PREVALENCE AND HORMONAL-MORPHOLOGICAL CHARACTERISTICS OF NODULAR GOITER IN ADULTS OF ANDIJAN UNDER IODINE DEFICIENCY

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Abstract. *In a prospective study of 60 adults in Andijan, thyroid ultrasound detected nodular goiter in 15 participants (25%), predominantly women. Clinical, hormonal (TSH, fT3, fT4, anti-TPO), and morphological assessments (FNAB and histology) were performed to characterize the nodules. Elevated TSH correlated with larger nodule size, and anti-TPO positivity was associated with heterogeneous structure. These findings highlight the prevalence of nodular goiter and its diverse hormonal and morphological features, emphasizing the importance of integrated screening for early detection and management in iodine-deficient populations.*

Keywords: *Nodular goiter; prevalence; thyroid hormones; ultrasound; fine-needle aspiration; Andijan; iodine deficiency.*

Introduction. Nodular goiter remains a significant public health issue in regions with iodine deficiency. It is associated with structural and functional thyroid abnormalities that may lead to hypo- or hyperthyroidism, as well as an increased risk of malignancy [1,2]. Despite ongoing iodine prophylaxis programs, nodular goiter continues to affect urban populations in Uzbekistan, including Andijan. Understanding the prevalence and hormonal-morphological characteristics of nodular goiter in this population is crucial for optimizing early detection, clinical management, and preventive strategies. This study aimed to investigate the prevalence of nodular goiter among adults in Andijan and to evaluate the associated thyroid hormonal profile and morphological features of the nodules.

Materials and methods. A cross-sectional study was conducted at the Andijan branch of the Endocrinology Center named after Academician Y. Kh. Turakulov, including 60 adult participants aged 18–65 years who had resided in Andijan for at least five years. The study aimed to determine the prevalence of nodular goiter using ultrasound screening, evaluate thyroid function in affected patients, and investigate correlations between hormonal parameters and morphological features of thyroid nodules. All participants underwent clinical evaluation, including physical examination and detailed history covering diet, iodine supplementation, and family history of thyroid disease. Thyroid ultrasound was performed to assess gland volume, parenchymal structure, and the presence, size, and number of nodules.

Laboratory tests measured serum levels of TSH, free T3 (fT3), free T4 (fT4), and anti-thyroid peroxidase antibodies (anti-TPO). Morphological assessment included fine-needle aspiration biopsy (FNAB) for selected nodules, with histological examination of surgically excised tissue when indicated. Statistical analysis involved descriptive statistics for prevalence and hormone levels, while correlations between hormonal status and nodule characteristics were evaluated using Pearson or Spearman correlation coefficients, with $p<0.05$ considered statistically significant.

Results. Out of 60 screened adults, 15 participants were diagnosed with nodular goiter, giving a prevalence of 25%.

Among these patients, 11 were women (73%) and 4 men (27**%)**, with a mean age of 44.3 ± 10.5 years. Ultrasound revealed solitary nodules in 9 patients (60%) and multinodular goiter in 6 patients (40%). The mean thyroid volume in affected individuals was significantly higher than in subjects without nodules ($p<0.05$). Laboratory evaluation showed elevated TSH in 4 patients (27%), normal fT3 and fT4 in 10 patients (67%), and anti-TPO positivity in 5 patients (33%).

Patients with multinodular goiter had higher anti-TPO positivity compared to solitary nodules ($p<0.05$). FNAB and histological analysis of 10 nodules revealed benign colloid nodules in 7 cases (70%), Hashimoto thyroiditis-related nodules in 2 cases (20%), and follicular neoplasms in 1 case (10%). Elevated TSH correlated with increased nodule size ($r = 0.41$, $p = 0.02$). Anti-TPO positivity was associated with hypoechogenic and heterogeneous nodular structure on ultrasound.

Discussion. The prevalence of nodular goiter in this urban cohort remains notable despite iodine supplementation. Women were predominantly affected, in line with global trends.

Hormonal evaluation indicated that a subset of patients had subclinical thyroid dysfunction and autoimmune involvement. Morphological assessment confirmed most nodules were benign, while correlations between TSH and nodule size highlight the influence of thyroid function on nodule growth. These findings emphasize the importance of combining ultrasound, hormonal evaluation, and targeted FNAB for early detection and management.

Conclusion. Nodular goiter affects a significant proportion of adults in Andijan, particularly women. Ultrasound and hormonal evaluation revealed diverse morphological and functional characteristics, with TSH elevation and anti-TPO positivity correlating with nodule features. Integrated screening combining imaging, laboratory testing, and selective biopsy is recommended to ensure early detection and appropriate management in iodine-deficient regions.

References:

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