

What is a thyroid nodule?

The term *thyroid nodule* refers to any abnormal growth of thyroid cells into a lump within the thyroid. Although the vast majority of thyroid nodules are benign (noncancerous), a small proportion of thyroid nodules do contain thyroid cancer. Because of this possibility, the evaluation of a thyroid nodule is aimed at discovering a potential thyroid cancer.

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1 SYMPTOMS

What are the symptoms of a thyroid nodule?

Most thyroid nodules do not cause any symptoms. Your doctor usually discovers them during a routine physical examination, or you might notice a lump in your neck while looking in a mirror. If the nodule is made up of thyroid cells that actively produce thyroid hormone without regard to the body's need, a patient may complain of hyperthyroid symptoms (see the [Hyperthyroidism brochure](#)). A few patients with thyroid nodules may complain of pain in the neck, jaw, or ear. If the nodule is large enough, it may cause difficulty swallowing or cause a "tickle in the throat" or shortness of breath if it is pressing on the windpipe. Rarely, hoarseness can be caused if the nodule irritates a nerve to the voice box.

2 CAUSES

What causes a thyroid nodule?

The thyroid nodule is the most common endocrine problem in the United States. The chances are 1 in 10 that you or someone you know will develop a thyroid nodule. Although thyroid cancer is the most important cause of the thyroid nodule, fortunately it occurs in less than 10% of nodules (see the [Thyroid Cancer brochure](#)). This means that about 9 of 10 nodules are benign (noncancerous). The most common types of noncancerous thyroid nodules are known as *colloid nodules* and *follicular neoplasms*. If a nodule produces thyroid hormone without regard to the body's need, it is called an *autonomous nodule*, and it can occasionally lead to hyperthyroidism. If the nodule is filled with fluid or blood, it is called a *thyroid cyst*.

We do not know what causes most noncancerous thyroid nodules to form. A patient with hypothyroidism may also have a thyroid nodule, particularly if the cause is the inflammation known as *Hashimoto's thyroiditis* (see [Hypothyroidism brochure](#)). Sometimes a lack of iodine in the diet can cause a thyroid gland to produce nodules. Some autonomous nodules have a genetic defect that causes them to grow.

3 DIAGNOSIS

How is the thyroid nodule diagnosed?

Since most patients with thyroid nodules do not have symptoms, most nodules are discovered during an examination of the neck for another reason, such as during a routine physical examination or when you are sick with a cold or flu. Once the nodule is discovered, your doctor will try to determine whether the lump is the only problem with your thyroid or whether the entire thyroid gland has been affected by a more general condition such as hyperthyroidism or hypothyroidism. Your physician will feel the thyroid to see whether the entire gland is enlarged, whether there is a single nodule present, or whether there are many lumps or nodules in your thyroid. The initial laboratory tests may include blood tests to measure the amount of thyroid hormone (thyroxine, or T4) and thyroid-stimulating hormone (TSH) in your blood to determine whether your thyroid is functioning normally. Most patients with thyroid nodules will also have normal thyroid function tests.

Rarely is it possible to determine whether a thyroid nodule is cancerous by physical examination and blood tests alone, and so the evaluation of the thyroid nodule often includes specialized tests such as a thyroid fine needle biopsy, a thyroid scan, and/or a thyroid ultrasound.

Thyroid fine needle biopsy

A fine needle biopsy of a thyroid nodule may sound frightening, but the needle used is very small and a local anesthetic can be used. This simple procedure is done in the doctor's office. It does not require any special preparation (no fasting), and patients usually return home or to work after the biopsy without any ill effects. For a fine needle biopsy, your doctor will use a very thin needle to withdraw cells from the thyroid nodule. Ordinarily, several samples will be taken from different parts of the nodule to give your doctor the best chance of finding cancerous cells if a tumor is present. The cells are then examined under a microscope by a pathologist.

The report of a thyroid fine needle biopsy will usually indicate one of the following findings:

- 1) The nodule is **benign (noncancerous)**. This result is obtained in 50% to 60% of biopsies and often indicates a colloid nodule. The risk of overlooking a cancer when the biopsy is benign is generally under 3 in 100 and is even lower when the biopsy is

DIAGNOSIS CONTINUED

reviewed by an experienced pathologist at a major medical center. Generally, these nodules need not be removed, but another biopsy may be required in the future, especially if they get bigger.

