Assessment of iodine status and thyroid structure changes in a cohort of patients with diabetes mellitus type 1 and comorbid chronic kidney disease in Belarus

A. Sazonava, T. Mokhort, M. Astapovich,* S. Petrenko**

Belarusian State Medical University, Minsk City Endocrinological Dispensary,* International Sakharov Environmental University**

OBJECTIVES

According to World Health Organization (WHO) iodine deficiency (ID) occurs due to lack of dietary iodine and results in impaired biosynthesis of thyroid hormones and/or thyroid enlargement.

The **aim** was to assess iodine supplementation and thyroid structure changes in a cohort of patients with diabetes type 1 (DM 1) at different stages of comorbid chronic kidney disease (CKD) after achievement of adequate iodine status in Belarus.

METHODS

We examined 62 patients (20m; 42f; age 42,1±12,07yrs; BMI 26,14±5,27 kg/m^2; duration of DM1 22,9±8,67yrs; age at DM 1 onset 19,89±12,72yrs) at CKD stages 1, 2, 3, 5 (N=28; 21; 12; 1, respectively). GFR was estimated using Cockcroft-Gault formula.

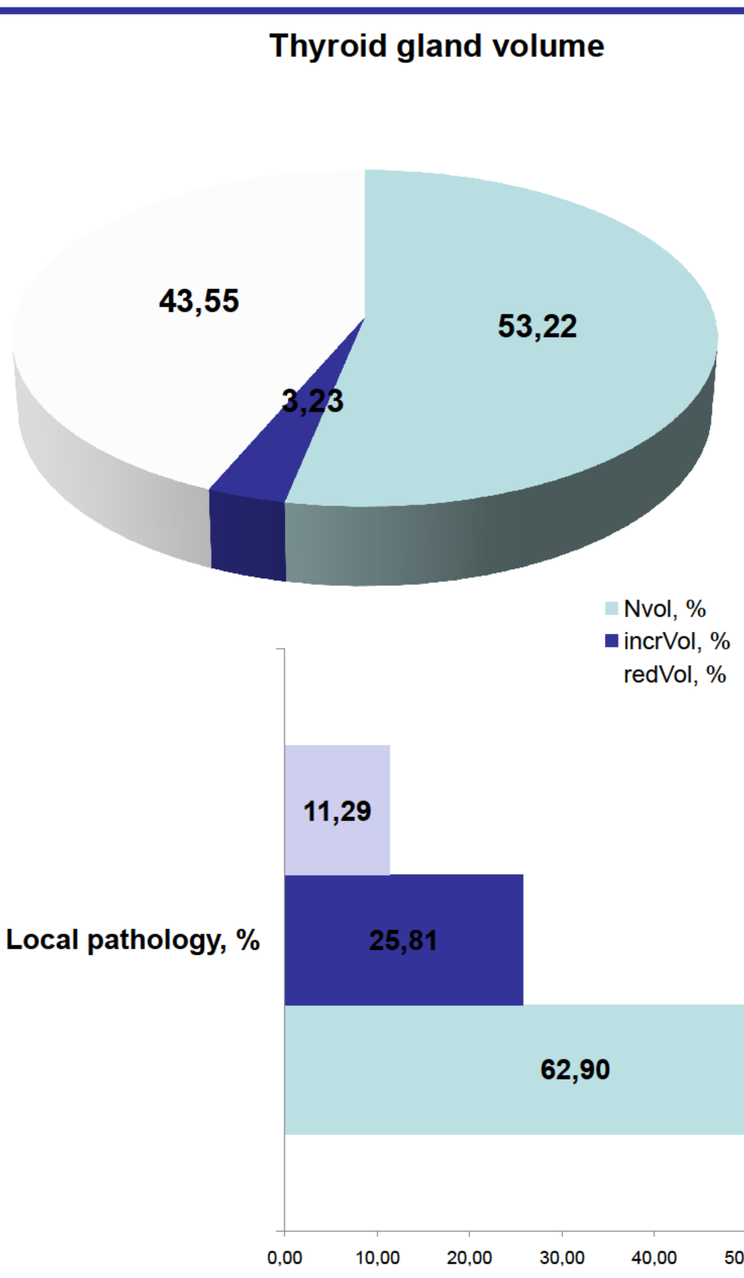
Urinary iodine excretion in urine morning sample was measured with the use of cerium-arsenite method approved WHO as a standard.

ID is defined as a median urinary iodine concentration less than **50 µ/l** in a population.

All data concerning ultrasound structure of thyroid gland were determined as normal, reduced, increased volume (N Vol, redVol, incrVol), homogeneity (hypo-, hyper-, homogeneous), local pathology (abs, single, multiple).

Nonparametrics and descriptive statistical methods were used.

RESULTS



Characteristics of patients	
Total N= 62	**Me [Lq; Uq]**
Gender, m/f (% respectively)	20/42
Age, years	43,05 [33,55; 51,41]
BMI, kg/m^2	25,63 [21,56; 29,34]
Smoking, n (%)	8 (12,9)
Family history of DM, n (%)	19 (30,65)
Age at DM 1 onset, years	15,45 [10,52; 29,47]
DM 1 duration, years	21,35 [16,94; 26,62]
HbA1c, %	8,80 [7,30; 9,80]
Urinary Iodine excretion, mkg/l	115,5 [58,0; 241,2]
Thyroid volume, cm^3	9,6 [7,7; 12,0]

In the examined group evaluating iodine supplementation in morning urine samples a lack of ID was registered - a median urinary iodine excretion at the time of survey was **115,5 [58,0; 241,2] mkg/l**. Comparative analysis of patients in the subgroups according to CKD stages revealed reliable differences in level of urinary iodine excretion (p=0,0133: p<0,05), total volume of thyroid gland (p=0,0325), and in homogeneity of thyroid gland (p=0,040). Urinary iodine excretion in morning sample correlates with urea plasma level (r=-0,309: p<0,05), GFR (r=0,420), CKD stage (r=-0,323). Total volume of thyroid gland correlates with plasma urea (r=0,313) and creatinine levels (r=0,259). Strong correlation was revealed between homogeneity and age at DM 1 onset (r=0,292). Structural changes in thyroid gland such as hypoechoic structure were reported in 24 patients (38,71%).

CONCLUSIONS

ID was not registered in examined population of patients that demonstrates the effectiveness of iodine prophylaxis. Revealed a direct correlation between the level of urinary iodine excretion and CKD stage can lead to a variety of structural changes in the thyroid gland which requires close monitoring of patients with reduced renal function.

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Alena Sazonava

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