

Cytomorphology of a 'Benign Follicular Nodule' of Thyroid

Abdulaziz Radhi S ALjohni^{1*}, Ahad Amer Alsaiani², Omar Abdulrhman Alfaroq³, Amar Hassan Hussain Bashir⁴ and Azeza Abdulrhman Alfaroqie⁵

¹Phd microbiology Department of Laboratory at King Fahad Hospital, Medina P.O Box Building 4573, Zipcode 42392, Additional No 8925

²Taif University, College of Applied Medical Science, Department of clinical laboratory Sciences, Taif Saudi Arabia

³Department of Laboratory at King Fahad Hospital, Medina, Saudi Arabia

⁴MD pathology King Fahad Hospital, Medina, Saudi Arabia

⁵Department of Laboratory at King Fahad Hospital, Medina, Saudi Arabia

***Corresponding Author:** Abdulaziz Radhi S ALjohni, Phd microbiology Department of Laboratory at King Fahad Hospital, Medina P.O Box Building 4573, Zipcode 42392, Additional No 8925, Saudi Arabia.

Received: January 27, 2022; **Published:** February 05, 2022

DOI: 10.55162/MCMS.02.018

Summary

There is 4 to 7 percent of the population who have palpable thyroid nodules; nevertheless, there is 19 to 67 percent of the population who have nodules identified accidentally on ultrasonography. The great majority of thyroid nodules do not manifest themselves with symptoms. As malignant nodules account for around 5% of all palpable nodules, the major purpose of investigating thyroid nodules is to rule out the presence of cancer. One of the tests that may be used to differentiate between a thyrotoxic nodule and a euthyroid nodule is the thyroid-stimulating hormone test. Thyroid nodules should be fine-needled aspirated in individuals who are otherwise healthy but have a thyroid nodule, and radionuclide scanning should be reserved for patients with equivocal thyroid cytology or thyrotoxic endocrine disease (thyrotoxicosis). Using ultrasonic guidance during fine-needle aspiration, the frequency of inadequate specimens from fine-needle extraction is reduced. Operation is the most common treatment for malignant lesions, and the amount of the surgery is decided by the severity and kind of the sickness. Postoperative radioactive iodine ablation is done on high-risk patients who have cancer that has spread or that has returned after treatment. However, thyroxine suppression therapy is often employed surgically to treat malignant lesions.

Keywords: Thyroid thyroid nodules; Epidemiologic presentation; Lymphocytic thyroiditis; Diagnosis; Treatment

Introduction

Thyroid nodules are a prevalent clinical condition that affects many people. The prevalence of palpable thyroid nodules has been estimated to be roughly 5 percent among women and 1 percent among men who live in iodine-deficient regions of the globe, according to epidemiologic research [1, 2]. High-resolution ultrasound (US) may, on the other hand, reveal thyroid nodules in 19 percent to 68 percent of randomly chosen persons, with a greater frequency of detection in women and older people [3, 4]. In regard to clinical significance, thyroid nodules are important because they allow doctors to rule out thyroid cancer, which may occur in as few as 7 percent to as many as 15 percent of cases depending on age, gender, radiation exposure history, family history, and other variables [5, 6]. Differentiated thyroid cancer (DTC) includes papillary and follicular thyroid cancers [7]. In 2014, the American Thyroid Association expected 63,000 new cases of thyroid cancer, compared to 37,200 in 2009, when the most current American Thyroid Association guidelines were given.

