

*Prikaz slučaja /
Case report*

THYROID PEROXIDASE ANTIBODY LEVEL
DECLINE AFTER TEN DAYS LONG
VEGETARIAN DIET-A – *Case report*

PAD NIVOVA TIROID PEROKSIDAZNIH
ANTITELA TOKOM DESETODNEVNE
VEGETARIJANSKE ISHRANE – *Prikaz slučaja*

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Ključne reči

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Abstract

Introduction. Autoimmune thyroid disease (AITD) include a diverse set of clinical conditions. One of the characteristics of AITD is the level of thyroid peroxidase antibody (TPO Ab) being above normal. There is little information as to the possible influence of the environmental factors on the TPO Ab levels. **Case report.** A 57 old female with autoimmune thyroiditis on a substitutional therapy, showed TPO Ab values declined after replacing common European diet with a vegetarian diet. **Conclusion.** During vegetarian diet decline in TPO Ab level occurred. There is a need to investigate further the suitable diet for patients with AITD.

INTRODUCTION

The term autoimmune thyroid disease (AITD) encompasses a diverse range of clinical entities with similar etiology: a susceptibility determined by a combination of genetic and environmental factors. One of the characteristic finding is occurrence of thyroid autoantibodies (Ab) most often directed against thyroglobulin (TG), thyroid peroxidase (TPO) and thyroid stimulating hormone receptor (TSH-R), while others are less frequent. The detection of either TG Ab or TPO Ab levels above normal in serum correlates with the presence of thyroid lymphocytic infiltrate of Hashimoto thyroiditis (HT). While TPO Ab are also present in Graves disease, the hallmark of this autoimmune disorder are TSH-R autoantibodies which mimic TSH causing thyroid stimulation. In the presence of a lymphocytic thyroiditis ultrasound reveals a distinctive hypoechoic pattern. There is a close correlation between this marker of AITD and presence of TPO Ab⁽¹⁾. There is very little data on environmental agents that can serve as the trigger for autoimmunity in genetically predisposed host. The best established factor is excess dietary iodine⁽²⁾. Selenium supplementation, maximizing the antioxidant enzymes activity, may reduce the thyroid inflammatory status⁽³⁾. Stress, physical and psychological, has been implicated in the development of autoimmune disease⁽⁴⁾. Several studies have shown the correlation between vitamin D deficiency and thyroid autoimmunity. Cholecalciferol supplements are effective in reducing TPO Ab among patients with HT and vitamin D deficiency. Still, it is not clear, whether the low

25(OH)D levels observed in HT patients are result of the disease itself or actually part of its cause. It is accepted that patients with HT with or without Crohn disease benefit from the diet low in gluten as far as the progression and disease complications are concerned⁽⁵⁾. It was known that vegetarian diet is beneficial in some diseases⁽⁶⁾. Recently the role of dietary factors in thyroid autoimmune disease was investigated. It was shown that vegetarian diet is associated with negative findings of TPO Ab and/or TG Ab⁽⁷⁾.

Case report

A 57-year-old female with autoimmune hypothyroidism and following a treatment of 75 µg/day sodium levothyroxine was studied. A house wife, nonsmoker and nonalcoholic was also diagnosed with angina pectoris, hypertension, hypercholesterolemia and gastroesophageal reflux disease. No other autoimmune conditions were recognized in patient's history.

Ultrasound examination (US) of thyroid gland revealed gland of normal size with diffuse heterogeneity of the left lobe and hypoechoic nodule of the right lobe. As nodule was suspicious on malignancy, the fine needle biopsy was performed and as nondiagnostic result was obtained, thyroidectomy was planned. Pathohistological finding after total thyroidectomy showed no sign of malignancy.

In January 2016, before operative treatment, patient followed a diet without meat, eggs and the products containing them in ten days. TPO Ab and TG Ab level were measured before and after the diet (Tab 1).

