



A CASE OF PATIENT WITH SUSPICIOUS, RAPIDLY GROWING THYROID TUMOR, WITH A SHORT REVIEW OF THE THYROID NODULAR DISEASE GUIDELINES



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Abstract:

Thyroid nodules, also known as goitre, is the most common thyroid disease. Its prevalence depends on age, iodine supply, and availability of ultrasonography examination. The manuscript presents a case of a patient with fast-growing thyroid nodule, with ultrasonographic and cytological features suggesting high probability of malignancy, which finally turned out to be a benign one. In addition to the presented case, the EU-TIRADS guidelines and indications for hemithyroidectomy are briefly discussed.

Keywords: goitre, thyroid nodule, FNA, EU-TIRADS, BETHESDA.

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Introduction

Thyroid nodular disease, commonly known as thyroid nodules or goitre (ICD-10: E04), is a frequent condition with the prevalence dependent on the examination type, with rates ranging from 2-7% (palpation) to 19-67% (ultrasonography – USG). [1,2]. Due to the high percentage of the disease in the population, and increasing availability of ultrasound examination, the diagnosis of thyroid nodules is increasing yearly. Prevalence of the disease is correlated mostly with iodine supply (has U-shape distribution – increases both with iodine deficiency and excess), and advanced age [2, 3]. Proper interpretation of neck USG examination is crucial for accurate diagnosis and appropriate recommendations. Ultrasonographic features of nodules can suggest the need for performing fine-needle aspiration (FNA) to differentiate between benign and malignant characteristics of the lesion [4]. Many ultrasound images, despite suggesting the possibility of malignancy, can be misleading and force unnecessary procedures. This often leads to overtreatment and long-life complications. Thus the most important aspect of assessing thyroid nodules is the good qualification for FNA, which gives the most probable answers and suggests treatment or active surveillance.

Case presentation

A 66-year-old woman with no chronic diseases was referred to endocrinological assessment due to a rapidly growing neck nodule. She had no family history of cancer, radiotherapy, or any other factors increasing the risk of cancer. First USG of the neck showed a thyroid nodule almost fully filling the right lobe. She was urgently admitted to the nearest oncological center where FNA was performed, and the cytological result was *Bethesda IV* category, with the commentary: “Suspicious of follicular neoplasm”. Hormonal evaluation showed euthyrosis (calcitonin concentration was not measured). The patient was referred to a local surgery department, with a diagnosis of “thyroid cancer”, but due to the long waiting time for admission she looked for help and consultation in another reference center. In this stage of a diagnostic process she was redirected to the center of the manuscript authors. In physical examination we confirmed a clearly palpable nodule of the right lobe, with “soft consistency” in palpation. USG showed 30 x 30 x 36 mm (H x W x L) sized solid, hypoechogenic nodule of right thyroid lobe, with irregular shape, mixed type of vascularity, and no “halo” sign (Fig. 1, 2, 3). The only ultrasonographic feature that spoke against the high risk of malignancy was Shear Wave Elastography (SWE), which showed similar elastic-

ity to a normal thyroid tissue (in this case the left lobe). Due to ultrasonographic features suggesting possible malignancy, the fine needle aspiration cytology results, and most importantly clinical aspect (rapid growth) the patient was referred to an experienced oncological surgeon, and underwent surgery a week later. During the

surgery, the operator decided to perform hemithyroidectomy, due to palpable features of the lesion, and low “intraoperative visual probability” of malignancy. Pathological results confirmed that the lesion was a follicular adenoma [Fig.4]. Patient received 50 ug levothyroxine a day, and remains euthyroid.

Figure 1. Right lobe of thyroid.

