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Patient information: Thyroid nodules (Beyond the Basics)

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OVERVIEW

The thyroid is a butterfly-shaped gland in the middle of the neck, located below the larynx (voice box) and above the clavicles (collarbones) (figure 1). Thyroid nodules are round or oval-shaped areas within the thyroid (figure 2) that can be caused by a number of conditions, most of which are not serious.

This topic discusses the tests that may be performed on thyroid nodules, as well as the treatments that are available. Other thyroid conditions are discussed separately. (See "Patient information: Hyperthyroidism (overactive thyroid) (Beyond the Basics)" and "Patient information: Hypothyroidism (underactive thyroid) (Beyond the Basics)" and "Patient information: Antithyroid drugs (Beyond the Basics)".)

WHAT DOES THE THYROID DO?

The thyroid produces two hormones, triiodothyronine (T3) and thyroxine (T4), which regulate how the body uses and stores energy. Thyroid function is controlled by a gland located just below the brain, known as the pituitary (figure 3). The pituitary produces thyroid stimulating hormone (TSH), which stimulates the thyroid to produce T3 and T4.

Thyroid nodules are very common (figure 2); up to half of all people have at least one thyroid nodule, although most do not know about it. Thyroid nodules can be caused by many different conditions (table 1). Reassuringly, about 95 percent of all thyroid nodules are caused by benign (non-cancerous) conditions.

THYROID NODULE DIAGNOSIS

Diagnostic tests can determine if a thyroid nodule is benign or malignant (cancerous); this information can help to guide treatment decisions. There are several diagnostic tests and each provides unique information about the thyroid nodule. However, not every person with a thyroid nodule needs all of these tests.

Often, a test will provide a definitive answer about the type and cause of a nodule. In other cases, a test may be inconclusive and further testing will be required. Discuss which tests you will need and the results of these tests with your healthcare provider.

Thyroid stimulating hormone — Thyroid stimulating hormone (TSH) can be measured with a blood test.

- If the TSH level is normal, the next step is to have a thyroid ultrasound and fine needle aspiration biopsy. (See 'Thyroid ultrasound' below and 'Fine needle aspiration' below.)
- Low levels of thyroid TSH in the blood may indicate that a nodule is producing high levels of thyroid hormone. If the TSH level is lower than normal, the next step is to have a thyroid scan. (See 'Thyroid scan' below.)
- High levels of TSH may indicate autoimmune inflammation of the thyroid (called Hashimoto's thyroiditis). Another blood test, to measure levels of thyroid antibodies, is sometimes recommended in this case. (See "Pathogenesis of Hashimoto's thyroiditis (chronic autoimmune thyroiditis)".)

Thyroid ultrasound — A thyroid ultrasound should be performed in all patients with a suspected thyroid nodule or nodular goiter on physical examination or with nodules incidentally noted on other imaging studies (carotid ultrasound, CT, MRI, or PET scan). Thyroid ultrasonography is used to answer questions about the size and anatomy of the thyroid gland and nearby structures in the neck. Thyroid ultrasound findings can be used to select nodules that require fine needle aspiration (FNA) biopsy.

Fine needle aspiration — In most cases, the TSH level is normal, and the next step is the fine needle aspiration (FNA). FNA uses a thin needle to remove small tissue samples from the thyroid nodule. The tissue is examined with a microscope.

Fine needle aspiration biopsy can be performed in the office with a local anesthetic (numbing medicine). It can be performed by palpation or using ultrasound guidance. You may feel mild discomfort as the anesthesia is injected, and you may feel some pressure during the biopsy, but the level of discomfort is similar to a visit with the dentist.

This test is accurate in identifying cancer in a suspicious thyroid nodule. In some cases, the biopsy does not contain enough tissue to make a diagnosis, and a repeat biopsy is necessary. In other cases (10 percent), the result of the biopsy is indeterminate and surgery is necessary for a definite diagnosis.

The results of the biopsy will be one of the following:

- Benign (noncancerous)
- Malignant (cancer)
- Suspicious for malignancy
- Follicular neoplasm (microfollicular nodules, including Hürthle cell lesions)
- Follicular lesion or atypia of undetermined significance (nodules with atypical cells)
- Nondiagnostic or insufficient

Thyroid scan — Most people do not have to have a thyroid scan – only those who have a low TSH level. In these cases, the thyroid scan is the first step after the blood test (instead of the fine needle aspiration).

A thyroid scan can help to determine if a thyroid nodule is autonomous ("hot") or non-functional ("cold"). The scan is performed after taking a small dose of a radioactive iodine (a pill); technetium scans may also be used (an injection), but they are less reliable.

- Thyroid nodules that absorb the radioiodine are usually **not** cancerous (called autonomous, hot, or toxic). (See 'Autonomous ("hot") thyroid nodules' below.)
- Thyroid nodules that do not absorb the radioiodine are called cold, and have a 5 percent risk of being cancerous. Approximately 95 percent of thyroid nodules are cold.