From 4.9 per 100,000 people in 1975 to 14.3 per 100,000 people in 2009, the annual incidence was almost quadrupled [9]. A rise in the incidence of papillary thyroid carcinoma is responsible for almost the whole shift (PTC). Moreover, although 25% of new thyroid cancer diagnoses in 1988–1989 were under 1 cm in size, 39% of new thyroid cancer diagnoses in 2008–2009 were [9]. The increased use of neck ultrasonography or other imaging, as well as early detection and therapy [10], may be contributing to the tumor shift, which is changing the initial treatment and follow-up for many thyroid cancer patients. Recently published findings from an Olmsted County population-based research found that thyroid cancer incidence more than doubled from 2000 to 2012 when compared to the preceding decade, with the increase completely attributed to clinically occult malignancies discovered incidentally on imaging or pathology [11]. According to one estimate, PTC will overtake cervical cancer as the third most frequent malignancy in women by 2019, resulting in a cost of \$19–21 billion in the United States [12]. Individuals with thyroid neoplasms must be educated about their likely prognosis and their long-term health consequences, which is vital to their survival. In 1996, Treatment recommendations for individuals with thyroid nodules and DTC were released by the American Thyroid Association (ATA) [13]. There have been several breakthroughs in the diagnosis and treatment of thyroid nodules and DTC during the past 15–20 years, although clinical debate persists in several areas. A lengthy history of limited peer-reviewed financing for high-quality clinical studies in thyroid neoplasia may be a significant contributor to current clinical uncertainty [12]. In several areas of thyroid neoplasia, methodological constraints or contradicting results from previous research provide a considerable barrier to current medical decision-making. While they are not a focus of these recommendations, we understand that the practicality and affordability of different diagnostic and treatment alternatives nevertheless pose significant clinical issues in a variety of clinical practice settings.

Epidemiology

In the United States, there are around 10 to 18 million persons with palpable thyroid nodules, but nodules identified by chance with ultrasonography are found in 19 to 67 percent of the general population. During ultrasonography, 30 percent of people aged 19 to 50 years old had an unintentional nodule, according to one study.

According to the results, more than half of the thyroid glands examined had one or more nodules, with only around one in every ten of them being palpable. According to the American Goiter Association, around 23% of solitary nodules within a multinodular goiter are dominating nodules. Thyroid cancer is seen in around 5% to 10% of all thyroid nodules that can be felt. Thyroid cancer was projected to account for 19,500 of the total 1,268,000 malignancies discovered for the first time in the United States in 2001, with 1,300 deaths [14].

Thyroid nodules are four times more frequent in women than in men, and they are more common in those who live in areas with low iodine levels in the environment. According to the American Thyroid Association, thyroid nodules occur at a rate of 2% each year following ionizing radiation exposure [15].

Presentation

The vast majority of thyroid nodules cause no symptoms. Thyroid nodules cause hyperthyroidism or thyrotoxicosis in less than 1% of patients (excessive thyroid hormone production). If spontaneous bleeding from the nodule occurs, patients may experience neck stiffness or discomfort. Questioning about hypothyroidism or hyperthyroidism symptoms, nodules or goiters, and family history of autoimmune thyroid illness (such Hashimoto's thyroiditis or Graves' disease), thyroid cancer, or familia polyposis (like Gardner's syndrome) is crucial.

Table 1 shows the numerous thyroid nodule kinds. The most common kind of nodule is a colloid nodule, which does not proceed to cancer. Adenomas are usually benign, however, some resemble follicular carcinoma. Approximately 5% of microfollicular adenomas are follicular malignancies. 1 Thyroiditis may present as a nodule (Figure 1). A single palpable thyroid nodule frequently indicates thyroid cancer. Papillary carcinoma of the thyroid is the most prevalent kind of malignant thyroid nodule in adults (Figure 2).

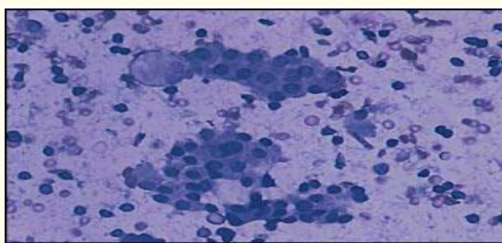


Figure 1: Thyroid lymphoma. Two benign follicular cell clusters in a lymphocyte background. Diff-Quick dye.