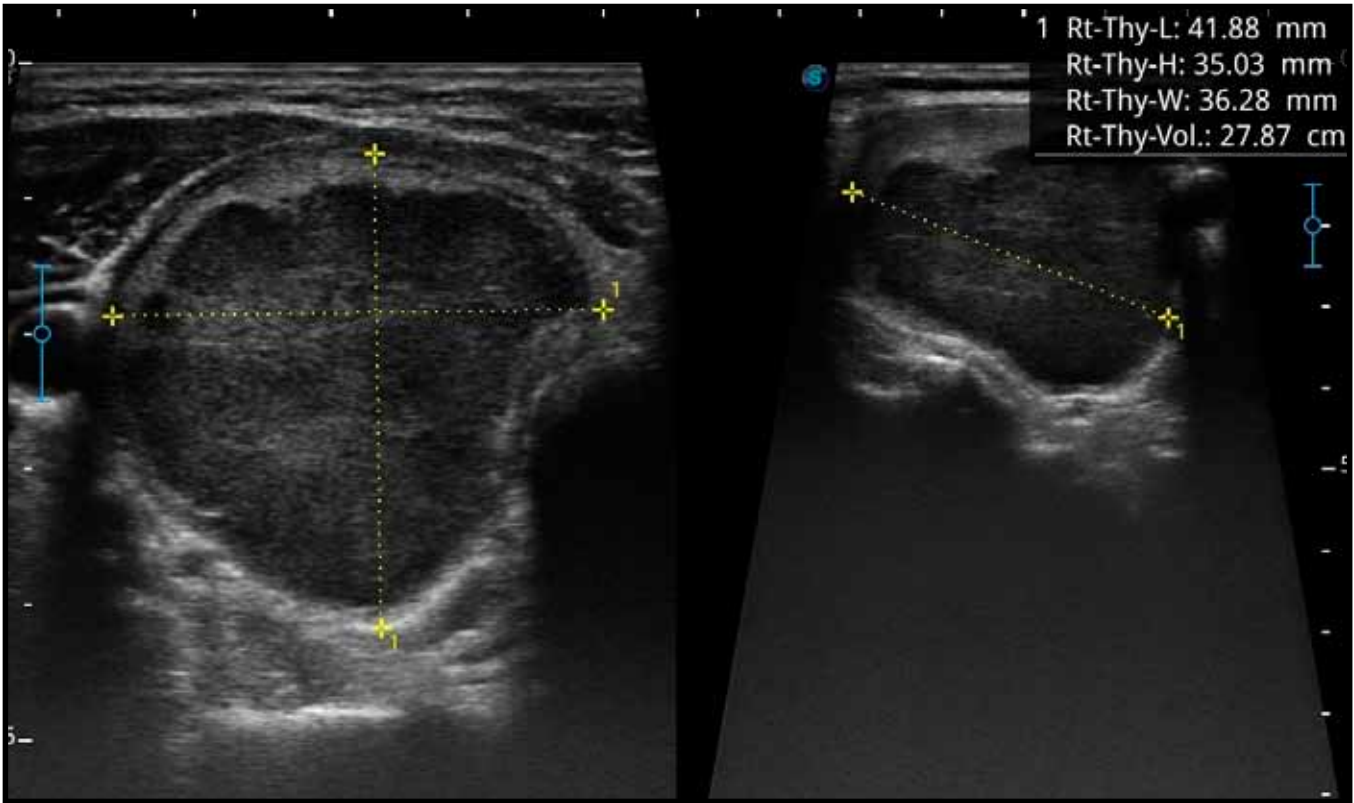


Figure 2. Left lobe of thyroid.

