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PERIPHERAL BRONCHIAL OBSTRUCTION IN PATIENTS WITH CLINICAL HYPOTHYROIDISM

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ABSTRACT

AIM: To evaluate the pulmonary function parameters in patients with clinical hypothyroidism. METHODS: A total of 10 patients (3 males/ 7 females) with clinical hypothyroidism were included in the study and a comparison with a group of 10 age and sex matched healthy controls was performed. Thyroid parameters measured were: TSH, FT3, FT4, AntiTGAb, AntiTPOAb (by chemiluminescent immunoassay) and TSHRAb (by ELISA). Autoimmune thyroiditis was defined by immunological, morphological (ultrasound characteristics) and hormonal criteria. All the participants underwent pulmonary function assessment in a certified laboratory. RESULTS: The patients had clinical and laboratory data consistent with overt hypothyroidism but they appeared to be insignificantly different from controls with respect to main anthropometric parameters and thyroid volume. With regard to pulmonary function the two groups exhibited comparable values of the main spirometric parameters except for the mean expiratory flows - MEF50% and MEF25%. CONCLUSIONS: Patients with clinical hypothyroidism reveal mild peripheral bronchial obstruction but the actual extent of these changes should be elucidated further regarding the small number of our patients.

Key words: autoimmune thyroiditis, pulmonary function, spirometry

INTRODUCTION

Respiratory manifestations are seldom the major complaint of the patient with hypothyroidism. Nonetheless, the pulmonary system may be affected in many ways. There are few studies dealing with pulmonary function in patients with clinical hypothyroidism (1-4). The pulmonary consequences of hypothyroidism should be carefully assessed especially in subjects with concomitant respiratory diseases and especially those referred to surgical procedures and the use of general anesthesia.(4)

The aim of the current study is to evaluate the pulmonary function parameters in patients with clinical hypothyroidism.

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MATHERIALS AND METHODS

A total of 10 patients (3 males/ 7 females) with clinical hypothyroidism were included in the study (age = 48.2±12.5; BMI = 29.4±4.5, mean±SD) and a comparison with a group of 10 age and sex matched healthy controls was performed. The following thyroid parameters were measured: Thyroid stimulating hormone (TSH); Free Triiodothyronine (FT3); Free Thyroxin (FT4), Thyroglobulin autoantibodies (AntiTGAb); Thyroid-peroxidase autoAB (AntiTPOAb) by Chemiluminescent immunoassay and TSH receptor antibodies (TSHRAb) by ELISA; Autoimmune thyroiditis was defined by immunological (positive titers of AntiTPOAb and/or AntiTGAb), morphological (ultrasound characteristics) and hormonal criteria. All the participants underwent comprehensive pulmonary function assessment (MasterScreen Diffusion, Jaeger, Wurzburg, Germany) in a certified laboratory applying the ATS and ERS criteria to ensure quality.

RESULTS

The patients had clinical and laboratory data consistent with overt hypothyroidism but they appeared to be insignificantly different from healthy controls with respect to main anthropometric parameters **(Table 1)** and thyroid volume. With regard to pulmonary function the two groups exhibited comparable values of the main spirometric parameters except for the mean expiratory flows - MEF50% **(Figure 1)** and MEF25% **(Figure 2)**.

Table 1. *Patient characteristics*

Parameter	Hypothyroidism	Controls	P
Age [years]	47.2±14.2	49.1±8.7	NS
BMI [kg.m2]	30.5±5.0	28.4±4.0	NS
TSH [mU.L-1]	96.5±74.4	N	-
FT4 [pmol.L-1]	5.2±5.2	N	-
antiTPOAb [U.ml-1]	1026.3±491.5	N	-
FEV1 %pred	97.6±8.0	99.8±13.8	NS
FEV1/FVC	78.8±8.8	78.2±3.8	NS

