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Khasan Khalikovich Khushnazarov

Tashkent Institute of Advanced Medical

Senior lecturer of department “Oncology with a course in ultrasound”

Tashkent, Uzbekistan

Yashnar Mamasalievna Mamadalieva

Tashkent Institute of Advanced Medical

MD, Professor of department “Oncology with a course in ultrasound”

Tashkent, Uzbekistan

MODERN COMPLEX OF ECHOGRAPHIC DIAGNOSIS OF FOCAL THYROID FORMATIONS

Abstract: The article presents the results of a study of 146 patients with focal thyroid formations. Based on the modern complex ultrasound examination of patients, the main specific diagnostic criteria were determined, the use of which allows the detection of echographic signs of thyroid cancer in the early stages. It found that a comprehensive ultrasound study, including B-mode, EDC, CDK, spectral Doppler and elastography, improves the quality of the study and the early detection of thyroid cancer.

Key words: focal formations, thyroid gland, comprehensive ultrasound examination.

Language: English

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Introduction

In endocrine pathology, thyroid diseases take the second place in their prevalence. Focal formations found in 30-50% of people in the population, most of these formations represented by nodular proliferating colloid goiter. Up to 5-10% of focal formations represented by various types of carcinomas, 90% of which are highly differentiated follicular cancer [2, 9, 14]. In this regard, today the issues of early and differential diagnosis of nodular formations of the thyroid gland are relevant. A special place at the present stage held by the high information content of ultrasound imaging, which allows the use of ultrasound imaging to diagnose diseases in the early and even preclinical stages of the disease. [1,11,14,22,24]. Leading specialists endocrinologists noted the versatility and high information content of ultrasound at all stages of diagnosis and treatment, as well as after surgery or during follow-up [3,14,22,23].

Increases in risk factors, a high probability of malignant changes in benign formations, a tendency

to the occurrence of latent forms of cancer, and the peculiarity in the mild severity and no specificity of the clinical symptoms of the tumor attach particular importance to the problem. Unfortunately, even when using the latest ultrasound technologies in attempts to classify echographic semiotics and systematize the data when differentiating ultrasound signs of thyroid cancer and morphological forms of cancer, the question is still considered open, and the problem is relevant [1,9,14,22]. The introduction of innovative technologies opens up new prospects in the refinement diagnostics of nodular formations [2,3,5,24]. A new direction in ultrasound diagnostics is elastography - a non-invasive method of ultrasound diagnostics, with which it is possible to study such physical properties of tissue as rigidity. Modern elastography represented by two main techniques: compression and shear wave elastography. However, the role and place of high-tech sonography is not well understood [1,11,22,23,24].

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Aim of research. Improving the differential and clarifying diagnostics of focal thyroid formations with multipara metric ultrasound.

Methods of research

Under the supervision were 146 patients referred for ultrasound to clarify the nature of nodular formations in the thyroid gland. The age of patients ranged from 18 to 72 years. Among the examined patients, men and women were 55 (38%) and 91 (62%), respectively.

Ultrasound was performed on modern ultrasound machines HI VISION Preirus (Hitachi Medical Corporation, Japan), Samsung-Medison WS 80 AC ELITE (South Korea), Logiq S8 XD clear GE Healthcare (USA), MINDRAY DS-8 (China) and " MINDRAY DS-70 "(China) with a frequency range of the linear sensor 5-13 MHz, providing real-time visualization of the gray scale, obtaining the characteristics of Doppler studies, elastography. Ultrasound examination was performed according to the standard method with seroscale examination, Doppler ultrasound (CDC, EDC, spectral Doppler), as well as the elastography mode (compression and shear wave elastography), with which the stiffness of focal thyroid gland formations was assessed.

Patients were divided into 4 groups:

Group 1 (n = 38) included patients whose examination revealed a lesion with a diameter of up to 10 mm. Patients in this group were under follow-up for 5 to 10 months.

Group 2 (n = 38) consisted of patients whose examination revealed nodes with a diameter of more than 10 mm, and morphologically the analysis did not indicate a malignant tumor.

Group 3 (n = 35) underwent surgical intervention of nodular formations, and the results of a morphological study gave a dubious result.

The 4th group (n = 35) consisted of patients who were operated on with subsequent verification of the malignancy of the process in the thyroid gland.