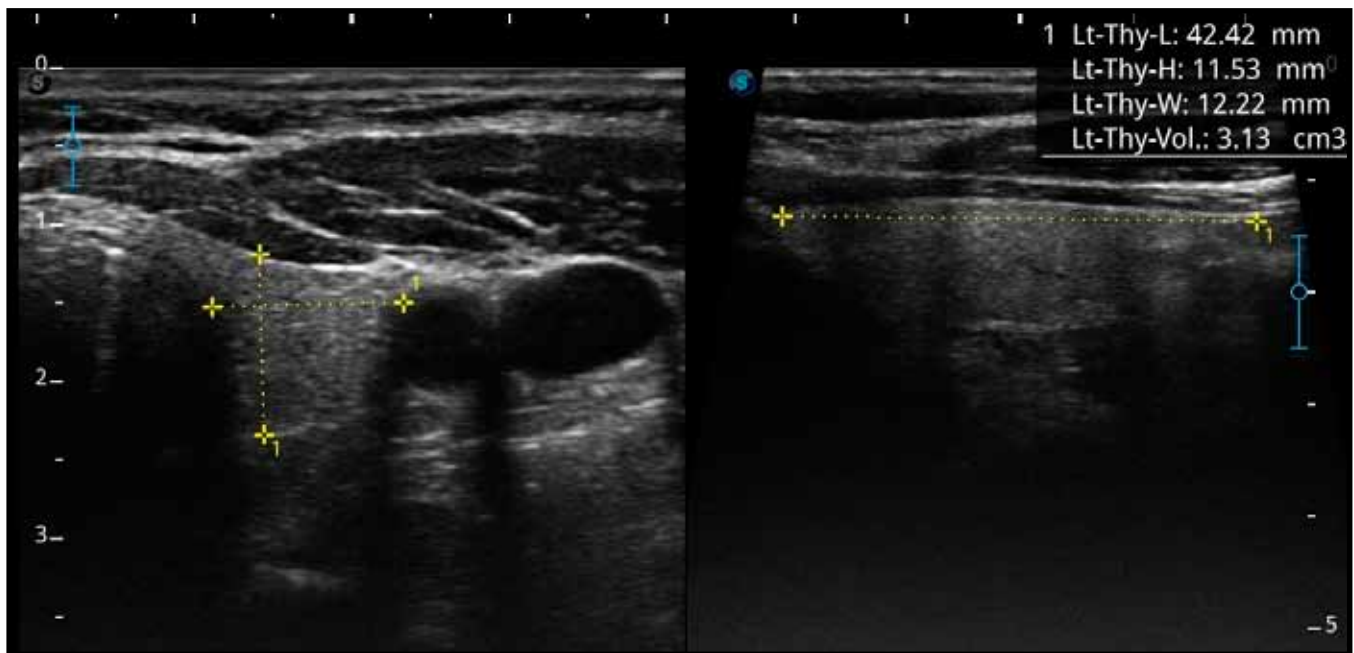


Figure 3. Hypoechoic nodule in right lobe.

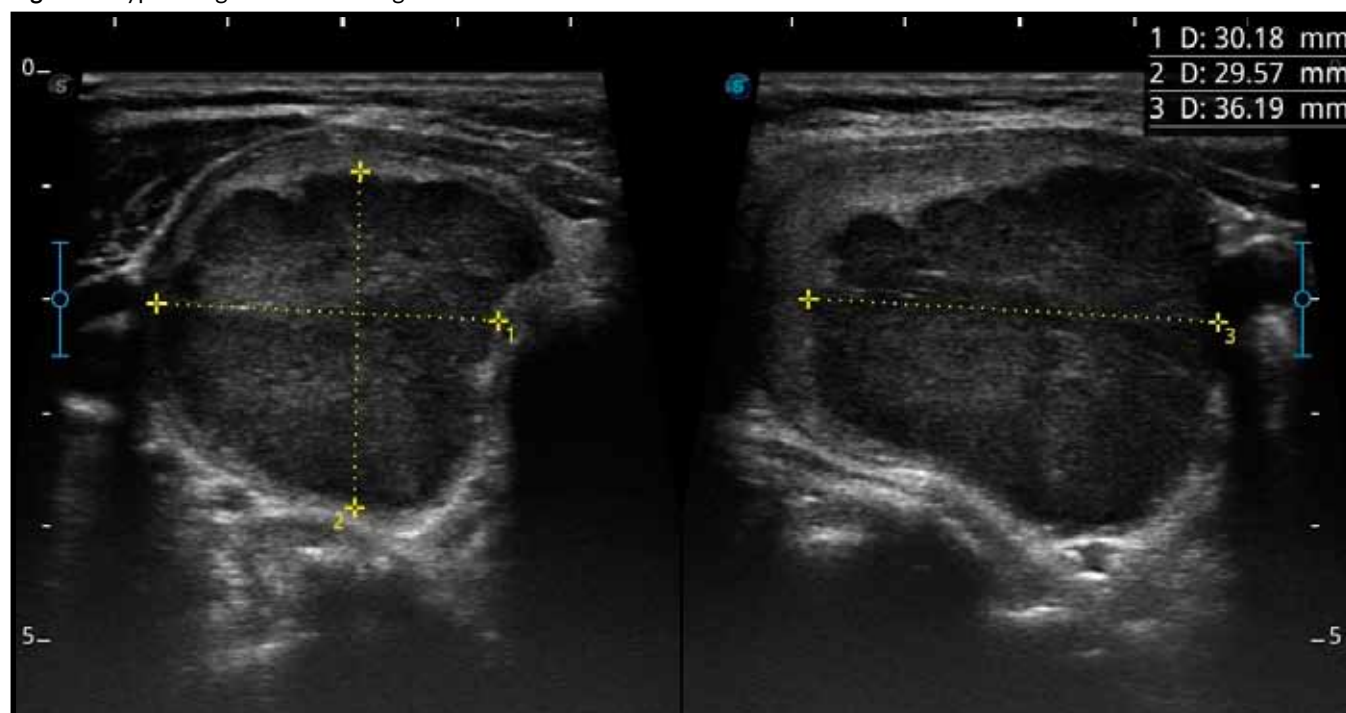
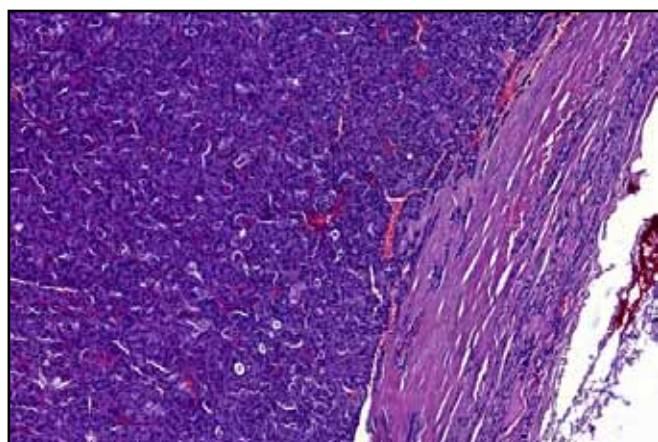