Tab 1. TPO Ab and TG Ab before and after the vegetarian diet

	Before the diet	After the diet	Referent values
TPO-Ab	256	216	<40IU/mL
TG-Ab	<20	<20	<35IU/mL

Plasma TPO Ab and TG Ab were determined by the chemiluminescence immunoassay method. The immunoassay was conducted in a fully automated instrument Immulite 2000 (Siemens) using in vitro assays for the quantitative determination of TPO Ab and TG Ab in the plasma.

After a diet, level of TPO Ab declined for 16 %, while level of TG Ab remained within normal values. Subject of the study was avoiding meat, but consuming fish. Also, eggs were avoided, but not milk and dairy products. The milk was taken in modest amount in coffee and bakery products. Also, patient avoided cheese of any kind, but consuming butter. Mushrooms were not eaten, but fish was, although not every day. Used vegetable was mostly from the group of root and leafy vegetables and also legumes were taken. Used bread was white. There were no other restrictions nor recommendations during this period of dietary change. Also, patient did not take supplement therapy of any kind, before and during the diet.

DISCUSSION

TPO Ab are a good serological marker for the diagnosis of autoimmune thyroid disease (AITD) (8). Although characteristic for AITD, they are also connected with some other conditions like severity of the clinical expression of oral lichen planus lesions (9), a higher miscarriage rate (10) and a rare condition called Hashimoto Encephalopathy (11). In euthyroid patients with HT there is an impairment in brain perfusion in particular in the frontal lobe. Psychological well-being in the patients with HT is diminished despite the euthyroid state. Patients with TPO Ab above the cut-off value reported the following much more often: chronic fatigue, dry hair, easy fatigability, dysphagia, and chronic irritability (12).

The dynamic of TPO Ab change as a consequence of a treatment differs individually as has been seen in a study which was following TPO Ab changes during treatment with Se in form of Se methionine.

In the group of 34 patients with AITD treated with LT4 in a titrated dose to maintain TSH from 0.3 to 2.0 mU/L combined with Se in the form of 200µg Seme administered once/day there was significant improvement of TPO Ab level with 46.0% decrease at 3 months and 55.5% at 6 months. Individual reaction to this supplementation was different. 18/34 (53%) exhibited decrease of TPO Ab by 73% at 3 months and by 86% at 6 months, whereas 12/34 (35%) showed a decrease of 22% at 3 months and 28% at 6 months and 4/34 (12%) did not show any decrease (13).

According to novel data nutritional intervention can bring result even in a short period of time. The case was described where patient with grade II hypothyroidism, following a treatment of 75mg/day sodium levothyroxine and 20mg/day atorvastatin, with overweight, dyslipidemia

(hypertriglyceridemia, hypercholesterolemia) diabetes, cardiovascular disease (angina pectoris, heart attack and arrhythmia) was provided with a balanced but moderate slimming diet for 1 month. Diet contained food necessary to maintain levels of iodine intake of 150µg/day. The biochemistry data obtained after this nutritional intervention demonstrated substantial improvement in the level of TSH which reduced from 11.2µIU/mL to 1.78µIU/mL. According to these results, it appears that regularization of the consumption of foods with an adequate amount of iodine and adequate caloric value is a valuable aid for these patients (14).

In our case decrease of TPO Ab was evident even after ten days of dietary change. TPO Ab level declined for 16% which could be a sign of good individual response to this kind of nutritional intervention.

Vegetarian diet is considered to bring lower risk of coronary heart disease and many specific cancers. This diet is also connected with greater life expectancy. There are, however, great differences between different types of vegetarian diets (6).