At the same time, papillary cancer was detected in 28 (19.1%), follicular cancer - in 4 (3.2%), medullary cancer in 2 (1.6%) and the primary lesion with lesions of regional lymph nodes in 1 (0.1 %) of the patient.

Results.

Research results and discussion. In 76 (52%) examined individuals, single thyroid nodules were detected, in 70 (48%), multiple nodular formations were revealed.

The defeat of the thyroid gland mainly observed in 67 (55%) women of reproductive age. The largest group, of the surveyed (n = 54) 45%, were various variants of diffuse-nodular goiter.

Of the 146 patients, 101 (69.2%) had a change in size, toward an enlarged gland, uneven contours were observed in 54 (36.8%) patients, uneven echogenicity in 77 (52.5%), and the "halo" rim 101 (69.5%), an increase in thyroid gland in 112 (77.3%), calcifications in 48 (33.1%), hypervascularization in 127 (87%) patients. Thyroid tissue of elasticity indices were above 163 kPa (normal 6.7-19.8 kPa.) In 104 (86.6%) patients from groups 3 and 4. When conducting shear wave elastography, the Ewing modulus in malignant tumors was 125.9-158.78 kPa. According to compression elastography, they characterized by blue staining with insignificant green areas (4 types of color maps) and a high stiffness coefficient.

The characteristic ultrasonic signs of the most common papillary cancer (n = 28) of the thyroid gland were: irregular shape, uneven borders, fuzzy contours, decreased echogenicity, heterogeneity of the echostructure of formation; preservation of the thyroid capsule; node hypervascularity, asymmetry, randomness, disorganization of the vascular pattern in its structure, pathological transformation of blood vessels. (Fig.1)

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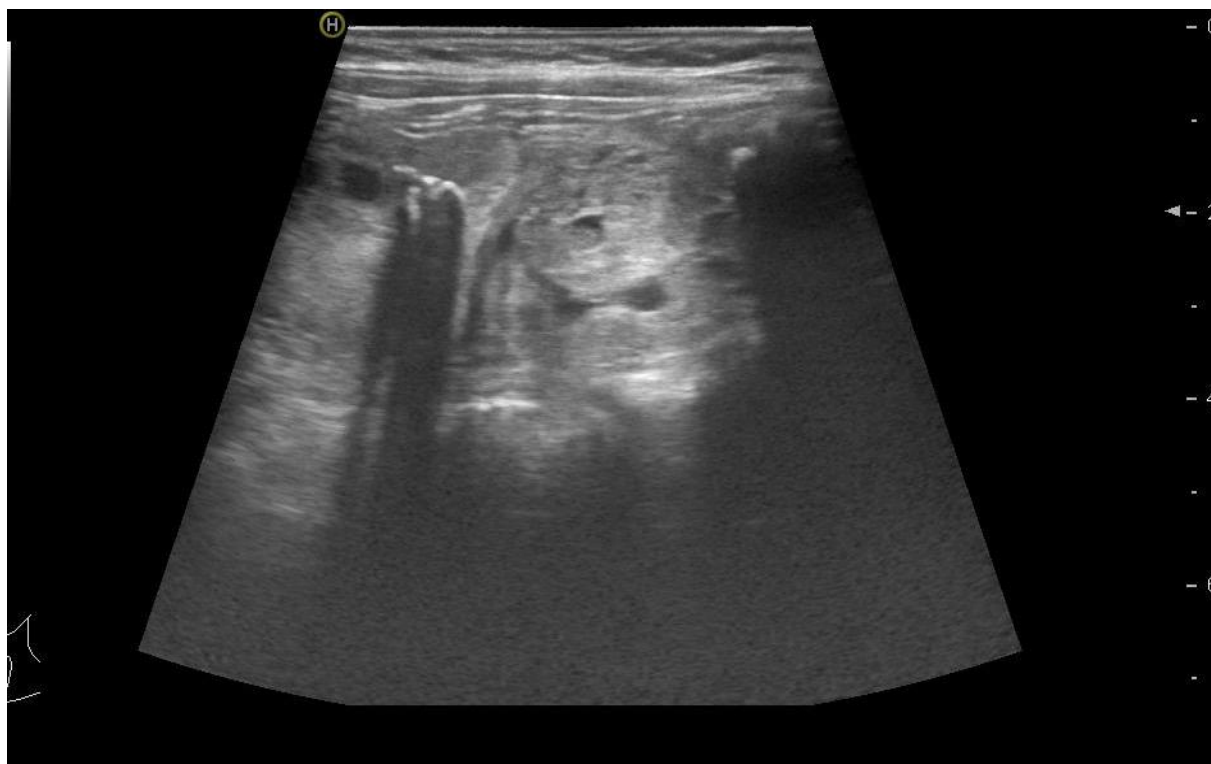