Figure 4. Histopathological result of the surgery – follicular adenoma. Hematoxylin & Eosine (HE) staining. Magnification 10x.



Discussion

Interpretation of ultrasound thyroid examination and biopsy qualification should be performed on local guidelines. The European Thyroid Association in 2017 published Guidelines for Ultrasound Malignancy Risk Stratification of Thyroid Nodules in Adults, known as EU-TIRADS [4]. Most important summaries of those guidelines are presented in Table 1. The aim of the EU-TIRADS guidelines is to help in properly qualifying patients to FNA or observation group. The diagnosis of malignancy should never be stated only on the basis of ultrasound examination. There are some ultrasound features that can suggest potential malignant character of the nodule, but the patient never should be told that diagnosis is sure. Some ultrasound features, including SWE which is a method where ultrasound waves are used to estimate density and elasticity of the tissues, can help to set

up a diagnosis (malignant nodules tend to be stiffer than benign ones). Several studies proved the utility of using SWE in the diagnosis of thyroid nodules [5]. The results have shown that this method can improve the accuracy of the diagnosis, especially in inconclusive or ambiguous cases, however, the examination should always be used in combination with other imaging modalities (and clinical data), and the interpretation should be done by an experienced ultrasonographer. Only the cytological examination of cells harvested during FNA can give the answer on the true potential risk of the lesion. According to the above, the FNA is a basic examination which can answer the most important question for the patient and the doctor: “Do I need surgery?”. Decisions about surgical intervention and its range are based on cytological results, and guidelines summary is presented in Table 2 below. In the table differences of malignancy percentage in European and Polish population, due to published studies are presented in separate columns [6, 7]. As above, the most appropriate suggestion for the patient, about thyroid surgery is when the result of FNAC shows Bethesda V or Bethesda VI. If the nodule is below 10 mm in every diameter surgery of one lobe can be considered. This recommendation of hemithyroidectomy seems to be most advantageous in FNAC of Bethesda IV, although in those cases total thyroidectomy is also an option. Bethesda III results suggest repeating FNAC after 3 months (to avoid false positive results which repairing tissue can suggest). Triple result of Bethesda III leads to the suggestion of the surgery, especially if ultrasound features of malignancy are observed. Bethesda I and Bethesda II results are considered as low probability of malignancy, so observation or repeating FNA after 3-12 months is considerable. Surgery can be proposed to patients with family history of thyroid cancer or in cases of compressive goiter [8]. Hemithyroidectomy compared to total thyroidectomy is associated with less number of possible complications

Table 2. FNA results and follow-up procedure recommendations.