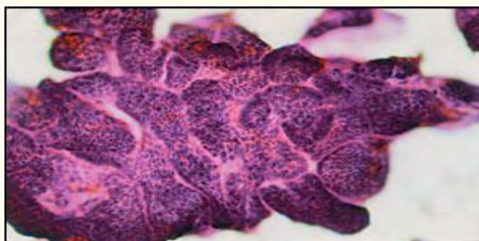


Figure 2: Fine-needle aspiration of a thyroid nodule reveals a tiny fragment of papillary thyroid cancer in papillary thyroid carcinoma. Papanicolaou stain is a kind of stain.

Physical Examination

Nodules are often detected by the patient as a palpable lump or by chance during a physical checkup. Thyroid nodules may be smooth, nodular, diffuse, soft, hard, movable, sensitive, or painful. While palpation is the most clinically relevant form of thyroid gland examination, it may be insensitive and incorrect. 6, 9 less than 1 cm nodules are typically not perceptible unless they are in the anterior thyroid lobe.

However, large lesions are difficult to palpate. Regardless, nearly half of all ultrasonographically identified nodules are clinically undetectable. 9 In addition to palpating the thyroid, the head and neck lymph glands should be thoroughly examined. A firm, fixed lesion; cervical lymphadenopathy; a nodule larger than 4 cm; or hoarseness are all signs of thyroid cancer.

Diagnosis

Together with the American College of Endocrinology, the Thyroid Nodule Task Force developed a practice recommendation for patients with thyroid nodules. The rule was enacted in 1996. The 10 the guideline was intended to "improve clinicians' and patients' understanding of thyroid nodule diagnosis and therapy." 10 Figure 311 shows how to examine a thyroid nodule.

Evaluation of Thyroid Disorders

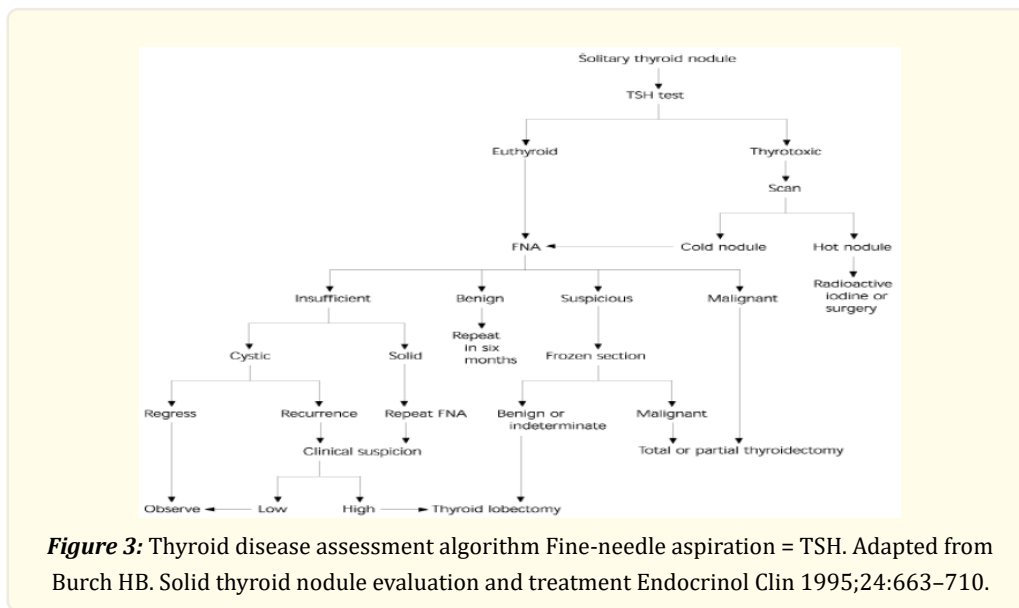


Figure 3: Thyroid disease assessment algorithm Fine-needle aspiration = TSH. Adapted from Burch HB. Solid thyroid nodule evaluation and treatment *Endocrinol Clin* 1995;24:663–710.