A case control study was done to explore if dietary factors are associated with TPO Ab and TG Ab levels. Dietary intake was assessed with a food frequency questionnaire and shown as dietary groups (factors) which were identified using principal component analysis. Logistic regression analysis revealed that the dietary group with high loadings for root vegetables, flower vegetables, leafy vegetables, fruity vegetables and legumes and dietary groups with high loadings for dried fruit, nuts and muesli were negatively associated with the plasma TPO Ab and/or TG Ab levels (7). This result could be explained with protective role of polyunsaturated fatty acids (PUFA) contained in vegetables, nuts and cereals (15). Th17 lymphocytes serve as pathogenic factor in the development of various diseases. Their number rises in HT (16). Studies performed in experimental animals showed that a diet enriched with n-3 fatty acids suppresses the inflammation by reducing the differentiation of Th17 cells from naive CD4+ T cells (17).

Excessive dietary iodine intake plays an important role in triggering and exacerbating HT. In group of patients with restricted iodine intake the recovery rate of thyroid function was 78.3% after 3 months compared with 45.5% in group without restriction (18).

The domestic animals diet is very complex and some domestic animals as chicken are being fed with sea originated products (19,20) which could interfere with iodine balance in final recipient.

There are reports about meat consumption affecting thyroid hormones. Hyperthyroidism was consequence of consumption of minced beef and chorizo contaminated with thyroid gland most likely (21).

Although enlargement of thyroid gland could be one of the US signs of AIT, atrophic variant of the disease can present with decreased or unchanged thyroid size. Hypochoic areas of various sizes distributed within the thyroid tissue are also characteristic US finding in AIT. When suspicious nodule is diagnosed, fine needle biopsy is performed. If results with nondiagnostic finding, surgical treatment is of concern (22).

CONCLUSION

AITD encompasses a diverse range of clinical entities with TPO Ab levels above normal values as frequent finding. Vegetarian diet showed significant decline in TPO Ab level in our patient. This result is in concordance with previously reported data and could be a consequence of greater PUFA intake and also a different intake of iodine through nutrients. There is need to find out more about suitable diet for patients with AITD in order to treat this condition in optimal way.

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Sažetak

Uvod. Autoimuna tiroidna bolest (ATB) uključuje različita klinička stanja. Jedna od karakteristika ATB je povišen titar antitela na tiroid peroksidazu (TPO At). Malo je podataka o mogućem uticaju faktora sredine na nivo TPO At. **Prikaz slučaja.** Kod pedesetsedmogodišnje ženske osobe sa autoimunim tireoiditisom (AT), na substitucijskoj terapiji, došlo je do pada titra TPO At nakon prelaska sa uobičajene evropske na vegetarijansku ishranu. **Zaključak.** Tokom vegetarijanske ishrane došlo je do pada titra TPO At. Potrebno je dalje istraživati odgovarajuću ishranu za pacijente sa ATB.

