Research Paper

Volume : 4 | Issue : 8 | Aug 2015 • ISSN No 2277 - 8179

Oral Health Status in Patients with Thyroid Disorders

Medical Science

KEYWORDS : thyroid dysfunction, chronic periodontitis, periodontal status

Adriana Maria Monea	University of Medicine and Pharmacy Tg.Mures, Romania, Adress: 38 Gh.Marinescu str., Tg,Mures, Romania
K.-Ivacson A.-Csinszka	University of Medicine and Pharmacy Tg.Mures, Romania, Adress: 38 Gh.Marinescu str., Tg,Mures, Romania
Adina Coşarcă	University of Medicine and Pharmacy Tg.Mures, Romania, Adress: 38 Gh.Marinescu str., Tg,Mures, Romania
Gabriela Bereşescu	University of Medicine and Pharmacy Tg.Mures, Romania, Adress: 38 Gh.Marinescu str., Tg,Mures, Romania

ABSTRACT

Any alteration in the function of endocrine glands may induce periodontal alterations. The aim of our study was to evaluate the oral health status of newly diagnosed patients with thyroid disorders, by measuring plaque, gingival inflammation, calculus and CPITN indices. Material and methods. We evaluated 70 patients with endocrine disorders (34 cases of hyperthyroidism, 36 cases of hypothyroidism). We recorded all personal data giving special attention to the general health status, endocrine disease and dental history for each patient. On clinical examination the aspect of oral soft tissues, gingiva, the code for plaque, calculus, gingival bleeding and CPITN indices we carefully evaluated. Results. In the group of patients with hyperthyroidism, there were different levels of periodontal disease, 19 of the subjects being with aspects of irreversible tissue destructions. For the patients with hypothyroidism, the severe periodontal disease was noted in only 12 cases. Conclusions. In hyperthyroidism, the aspect of periodontal inflammation was mild, with irreversible tissue destruction noted in 56% of the cases. In hypothyroidism the alterations were less important, as only 33% of the patients had signs of periodontal alterations.

INTRODUCTION

The alterations in hormonal regulation system have an important impact upon periodontal tissues, by direct changes such as soft tissue edema, demineralization and pathological growth of the alveolar bone, or indirect changes through enzymes' defects which all modify the answer of periodontal tissues to microbial pathogens. (Zahid *et al*, 2011)

The influence of thyroid hormones on teeth and alveolar bone is well known, as they play an important role in glucose, protein, lipid and mineral metabolism. (Chandna and Bathla, 2011).

Triiodothyronine (T3) and thyroxine (T4) are hormones secreted by the thyroid gland, and have been shown to be fundamental for normal growth, development and skeletal maturation (Ganong 2001) as well as for normal bone turnover (Williams 2009). Decreased or increased levels of these hormones may be pathologically secreted to the blood, characterizing the conditions known as hypothyroidism, respectively hyperthyroidism (Little 2006a; 2006b). In hypothyroidism, bone turnover is slow, bone growth and maturation are retarded in childhood and adults tend to exhibit osteosclerosis, accompanied by increased fracture risk (Amashukeli *et al*, 2010; Vestergaard and Mosekilde, 2002) . Hyperthyroidism, on the other hand, is characterized by accelerated bone maturation, increased bone turnover accompanied by a negative calcium balance and reduced bone mineral density (Amashukeli *et al*, 2010; Siddiqi *et al*, 1998; Vestergaard and Mosekilde, 2002). Since changes in alveolar bone level are prominent features of periodontal disease, alterations of thyroid hormone levels may be suggested to be a modulating factor in periodontal disease.

The aim of our study was to evaluate the oral health status in patients with thyroid disorders, by measuring plaque, gingival, calculus and CPITN indices.

MATERIAL AND METHODS

Seventy patients with thyroid disorders were included in this study: 34 cases of hyperthyroidism (22 women and 12 men, aged 29-53, mean age 39,6); 36 cases of hypothyroidism (26 women and 10 men aged 23-52, mean age 38,2). All the selected subjects addressed to the endocrinologist for the first time due to a thyroid dysfunction, and were newly diagnosed with hypo- or hyperthyroidism.

The inclusion criteria were as follow:

-for hypo-thyroid group: age18 to 60, elevated levels of TSH higher than 3.45 µUI/ml, low FT4 levels, lower than 0.85ng/dl, non-smokers for at least 3 years;

-for hyper-thyroid group: age 18 to 60, very low TSH levels, extremely high FT4 levels, very high levels of T3, much over 1.7ng/ml, non-smokers for at least 3 years. All the subjects recruited for this study had no inflammatory disease at the time of recruitment or in the last 3 monts before recruitment, no drugs and no periodontal treatemnt in the last 3 months beforethe study. They were all informed about the purpose of this research and all signed an informed consent.

We recorded all personal data giving special attention to the general health status, endocrine disease and dental history for each patient. On clinical examination the aspect of oral soft tissues, gingiva, the code for plaque (IP), calculus (IC), gingival bleeding (IG) and CPITN indices we carefully evaluated.