Laboratory Evaluation

Patients with thyrotoxicosis or hypothyroidism should have a sensitive thyroid-stimulating hormone (TSH) test performed on them to assess their condition (Figure 4). The use of aspiration should be explored if the TSH level is within the normal range. This number should be evaluated when the patient has hyperthyroidism, and when the value is high, the patient may have hypothyroidism. In anybody who has a family history of medullary thyroid cancer, it is recommended that their serum calcitonin be tested. Thyroid function tests are not sensitive enough to discriminate between benign and malignant thyroid nodules. T4, antithyroid peroxidase antibodies, and thyroglobulin are used to diagnose thyroid nodules. These tests help diagnose thyroid diseases including Graves' disease and Hashimoto's thyroiditis.

Interpretation of Laboratory Values

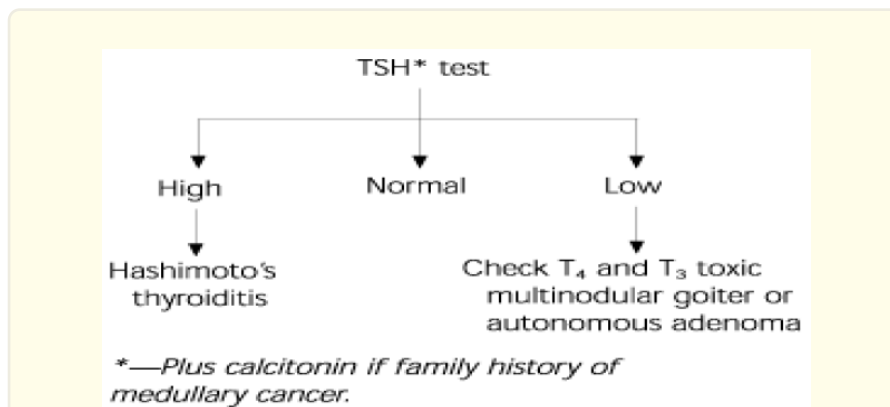
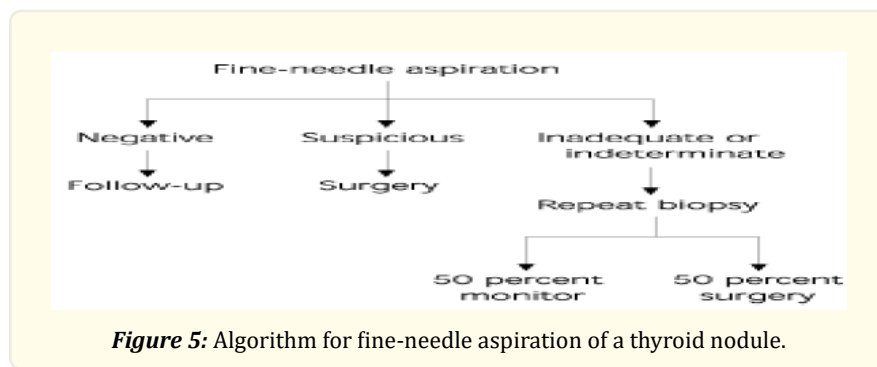


Figure 4: Interpreting thyroid function tests, TSH stands for thyroid-stimulating hormone. T4 stands for thyroxine.

Aspiration with a Fine Needle

According to the American Thyroid Association (ATA), FNA should be performed in the first instance in euthyroid people who have a nodule (Figure 5). It is "believed to be the most effective method available for distinguishing between benign and malignant thyroid nodules,"¹⁰ with an accuracy approaching 95 percent² depending on the experience of the person performing the biopsy and the skill of the cytopathologist interpreting the slides, according to the American Association of Clinical Endocrinologists' guidelines. The data analysis revealed that the false-negative rate varied from 1 to 11%, the false-positive rate ranged from 1 to 8%, the sensitivity ranged from 68% to 98%, and the specificity ranged from 72 to 100%.^{2, 10} Sampling mistakes occur in both big (over 4 cm in diameter) and minor (less than 1 cm in diameter) lesions, although they may be reduced by ultrasound-guided biopsy. The findings are classified into four types: benign, malignant, suspicious, and uncertain.