Legend: NS – non-significant; N – normal

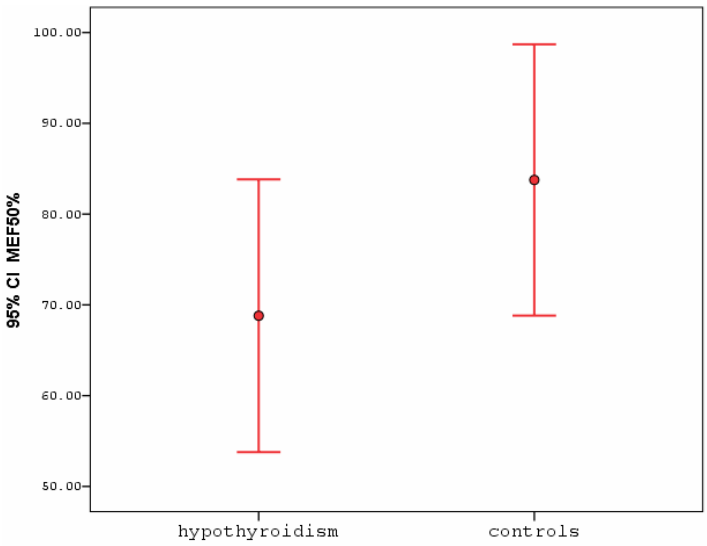

Figure 1. Difference in MEF50% in patients with hypothyroidism and controls

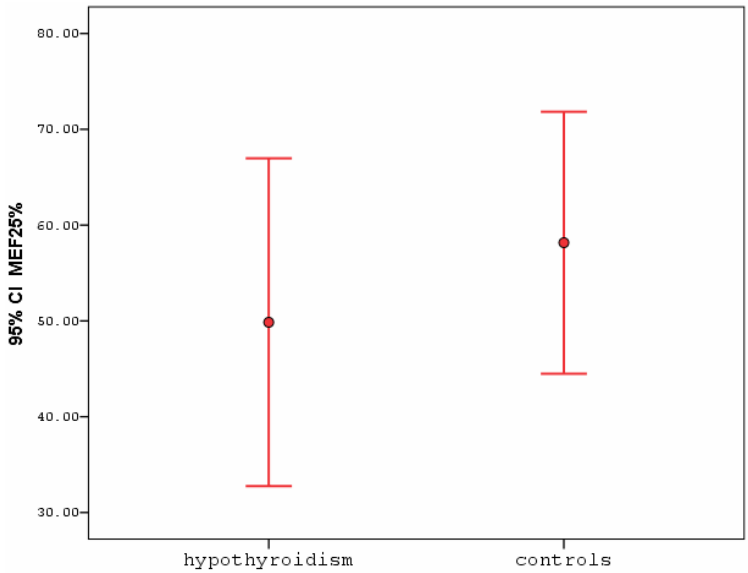

Figure 2. Difference in MEF25% in patients with hypothyroidism and controls

DISCUSSION

The mechanism of respiratory disorders in hypothyroidism is complex. Alteration in bronchomotor tone ventilatory control, gas exchange, exercise capacity and neuromuscular function have been discussed. In the majority of hypothyroid patients there was evidence of mild peripheral obstruction. This finding is consistent with the data of Cakmak et al. (1). The review of the literature reveals few reports on the impact of hypothyroidism on pulmonary structure and function (1-4). Neuromuscular dysfunction and mild edema of small bronchi are possible mechanisms of expiratory flow alterations /2/. The results must be interpreted with caution, considering the low number of subjects included in the study up to now.

It may be concluded that patients with clinical hypothyroidism reveal mild peripheral bronchial obstruction but the actual extent of these changes should be elucidated further regarding the small number of our patients. Pulmonologists and endocrinologists must become aware of the possible effects of hypothyroidism on pulmonary function and carry out regular screening tests. This approach could also prove valuable in patients who are being referred to surgical procedures (4).

REFERENCES

1. Cakmak G, Saler T, Saglam ZA, et al. Pulmonary functions in patients with subclinical hypothyroidism. *J Pak Med Assoc.* 61(10):951-3, 2011.
2. Ingbar D. The Pulmonary System in Hypothyroidism. In Werner & Ingbar's The Thyroid: A Fundamental & Clinical Text, 9th Edition, 781-88, 2005.
3. Salih Valjevac, Almira Hadzovic-Dzuvo, Amina Valjevac, et al Assessment of Lung Dysfunction with Spirometry in Patients with Thyroid Disorders *Acta Inform Med.* 19(1): 16-18, 2011.
4. Stathatos N, Wartofsky L. Perioperative management of patients with hypothyroidism. *Endocrinol Metab Clin North Am.*32(2):503-18, 2003.