REFERENCES

- Weetman AP. Autoimmune Thyroid Disease. *Autoimmunity* 2004; 37(4): 337-340
- Burek C, Talor MV. Environmental triggers of autoimmune thyroiditis. *J of Autoimmunity* 2009; 33:183-189
- Negro R. Selenium and thyroid autoimmunity. *Biologics: Targets and Therapy* 2008; 2(2) 265-273
- Stojanovich Lj, Marisavljević D. Stress as a trigger of autoimmune disease. *Autoimmunity Reviews* 7 2008; 209-213
- Liontris MI, Mazokopakis EF. A concise review of Hashimoto thyroiditis (HT) and the importance of iodine, selenium, vitamin D and gluten on autoimmunity and dietary management of HT patients. Points that need more investigation. *Hell J Nucl Med* 2017; 20(1):51-56
- Fraser GE. Vegetarian diets: what do we know of their effects on common chronic diseases? *Am J Clin Nutr* 2009; 89
- Matana A, Torlak V, Brdar D, Popovic M, Lozic B, Barbalic M, Boraska Perica V, Punda A, Polašek O, Hayward C, Zemunik T. Dietary Factors Associated with Plasma Thyroid Peroxidase and Thyroglobulin Antibodies. *Nutrients* 2017;9,1186
- Al-Juburi SA, Taresh HR, Al-Fatlawi RB. The Relation-Ship Between Anti-Thyroidal Peroxidase Antibodies (TPO-Abs) and Thyroid Hormones (T3,T4 and Thyroid Stimulating Hormone TSH) among Patients of Autoimmune Thyroid Disease (AITD). *KUFA Journal for Nursing Sciences* 2014; 4 (3)
- Alikhani M, Ghalaiani P, Askariyan E, Khunsaraki ZA, Tavangar A, Naderi A. Association between the clinical severity of oral lichen planus and anti-TPO level in thyroid patients. *Braz. Oral Res.* 2017; 31:e10
- Prummel MF, Wiersinga WM. Thyroid autoimmunity and miscarriage. *Eur J Endocrinol* 2004; 150: 751-755
- Payer J, Petrovic T, Lisy L, Langer P. Hashimoto Encephalopathy: A Rare Intricate Syndrome. *Int J Endocrinol Metab* 2012;10(2)
- Leyhe Th, Mussig K. Cognitive and affective dysfunctions in autoimmune thyroiditis. *Brain, Behavior, and Immunity* 2014; 41: 261-266
- Duntas LH, Mantzou E and Koutras DA. Effects of a six month treatment with selenomethionin in patient with autoimmune thyroiditis. *Eur J Endocrinol* 2003; 148: 389-93
- Lopez Y, Franco C, Cepeda A, Vazquez B. Constant iodine intake through the diet could improve hypothyroidism treatment: a case report. *J Physiology and Biochemistry* 2018; 74:189-193
- Orsavova J, Misurcova L, Ambrozova JV, Vicha R, Micek J. Fatty Acids Composition of Vegetable Oils and its Contribution to Dietary Energy Intake and Dependence of Cardiovascular Mortality on Dietary Intake of Fatty Acids. *Int J Mol Sci* 2015 16(6): 12871-12890
- Pyzik A, Grywalska E, Matyjaszek-Matuszek B, Rolinski J. Immune Disorders in Hashimoto Thyroiditis: What Do We Know So Far? *J Immunol Res* 2015
- Allen MJ, Fan YY, Monk JM, Hou TY, Barthoumi r, McMurray DN, Chapkin RS. n-3 PUFAs reduce T-helper 17 cell differentiation by decreasing responsiveness to interleukin-6 in isolated mouse splenic CD4⁺ T cells. *J Nutr* 2014 144(8):1306-13
- Yoon SJ, Choi SR, Kim DM, Kim KW, Ahn ChW, Cha BS, Lim SK, Kim KR, Lee HCh, Huh KB. The Effect of Iodine Restriction on Thyroid Function in Patients with Hypothyroidism Due to Hashimoto s Thyroiditis. *Yonsei Medical Journal* 2003, 44(2):227-235
- Mikulec Ž, Mas N, Mašek T, Strmotić A. Sojina i suncokretova saćma kao zamjena za riblje brašno u hrani za tovne piliće. *Veterinarski arhiv* 2004; 74(4):271-9 (Croatian)
- Karimi A. The Effects of Varying Fishmeal Inclusion Levels (%) on Performance of Broiler Chicks. *International Journal of Poultry Science* 2006; 5(3)
- Conrey EJ, Lindner C, Estivariz C, Pereira M, Welsh J, Vignolo J, Fishbein D, Kettel Khan L, Grummer-Strawn L. Thyrotoxicosis outbreak linked to consumption of minced beef and chorizo: Minas, Uruguay, 2003-2004. *Public Health* 2008; 122 (11): 1264-74
- Kharchenko VP, Kotlyarov PM, Mogutov MS, Alexandrov YK, Sencha AN, Patrunev YN, Belyaev DV. *Ultrasound Diagnostics of Thyroid Diseases*, Springer-Verlag Berlin Heidelberg 2010; pp 67-71, 185-194

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