Fine-Needle Aspiration of Thyroid Nodule



The majority of specimens are determined to be benign in 69 to 74 percent of cases.² In around 22 to 27 percent of all samples, indeterminate or questionable findings are obtained.² When the specimens do not have enough material to provide a diagnosis, a second FNA should be done. With the use of ultrasound-guided FNA, the rate of inadequate findings may be reduced significantly. Finally, around 4% of specimens are positive for malignancy, with the majority of false-positive findings indicating Hashimoto's thyroiditis is the most common cause.

Treatment

Malignant or ambiguous thyroid nodules or those with a suspected history or physical are surgically treated. Before surgery, several specialists prescribe a partial or whole thyroidectomy. However, the partial thyroidectomy argument rages on.¹⁶ Postoperative radioactive iodine (I-131) ablations (i.e., those with metastatic disease, nodal disease, or gross residual disease). In low-risk individuals, the advantages of postoperative thyroid replacement treatment are contested.^{9, 16, 17} TSH levels should be 0.5 U per mL following thyroid carcinoma removal (0.5 mU per L). High-risk patients and patients with metastatic or locally invasive cancers that were not entirely surgically excised or ablated by postoperative I-131 treatment may need suppression.^{9, 16, 17} Cold nodules on nuclear imaging should be surgically removed. Toxic nodules (low TSH or symptoms like atrial fibrillation) will need therapy. Hot nodules may be treated with radioactive iodine or surgically removed in certain cases.

References

1. Vander JB, Gaston EA and Dawber TR. "The significance of nontoxic thyroid nodules. Final report of a 15-year study of the incidence of thyroid malignancy". *Ann Intern Med* 69 (1968): 537-540.
2. Tunbridge WM., et al. "The spectrum of thyroid disease in a community: the Whickham survey". *Clin Endocrinol (Oxf)* 7.6 (1977): 481-493.

3. Tan GH and Gharib H. "Thyroid incidentalomas: management approaches to nonpalpable nodules discovered incidentally on thyroid imaging". *Ann Intern Med* 126.3 (1997): 226-231.
4. Guth S., et al. "Very high prevalence of thyroid nodules detected by high frequency (13 MHz) ultrasound examination". *Eur J Clin Invest* 39 (2009): 699-706.
5. Hegedus L. "Clinical practice. The thyroid nodule". *N Engl J Med* 351 (2004): 1764-1771.
6. Mandel SJ. "A 64-year-old woman with a thyroid nodule". *JAMA* 292 (2004): 2632-2642.
7. Sherman SI. "Thyroid carcinoma". *Lancet* 361 (2003): 501-511.
8. Siegel R, Ma J, Zou Z and Jemal A. "Cancer statistics, 2014". *CA Cancer J Clin* 64.1 (2014): 9-29.
9. Davies L and Welch HG. "Current thyroid cancer trends in the United States". *JAMA Otolaryngol Head Neck Surg* 140.4 (2014): 317-322.
10. Leenhardt L., et al. "Advances in diagnostic practices affect thyroid cancer incidence in France". *Eur J Endocrinol* 150.2 (2004): 133-139.
11. Brito JP, et al. "The impact of subclinical disease and mechanism of detection on the rise in thyroid cancer incidence: a population-based study in Olmsted County, Minnesota during 1935 through 2012". *Thyroid* 25 (2015): 999-1007.
12. Aschebrook-Kilfoy B., et al. "The clinical and economic burden of a sustained increase in thyroid cancer incidence". *Cancer Epidemiol Biomarkers Prev* 22.7 (2013): 1252-1259.
13. Singer PA., et al. "Treatment guidelines for patients with thyroid nodules and well-differentiated thyroid cancer". *American Thyroid Association. Arch Intern Med* 156.19 (1996): 2165-2172.
14. Cancer facts & figures 2001. Atlanta: American Cancer Society (2001).
15. Mazzaferri EL. "Management of a solitary thyroid nodule". *N Engl J Med* 328 (1993): 553-9.

Volume 2 Issue 3 March 2022

© All rights are reserved by Abdulaziz Radhi S ALjohni., et al.