Fig. 1. Thyroid cancer. Fuzzy contours of education. Two-dimensional study in sersoscale mode

Follicular cancer (n = 4) of the thyroid gland more often than other forms was characterized by hyperechoic and medium echogenicity nodes, the structure of which was also more often heterogeneous;

less often than with other forms, calcifications occurred, more often - the rim of delimitation (Fig.2). Avascular and hypovascular forms were also more common.



Fig. 2. Thyroid cancer. Irregular shape, uneven knot borders, small calcifications. Two-dimensional study in sersoscale mode

Medullary cancer (n = 2) of the thyroid gland, in contrast to other forms, was often defined as an oval-shaped hyperechoic mass; more often, in comparison

with other forms, the echostructure of the nodes was heterogeneous. Vascularization has always been high (Figure 3).

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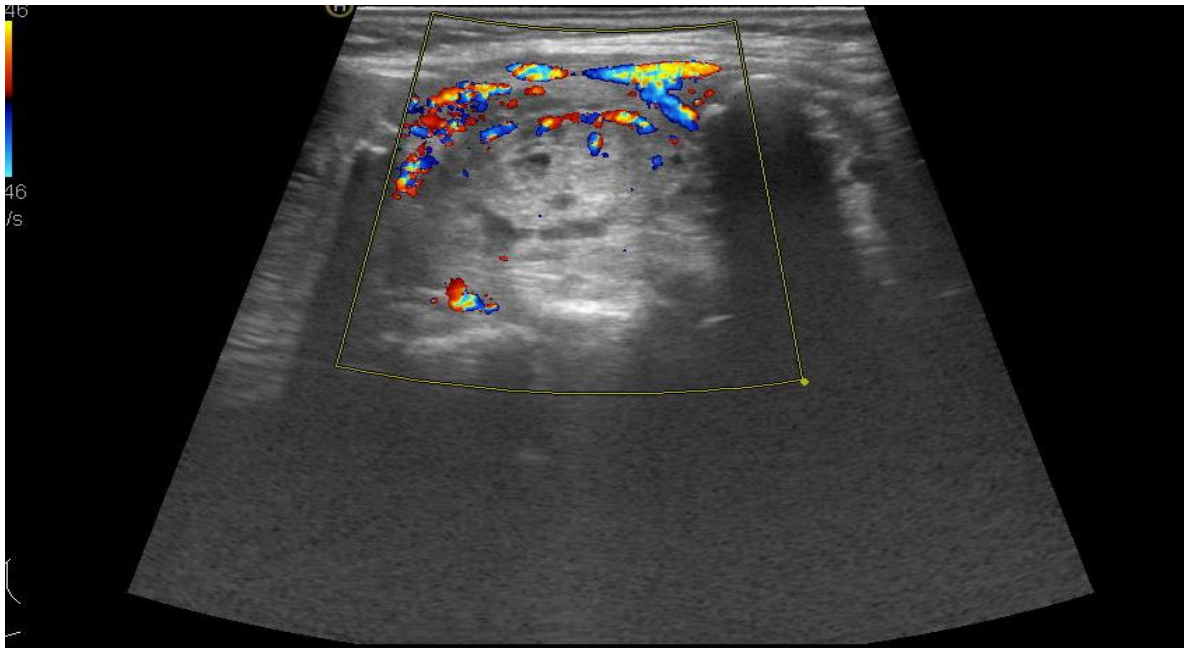


Fig. 3. Thyroid cancer. Hypervascularization of the node. In color Doppler mapping mode

When conducting elastography, the normative range was 18.4 ± 7.8 kPa. In benign formations, the arithmetic mean stiffness was 47.5 ± 10 kPa, which was significantly higher than the norm: ($p < 0.05$).

Hypoechoic focal lesions during elastography, 6-15 mm in size, characterized by uniform staining in blue (Figure 4).

