating mucosal cells and the growth of the gastrointestinal tract. In this study, we investigated the presence of *Helicobacter pylori (H. pylori)* infection in various types of thyroid disorders.

Materials and Methods:
Our study included 297 patients whose thyroid status was identified by evaluation of thyroid hormones; triiodothyronine (T3), thyroxine (T4), and thyroid-stimulating hormone (TSH) using Roche Electrochemiluminescence (ECL). *H. pylori* antibodies and antigen were evaluated by enzyme-linked immunosorbent assay (ELISA) kits in all cases.

Results:
Hypothyroidism had a significant correlation with *H. pylori* infection ($p < 0.001$). Hyperthyroidism was not related to *H. pylori* infection ($p = 0.171$). Also, in hypothyroidism, female sex more than male sex had a significant correlation with *H. pylori* infection ($p = 0.004$).

Conclusion:
Decreasing thyroid hormones can result in dysregulation of gastric mucosal cells, therefore hypothyroidism can lead to more chance of having *H. pylori* infection.

Keywords: Hyperthyroidism, Hypothyroidism, *H. pylori*, Gastric inflammation

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INTRODUCTION

The thyroid gland is one of the most important and largest endocrine glands (1). Thyroid gland secrets triiodothyronine (T3) and thyroxine (T4), which are regulated by thyroid-stimulating hormone (TSH) secreted by the anterior pituitary gland. The thyroid gland affects the cardiovascular system, skin, neurological system, and gastrointestinal (GI) tracts. Many GI manifestations result from thyroid hormones. Thyroid disorders can increase the risk of various specific pathogenesis in the GI system (2). Thyroid diseases are the most prevalent

Table 1: Correlation between thyroid status and *H. pylori* infection in our study

Thyroid Status	Female			Male			Total		
	N	HIP*	*p* value	N	HIP*	*p* value	N	HIP*	*p* value
Hyperthyroidism	56	17	0.367	9	2	0.274	65	19	0.171
Hypothyroidism	54	15	0.004	15	4	0.065	69	19	<0.001
Euthyroidism	106	40	0.006	57	23	0.119	163	63	<0.001

**H. pylori* infection positive

type of endocrine disorders worldwide (3).

Thyroid disorders are divided into two major groups, hypothyroidism, and hyperthyroidism. Hypothyroidism is a common endocrine condition with inadequate production of thyroid hormones (T3 and T4) or suboptimal action of thyroid hormone on the target tissues (4). In this condition, TSH secretion is increased compensatory. Hyperthyroidism is a special condition characterized by overproduction of thyroid hormones (T3 and T4) and can lead to hypermetabolic status in patients, and TSH secretion is decreased.

Helicobacter pylori (H. pylori) is a gram-negative, spiral-shaped pathogenic bacterium that specifically colonizes the gastric epithelium and causes chronic gastritis, peptic ulcer disease and/or gastric malignancies (5). *H. pylori* infection has been epidemiologically linked to some extra-digestive conditions, including endocrine disorders such as autoimmune thyroid diseases, autoimmune atrophic thyroiditis, Hashimoto thyroiditis, thyroid mucosal-associated lymphocyte tissue (MALT) lymphoma, diabetes mellitus, dyslipidemia, obesity, osteoporosis, and primary hyperparathyroidism; although there are contradictory data regarding the relationship between *H. pylori* infection and these diseases (5). The aim of this study was to investigate the relation between *H. pylori* gastritis and various thyroid disorders.

MATERIALS AND METHODS

In this study, samples from 134 patients with thyroid disorders (hyperthyroidism and hypothyroidism) and 163 individuals with healthy thyroid (euthyroidism) as a control group were obtained. Four ml of whole blood was obtained from all subjects in clot tubes and after 30 minutes centrifuged to get its serum. Serum levels of T4, T3, and TSH were measured by ELISA kits for the evaluation of thyroid function. *H. pylori* immunoglobulin G (IgG) and immunoglobulin M (IgM) antibodies and *H. pylori* antigen (in stool) were measured as indicators of *H. pylori* infection by enzyme-linked immunosorbent assay (ELISA) kits.

RESULTS

According to the cut-off point which was mentioned in the kits the thyroid status types were as follows: TSH level between 0.3–4.84 (µIU/mL), T3 level between 60-210 (ng/dL), and T4 level between 4-12 (µg/dL) showed euthyroid status. TSH level less than 0.3 (µIU/mL), T3 level more than 210 (ng/dL), and T4 level more than 12 (µg/dL) showed hyperthyroidism status. TSH level of more than 4.85 (µIU/mL), T3 level less than 60 (ng/dL), and T4 level less than 4 (µg/dL) showed hypothyroidism status.

H. pylori IgG and IgM antibodies more than 12 IU/ml and the presence of *H. pylori* antigen in stool samples showed *H. pylori* infection.

Correlation between thyroid status and *H. pylori* infection was analyzed using Chi-square (SPSS software version 16). The results are mentioned in table 1.

DISCUSSION

As mentioned in table 1, there was a significant correlation between hypothyroidism and euthyroidism with *H. pylori* infection ($p < 0.01$). Hyperthyroidism was not related to *H. pylori* infection ($p < 0.01$). In hypothyroidism, female sex more than male sex had a significant correlation with *H. pylori* infection ($p = 0.004$).

The association between *H. pylori* and thyroid problems such as Graves' disease and Hashimoto thyroiditis was reported (6-9). Some cross-reactions and similarities have been mentioned in the literature, which suggest the presence of a link between *H. pylori* infection and thyroid problems that are also mentioned in table 2.

Our results showed a high correlation between hypothyroidism and *H. pylori* infection. The results confirmed by other studies. Arsalan and colleagues

Table 2: Cross-reactions and similarities between thyroid gland, gastrointestinal tract, and *H. pylori*

	Characteristics	Thyroid gland	Gastrointestinal tract	*H. pylori*	Reference
Cross-reactions	Homologous amino acids	11-residue in thyroid peroxidase	11-residue in gastric parietal cell antigen	-	(10)
		Thyroperoxidase sequence	-	CagA sequence	(10)
Similarities	Embryological origin	Primitive gut	Primitive gut	-	(11)
	Cell features	Apical microvilli	Apical microvilli	-	(11)
	Biochemical features	Presence of peroxidase isoenzymes (TPO)	Presence of peroxidase isoenzymes (GPO)	-	(11)
		Presence of Na+/I− symporter	Presence of Na+/I− symporter	-	(11)
		Secretion of mucinous glycoproteins (thyroglobulin)	Secretion of mucinous glycoproteins (mucin)	-	(11)

reported the correlation between autoimmune thyroid disorder and *H. pylori* infection (9). Choi and others showed a high prevalence of TPO-Ab positive is related to *H. pylori* infection (10).

In conclusion, patients with euthyroidism and hypothyroidism have more chance for *H. pylori* infection.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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