RESULTS

By analyzing the data, we found that the two study groups were alike as regards mean age of investigated subjects, without a significant difference between mean age values (p=0.3045), but a predominant female presence.

The nonparametric test showed significant more dental plaque in subjects with hyper-thyroid function than in hypo-thyroid subjects. As regards calculus index, there was no statistic difference between the study groups (p>0.05). At the comparison of gingival index values we found an extremely significant difference between groups (p<0.0001), hyper-thyroid subjects presenting more gingival changes than hypo-thyroid subjects. CPITN recorded values are presented in Table 1, according to age groups.

TABLE – 1
CPITN index values

CPITN	Age 23-39 years	Age 40-57 years
Code 0	25%	-
Code 1	35.8%	17%
Code 2	23%	31%
Code 3	16.2%	43%
Code 4	-	9%

Our clinical examination results show no statistically significant difference in the total frequency of plaque and calculus between hypo- and hyper-thyroid subjects (p>0.05) (Figure 1, 2). Significant differences appear at the examination of periodontal status, degree of gingival inflammation and of the presence and depth of periodontal pockets. We noticed that hyper-thyroid subjects had worse periodontal status and more gingival inflammation than hypo-thyroid ones (Figure 3). On bleeding surfaces and on the surfaces containing sub-gingival calculus the prevalence of pockets increased significantly as the thyroid function increased. Hyper-thyroid subjects had significant higher prevalence of pockets compared to hypo-thyroid subjects (Figure 4). yHyper=thyroid subjects had significantly hy

In the group of hyperthyroidism patients, there were different levels of periodontal disease, 9 of the subjects being with aspects of irreversible tissue destruction. For the patients with hypothyroidism, the severe periodontal disease was noted in only 6 cases

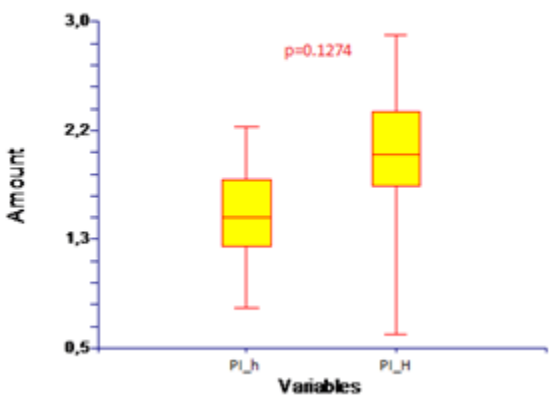

Figure 1: Mean and standard deviation for plaque index in hypo-thyroid (PI_h) versus hyper-thyroid subjects (PI_H)

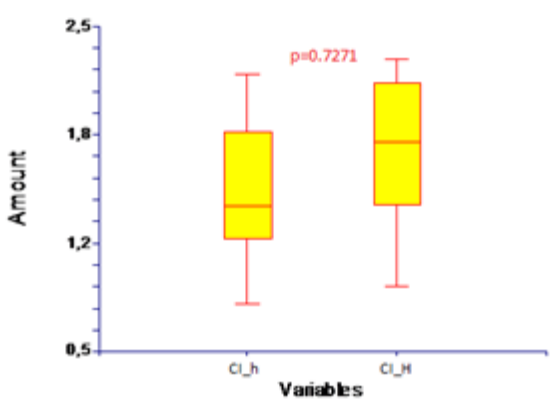

Figure 2: Mean and standard deviation for calculus index in hypo-thyroid (CI_h) versus hyper-thyroid subjects (CI_H)

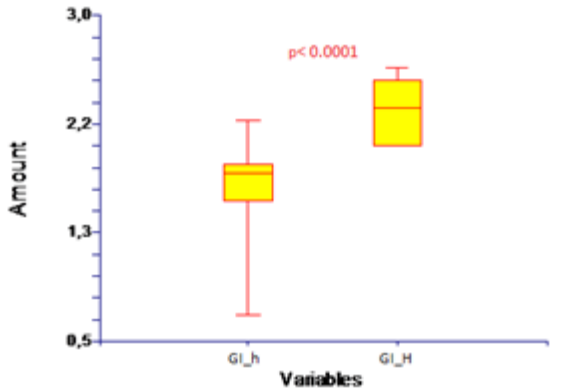

Figure 3: Mean and standard deviation for gingival bleeding index in hypo-thyroid (GI_h) versus hyper-thyroid subjects (GI_H)

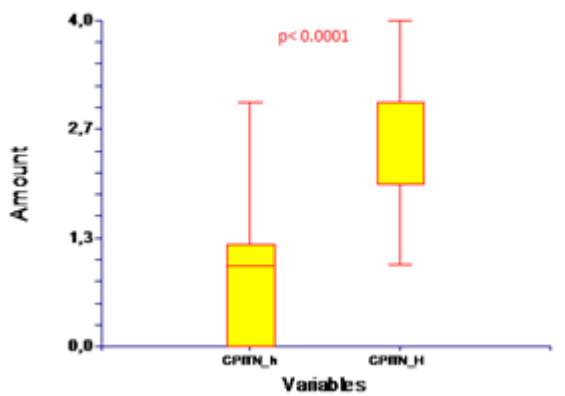

Figure 4: Mean and standard deviation for CPITN index in hypo-thyroid (CPITN_h) versus hyper-thyroid subjects (CPITN_H)

DISCUSSIONS

Our results show a higher degree of periodontal destruction in hyper-thyroid subjects compared to hypo-thyroid ones. Hypersecretion of thyroid hormones and their influence on periodontal tissues might be one factor why in the presence of similar amount of dental plaque and calculus, patients with hyperthyroidism have more severe periodontal problems than those with hypothyroidism.