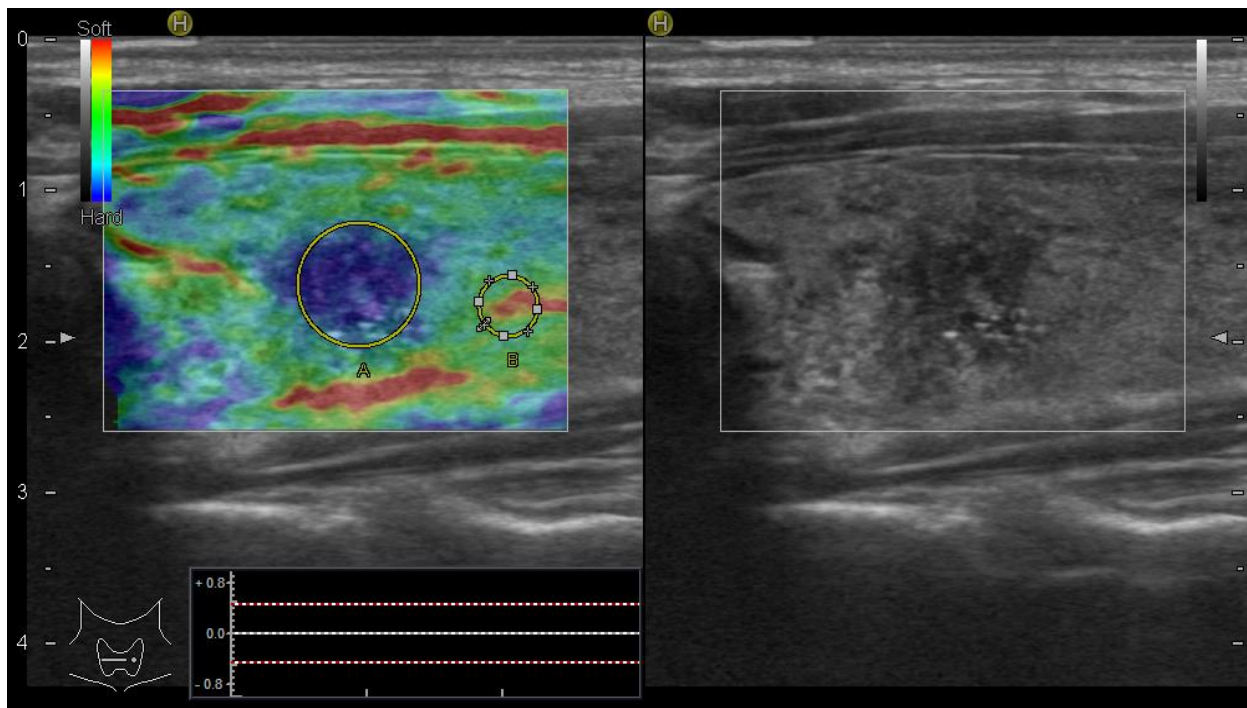


Fig. 4. Thyroid cancer. With compression elastography

When focal formations of mixed echogenicity with sizes exceeding 10 mm detected, as well as isoechoic formations with a hypoechoic rim around the periphery, the cytological and histological findings were follicular adenomas without proliferation. The formations had a mosaic staining

structure with a predominance of areas of blue and several more rigid areas of green. In the 3rd group, a mixed type of mapping was revealed on the elastograms, with the predominance of hard sections stained in blue on the elastograms. The stiffness was 169.2 ± 24.3 kPa, which was significantly higher than

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normal, and significantly higher stiffness indicators than in the 2nd group ($p < 0.01$).

Conclusion

Consequently, modern integrated ultrasound diagnostics of focal thyroid formations using elastography significantly increases the possibilities of early and accurate diagnosis of focal thyroid formations. In a modern ultrasound study of focal thyroid diseases, the most informative ultrasound criterion was the unevenness of the contours, an increase in volume, the presence of calcifications,

hyperactive vascularization and a decrease in the elasticity of the affected tissue, and an increase in the stiffness index. Elastography is a key step in modern integrated ultrasound examination of focal thyroid lesions and contributes to a more rational definition of zones for TAPB. Only modern integrated ultrasound examination, including B-mode, EDC, CDK, spectral Doppler and elastography, taking into account the information significance of the parameters, helps to improve the quality of the study, early detection of thyroid cancer and allows you to optimize the tactics of managing these patients.

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