FNAC Category "Bethesda"	Description	Malignancy probability [%] EU	Malignancy probability [%] PL	Indication for FNA repeat	Most common histological results	Recommended procedure
I	non-diagnostic	5-10	5-10	Repeat FNA after 3-12 months depending on risk	N/A	Another FNA or observation
II	benign	0-3	< 1	Yes, if ultrasound suspicion of malignancy or nodule enlarges it size significantly	<ul style="list-style-type: none"> • Nodular goiter • Thyroiditis, including chronic inflammations • Hyperplastic nodule • Colloid nodule (lots of colloid, sufficient cellularity) • Cytological findings suggest colloid nodules (lots of colloids, insufficient cellularity) • Thyroid cyst 	Observation
III	atypia of undetermined significance (AUS) or follicular lesion of undetermined significance (FLUS)	6-18	2.4- 5.2	<ul style="list-style-type: none"> • Yes, repeat FNA after 3-12 months depending on risk • USG every six month is indicated 	This category should be used in rare cases when it is not possible to state a precise cytological diagnosis	Consider surgical treatment in the presence of significant risk features in the US image or repeat FNA
IV	follicular neoplasm or suspicious for a follicular neoplasm	10-40	19	<ul style="list-style-type: none"> • No, but if surgery is planned another pathologist confirmation is necessary • USG every six month is indicated, with decision of FNA repeat every 3-12 months 	At least 25% of lesions belonging to this category are not neoplastic tumors (hyperplastic nodules, inflammation). This category should not be diagnosed when nuclear features of papillary thyroid cancer are present	In nodules < 10 mm in diameter, if they do not show risk features, a conservative strategy is acceptable (ultrasound observation); in larger nodules or presence of risk features, surgical treatment is generally indicated.
V	suspicious for malignancy	45-60	75	No, but another pathologist confirmation is necessary	<ul style="list-style-type: none"> • papillary thyroid cancer • medullary thyroid cancer • lymphoma • metastatic carcinoma • anaplastic thyroid cancer/vascular sarcoma due to the presence of necrotic tissues • hyalinizing trabecular tumor 	Thyroidectomy (consider hemithyroidectomy if tumor < 10 mm)
VI	malignant	94-96	95-100	No, but another pathologist confirmation is necessary	<ul style="list-style-type: none"> • papillary thyroid cancer • medullary thyroid cancer • lymphoma • metastatic carcinoma • anaplastic thyroid cancer/vascular sarcoma 	Thyroidectomy (consider hemithyroidectomy if tumor < 10 mm)

like vocal cords impairment or hypoparathyroidism. It can be proposed to almost every patient, even with high-risk cancers [9-11]. Decisions should be made by patient and surgeon together, and possible outcomes of every decision should be discussed before the surgery. Patients and physicians should remember that if histopathological diagnosis of thyroid cancer confirms TNM classification higher than pT1aNOMO, a second operation and radioiodine treatment might be necessary. Nevertheless, high cytological possibility of malignancy (Bethesda V and Bethesda IV), especially with a tumor size of ≥ 10 mm in any diameter, should suggest total thyroid removal [7].

Conclusions

Majority of suspicious nodules diagnosed in thyroid ultrasound examination are not malignant, even when "looking suspicious".

If there is ultrasonographic or clinical risk of malignancy, or any uncertainty in obtained results, patient should be referred to experienced endocrinologist for proper diagnosis.

Fine needle aspiration with cytological examination should be the only test that can confirm possibility of malignancy, and practitioners should not set up diagnosis only on the base of ultrasound image.

Hemithyroidectomy is a treatment option, with less number of complications, but cannot be offered to every patient.

Indication for the surgery should be made individually regarding patient needs and expectations.

Fine needle aspiration results Bethesda V and Bethesda VI should suggest total thyroidectomy.