Thyroid gland hyper-function has an important impact on the alveolar bone, as it induces osteoporosis. Thus, our results are in concordance with other experimental studies on animals treated 6 weeks with thyroid hormone, which showed alveolar bone resorption, periodontal pockets formation, medullary marrow fibrosis and reduced vascularization in the periodontal ligament. (Feitosa *et al*, 2009).

Periodontal disease is a chronic condition with local and general etiopathological factors, including systemic diseases that influence the immune response of each individual to dental plaque. Recent data suggest that 50% of healthy persons and 75-80% from patients with endocrine disorders (hyperthyroidism, Cushing syndrome) have a certain form of periodontal disease.(Dennison, 2006)

In the present study we evaluated adult patients newly diagnosed with thyroid dysfunction, without taking into consideration the children and adolescents, in order to have a clear view on the periodontal alterations, as these manifestations are fully developed only in the adults. The data obtained after these

Volume : 4 | Issue : 8 | Aug 2015 • ISSN No 2277 - 8179

measurements will represent the starting point of further investigations, in order to study the role of endocrine disturbances and their exact mechanism on the periodontal tissue destruction.

The clinical importance of our findings is that the degree and form of thyroid dysfunction might serve as an indicator to predict the evolution of periodontal disease in subjects with thyroid dysfunction.

Limitations of the study are that we included only non-smokers subjects, to minimize confounding variables. Further research should include smokers with thyroid dysfunction, as smoking is a common habit in Romanian population.

One subject that remains to be explored is how thyroid gland treatment can influence periodontal status in subjects with thyroid disorders. It is also to be explored if thyroid function can be influenced by maintaining the oral health status when the appropriate prophylactic measures are taken by the dentist, in subjects with thyroid dysfunction and periodontal problems.

CONCLUSIONS

Our results show a higher degree of periodontal destruction in hyper-thyroid subjects compared to hypo-thyroid ones, in the presence of similar amount of dental plaque and calculus.

In hyperthyroidism, the aspect of periodontal inflammation was mild, with irreversible tissue destruction noted in 52% of the cases.

In hypothyroidism the alterations were less important, as only 33% of the patients had signs of periodontal alterations.

REFERENCE

| Zahid TM1, Wang BY, Cohen RE. The effects of thyroid hormone abnormalities on periodontal disease status.J Int Acad Periodontol. 2011 Oct;13(3):80-5 | Chandna, S., & Bathla, M. (2011). Oral manifestations of thyroid disorders and its management. Indian Journal of Endocrinology and Metabolism, 15(Suppl2), S113–S116. doi:10.4103/2230-8210.83343 | Ganong WF. Review of Medical Physiology. 20th ed. New York, NY: McGraw-Hill, 2001: 307-321. | Williams GR, Actions of thyroid hormones in bone Endokrynol Pol. 2009 Sep-Oct;60(5):380-8. | Little JW1. Thyroid disorders. Part I: hyperthyroidism Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006 Mar;101(3):276-84. | Little JW1. Thyroid disorders. Part II: hypothyroidism and thyroiditis.Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006 Aug;102(2):148-53. Epub 2006 Jun 19. | Amashukeli M, Giorgadze E, Tsagareli M, Nozadze N, Jeiranashvili N. The impact of thyroid diseases on bone metabolism and fracture risk. Georgian Med News. 2010 Jul-Aug;(184-185):34-9. | Vestergaard P, Mosekilde L. Fractures in patients with hyperthyroidism and hypothyroidism: a nationwide follow-up study in 16,249 patients.Thyroid. 2002;12(5):411. | Siddiqi A, Burrin JM, Wood DF, Monson JP. Tri-iodothyronine regulates the production of interleukin-6 and interleukin-8 in human bone marrow stromal and osteoblast-like cells, J Endocrinol. 1998; 157: 453-461. | Feitosa DS1, Marques MR, Casati MZ, Sallum EA, Nociti FH Jr, de Toledo S. The influence of thyroid hormones on periodontitis-related bone loss and tooth-supporting alveolar bone: a histological study in rats.J Periodontal Res. 2009 Aug;44(4):472-8. doi: 10.1111/j.1600-0765.2008.01144.x. Epub 2009 Oct 22. | Dennison DK (2006): The relationship between periodontal health and systemic diseases. J of Greater Houston dental Society, 69 (8): 22-27. |