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THE IMPACT OF THYROID HORMONES ON THE PATTERN OF CARDIAC ARRHYTHMIAS IN PATIENTS

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Relevance. Thyroid diseases are the second most common endocrine pathology after diabetes mellitus. Thyroid hormones have a profound effect on the cardiovascular system, as cardiomyocytes are highly sensitive to their influence. These hormones regulate electrophysiological properties, myocardial contractility, and vascular tone. Cardiac arrhythmias — ranging from sinus tachycardia to atrial fibrillation—are often the primary, and sometimes the only, clinical manifestations of thyroid dysfunction. In hospitalized patients, this relationship is further complicated by comorbidities, necessitating a precise evaluation of thyroid status in arrhythmogenesis to determine the correct therapeutic strategy.

Aim: the aim of this study is to characterize the correlation between the structural and functional state of the thyroid gland and the patterns of cardiac rhythm in hospitalized patients.

Materials and methods. This research analyzed a cohort of hospitalized cardiac patients (median age 74.5 years, range 61–86 years) with established ischemic heart disease and post-infarction cardiosclerosis. Thyroid status was assessed via TSH and Anti-TPO levels and ultrasound to calculate volume and EU-TIRADS classification. Cardiac rhythm was evaluated using 24-hour Holter ECG monitoring, focusing on mean heart rate, ectopic activity, and the circadian index (CI).

Results and their discussion. The study found that 83.3% of patients were in a state of biochemical euthyroidism (mean TSH 2.49 ± 0.9 μ IU/mL), while subclinical hypothyroidism was detected in 16.7% of cases (TSH 4.82 μ IU/mL). These findings are consistent with current epidemiological data indicating a high prevalence of subclinical thyroid dysfunction in elderly patients with ischemic heart disease.

Despite maintaining normal hormone levels, 40% of euthyroid patients presented with significant structural thyroid alterations, including multinodular goiter (EU-TIRADS 3–4) and glandular hyperplasia (max volume 28.64 cm³). Our correlation analysis identified a direct link between these structural changes and increased electrical instability. Specifically, patients with nodular pathology exhibited high supraventricular activity, recording up to 570 supraventricular ectopic beats and short paroxysms of atrial tachycardia ($p < 0.05$). This suggests that morphological changes in the thyroid gland may serve as an independent risk for supraventricular arrhythmias, potentially through subclinical inflammatory pathways or localized autonomic influences, even before hormonal shifts are detectable in systemic circulation.

In a patient with significant thyroid hyperplasia (28.64 cm³) and an implanted pacemaker, a rigid circadian profile (CI 1.05) and episodes of accelerated idioventricular rhythm were recorded. In cases of subclinical hypothyroidism, rhythm disturbances were characterized by isolated ventricular and supraventricular extrasystoles associated with the underlying cardiac pathology.

Conclusions. The study demonstrates that in a state of biochemical euthyroidism, structural abnormalities of the thyroid gland—specifically nodular pathology and glandular hyperplasia—are associated with increased supraventricular ectopic activity and paroxysms of atrial tachycardia in elderly patients with pre-existing ischemic heart disease. Furthermore, subclinical hypothyroidism acts as a synergistic factor that exacerbates ventricular irritability in cases of post-infarction cardiosclerosis. These findings suggest that thyroid ultrasound imaging provides critical prognostic value independent of hormone concentrations, and routine thyroid screening should be integrated into the standard diagnostic workup for all patients presenting with cardiac arrhythmias to optimize therapeutic strategies.