- 2) The nodule is **malignant (cancerous)**. This result is obtained in about 5% of biopsies and often indicates *papillary cancer*, one of the most common thyroid cancers. All of these nodules should be removed surgically, preferably by an experienced thyroid surgeon.
- 3) The nodule is **suspicious**. This result is obtained in about 10% of biopsies and indicates either a *follicular adenoma* (noncancerous) or a *follicular cancer*. Often, your doctor may want to obtain a thyroid scan to determine which nodules should be removed surgically.
- 4) The biopsy is **nondiagnostic** or **inadequate**. This result is obtained in up to 20% of biopsies and indicates that not enough cells were obtained to make a diagnosis. This is a common result if the nodule is a cyst. These nodules may be removed surgically or be re-evaluated with second fine needle biopsy, depending on the clinical judgment of your doctor.

Thyroid scan

The thyroid scan uses a small amount of a radioactive substance, usually radioactive iodine, to obtain a picture of the thyroid gland. Because thyroid cancer cells do not take up radioactive iodine as easily as normal thyroid cells do, this test is used to determine the likelihood that a thyroid nodule contains a cancer. If done as the first test, the thyroid scan is used to determine those patients who most need a biopsy. The scan usually gives the following results.

- 1) The nodule is **cold**. In other words, the nodule is not taking up radioactive iodine normally. This patient is referred for a fine needle biopsy of the nodule.
- 2) The nodule is **functioning**. Its uptake of radioactive iodine is similar to that of normal cells. A biopsy is not needed right away since the likelihood of cancer is very low.
- 3) The nodule is **hot**. Its uptake of radioactive iodine is greater than that of normal cells. The likelihood of cancer is extremely rare, and so biopsy is usually not necessary.

If the fine needle biopsy was done as the first test, then a scan is usually ordered to evaluate a *suspicious* biopsy result. In this case, patients with a “cold” nodule result should have their nodule removed. Patients with “functioning” or “hot” nodules on a scan and a suspicious biopsy can be watched, and surgery is not immediately necessary.

Thyroid ultrasound

The thyroid ultrasound uses high-frequency sound waves to obtain a picture of the thyroid. This very sensitive test can easily determine if a nodule is solid or cystic, and it can determine the precise size of the nodule. The thyroid ultrasound can be used to keep an eye on thyroid nodules that are not removed by surgery to determine if they are growing or shrinking. Some ultrasound characteristics of a nodule are more frequent in thyroid cancer than in noncancerous nodules. Even so, the thyroid ultrasound alone is rarely able to determine if a nodule is a thyroid cancer. The thyroid ultrasound also can be used to assist the placement of the needle within the nodule during a fine needle biopsy, especially if the nodule is hard to feel. Finally, the thyroid ultrasound can identify nodules that are very small and cannot be felt during a physical examination. The clinical importance of these very small nodules is uncertain; however, the ultrasound provides a means by which an accurate fine needle biopsy can be performed if your doctor thinks a biopsy is needed.

4 TREATMENT

How are thyroid nodules treated?

All thyroid nodules that are found to contain a thyroid cancer, or that are highly suspicious of containing a cancer, should be removed surgically by an experienced thyroid surgeon. Most thyroid cancers are curable and rarely cause life-threatening problems (see *Thyroid Cancer brochure*). Any thyroid nodule not removed needs to be watched closely, with an examination of the nodule every 6 to 12 months. This follow-up may involve a physical examination by a doctor or a thyroid ultrasound or both. Occasionally, your doctor may want to try to shrink your nodule by treating you with thyroid hormone (see *Thyroid Hormone Treatment brochure*) at doses slightly higher than your body needs (called *suppression therapy*). Whether you are on thyroid hormone suppression therapy or not, a repeat fine needle biopsy may be indicated if the nodule gets bigger. Also, even if the biopsy is benign, surgery may be recommended for removal of a nodule that is getting bigger.

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