References

1. Dean DS, Gharib H. Epidemiology of thyroid nodules. *Best Pract Res Clin Endocrinol Metab*, 2008 Dec; 22 (6): 901-11. doi: 10.1016/j.beem.2008.09.019. PMID: 19041821
2. Lou X, Wang X, Wang Z, et al. The Effect of Iodine Status on the Risk of Thyroid Nodules: A Cross-Sectional Study in Zhejiang, China. *Int J Endocrinol*, 2020 Aug 18; 2020: 3760375. doi: 10.1155/2020/3760375. PMID: 32908502; PMCID: PMC7450337
3. Kwong N, Medici M, Angell TE, Liu X, Marqusee E, Cibas ES, Krane JF, Barletta JA, Kim MI, Larsen PR, Alexander EK. The Influence of Patient Age on Thyroid Nodule Formation, Multinodularity, and Thyroid Cancer Risk. *J Clin Endocrinol Metab*, 2015 Dec; 100 (12): 4434-40. doi: 10.1210/jc.2015-3100. Epub 2015 Oct 14. PMID: 26465395; PMCID: PMC4667162
4. Russ G, Bonnema SJ, Erdogan MF, et al. European Thyroid Association Guidelines for Ultrasound Malignancy Risk Stratification of Thyroid Nodules in Adults: The EU-TIRADS. *Eur Thyroid J*, 2017 Sep; 6 (5): 225-237. doi: 10.1159/000478927. Epub 2017 Aug 8. PMID: 29167761; PMCID: PMC5652895
5. Hazem M, Zakaria OM, Daoud MYI, Al Jabr IK, AlYahya AA, Hassanein AG, Alabdulsalam AA, AlAlwan MQ, Hasan NMA. Accuracy of shear wave elastography in characterization of thyroid nodules in children and adolescents. *Insights Imaging*; 2021 Sep 9; 12 (1): 128. doi: 10.1186/s13244-021-01074-7. PMID: 34499281; PMCID: PMC8429530
6. Cibas ES, Ali SZ. The 2017 Bethesda System for Reporting Thyroid Cytopathology. *Thyroid*, 2017 Nov; 27 (11): 1341-1346. doi: 10.1089/thy.2017.0500. PMID: 29091573
7. Jarzab B, Dedecjus M, Lewiński A, et al. Diagnosis and treatment of thyroid cancer in adult patients - Recommendations of Polish Scientific Societies and the National Oncological Strategy. 2022 Update [Diagnostyka i leczenie raka tarczycy u chorych dorosłych - Rekomendacje Polskich Towarzystw Naukowych oraz Narodowej Strategii Onkologicznej. Aktualizacja na rok 2022]. *Endokrynol Pol*, 2022; 73 (2): 173-300. doi: 10.5603/EP.a2022.0028. PMID: 35593680
8. Rios A, Rodriguez JM, Canteras M, Galindo PJ, Tebar FJ, Parrilla P. Surgical management of multinodular goiter with compression symptoms. *Arch Surg*, 2005 Jan; 140 (1): 49-53. doi: 10.1001/archsurg.140.1.49. PMID: 15655205
9. Addasi N, Fingeret A, Goldner W. Hemithyroidectomy for Thyroid Cancer: A Review. *Medicina (Kaunas)*, 2020 Nov 3; 56 (11): 586. doi: 10.3390/medicina56110586. PMID: 33153139; PMCID: PMC7692138
10. Mitchell AL, Gandhi A, Scott-Coombes D, Perros P. Management of thyroid cancer: United Kingdom National Multidisciplinary Guidelines. *J Laryngol Otol*, 2016 May; 130 (S2): S150-S160. doi: 10.1017/S0022215116000578. PMID: 27841128; PMCID: PMC4873931
11. Rodriguez Schaap PM, Botti M, Otten RHJ, Dreijerink KMA, et al. Hemithyroidectomy versus total thyroidectomy for well differentiated T1-2 N0 thyroid cancer: systematic review and meta-analysis. *BJS Open*, 2020 Oct 6; 4 (6): 987-94. doi: 10.1002/bjs5.50359. Epub ahead of print. PMID: 33022150; PMCID: PMC7709359