

Thyroid Cancer Questions and Answers

To the Patient and Family

This booklet has been written for people who have received a diagnosis of thyroid cancer or who are being tested for this illness. If you have questions that are not answered in this information sheet, please ask your doctor, nurse, or another member of your health care team.

Always ask your doctor for copies of your pathology reports, operative notes and other important test results. This way you can keep your own set of these important records.

For additional information, visit the following links on our thyroid cancer Web pages.

www.mdanderson.org/departments/endocrinesurg/

www.mdanderson.org/departments/endocrinology/

www.mdanderson.org/departments/headandneck/

Words that may be new to some readers appear in *italics*. The glossary section in this information sheet gives the meanings of these terms.

What is the thyroid gland and what does it do?

The thyroid gland is a butterfly-shaped gland, made up of two halves (lobes), one on either side of the neck connected by the isthmus in the center. The thyroid gland wraps around the front of the trachea (windpipe) just below the Adam's apple (*Figure 1*). The thyroid, which is part of the endocrine system, regulates the body's metabolism and other functions important to maintaining good health.

The thyroid is made up of two types of cells called follicular and parafollicular cells. Follicular cells produce thyroid hormones known as "T4" and "T3," which affect a person's heart rate, body temperature and energy level. Parafollicular cells (C-cells) make a hormone called *calcitonin*, which has a minor role in helping the body maintain a normal level of calcium in the blood. The thyroid gland is under the control of another hormone called "thyroid stimulating hormone" (TSH), which is made in the pituitary gland (a small gland at the base of the brain). TSH regulates the production of thyroid hormones T4 and T3, and as by-product, releases a protein called *thyroglobulin* into the bloodstream.

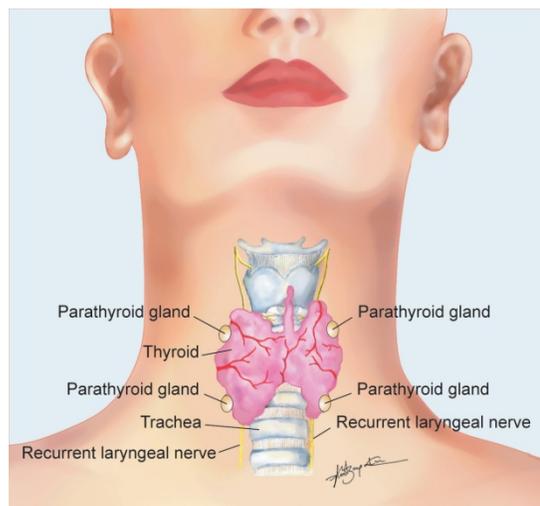


Figure 1: Anatomy of the thyroid and parathyroid glands in the neck

What is cancer?

Cells are the body's basic unit of life. Normally they grow and divide and are replaced by new healthy cells in an orderly controlled fashion. Cancer occurs when cells grow out of control. The resulting growth forms a mass, which may also be called a tumor, lesion, or nodule. These growths can be benign or malignant. Benign (non-cancerous) tumors do not spread to other parts of the body. Malignant tumors are cancerous and can spread (*metastasize*) to other parts of the body. This can cause more serious health problems. Fortunately most thyroid nodules are benign, and those that are malignant usually grow slowly and are not fatal.

Cancer of the thyroid is rare. Only 1 percent of all cancers are located in the thyroid gland. Early detection, accurate diagnosis, correct treatment, and regular checkups can ensure a healthy future.

What are the symptoms of thyroid cancer?

As with other cancers, treatment is likely to be more successful if the tumor is caught early.

A patient with any one of the following symptoms should see a doctor promptly.

- A lump or nodule in the front or side of the neck
- Hoarseness or change in voice quality

- Difficulty swallowing or breathing
- Swollen lymph nodes in the neck
- Pain in the throat or neck

A patient previously exposed to low-dose radiotherapy (radiation) to the head and neck area may be more likely to get thyroid cancer.

What are the different types of thyroid cancer?

There are four major types of thyroid cancer:

1. Papillary
2. Follicular*
3. Medullary
4. Anaplastic

(*includes a subtype called Hurthle cell cancer)

Each type of cancer is caused by an abnormality of a specific type of thyroid cell. Follicular cells are affected in papillary, follicular, Hürthle, and anaplastic thyroid cancer. Parafollicular cells are affected in medullary thyroid cancer (MTC).

About 80 to 90 percent of all thyroid cancers are papillary carcinoma, follicular carcinoma, or a mixture of both types. These cancers usually grow slowly. The chance for cure is excellent if the tumors are caught early and have not spread elsewhere in the body.

There are many lymph nodes in the neck, and they are usually the first place where thyroid cancer spreads. However, whether thyroid cancer spreads to the lymph nodes depends on several things — the patient's age, the type of thyroid cancer, the tumor size, and whether the tumor has pushed through the outer wall (capsule) of the thyroid gland. Sometimes, spread of the tumor to the lymph nodes is found before or during surgery. Other times, cancer may be identified in the lymph nodes months and even years later.

How is thyroid cancer diagnosed?

A patient with thyroid cancer may first notice a lump in the neck. Alternatively, a nodule may be felt by a physician during a routine physical exam or identified unexpectedly on imaging tests done for other reasons.

Blood tests are done to determine the function of the thyroid gland. An *ultrasound* is done to check the thyroid gland, to see the size, location and number of tumors, and to look for any lymph nodes in the neck that might have cancer in them. A *CT scan*, a *thyroid scan* or *MRI* is sometimes done to get more information, but is not part of the routine initial evaluation.

Usually, a doctor will obtain a small tissue sample (*biopsy*) from the thyroid gland before surgery to determine whether cancer is present or not. The information from this procedure shows what

treatment, if any, is necessary. The biopsy is obtained during a simple outpatient procedure called *fine-needle aspiration (FNA)*. FNA biopsies are often done with the guidance of ultrasound.

How is thyroid cancer treated?

Surgery is the most important initial treatment for most newly diagnosed thyroid cancers. There is a 90 percent or better chance for complete cure if the tumor is removed before it has spread outside the thyroid gland. Even if the tumor has spread to lymph nodes in the neck, most patients can still be cured when the thyroid gland and lymph nodes in the central part of the neck and possibly the sides of the neck are removed.

What does surgery of the thyroid gland involve?

Patients are admitted to the hospital on the day of surgery and often spend only one night in the hospital after the operation. However, patients traveling to Houston from out of town should plan to stay in Houston for at least two to three days after surgery. At their clinic visit before surgery, patients are instructed about taking regular medications and when to stop eating and drinking before surgery. Patients will also meet with a member of the anesthesia team and complete necessary blood tests before surgery.

Thyroid surgery is usually performed under *general anesthesia*. The type of surgery performed depends on the patient's tumor and what is known about it ahead of time. The surgeon will discuss details of the surgery with the patient and family beforehand. Common types of thyroid and neck surgery are described below.

Lobectomy

Only one lobe (either the right or left lobe) of the thyroid gland is removed. This surgery is normally done when the patient has a tumor in only one part of the thyroid gland and the doctor suspects that the tumor is more likely to be benign than malignant. Replacement thyroid hormone medication may be required after this surgery. If cancer is found in the tissue removed by the lobectomy, it may be necessary to remove the rest of the thyroid gland in a second procedure called "completion thyroidectomy."

Total thyroidectomy

The entire thyroid gland (both lobes) is removed. This surgery is normally done when a tissue sample from an FNA biopsy has already confirmed that a tumor in the thyroid gland is malignant. Even if an FNA biopsy is negative (benign), a patient might still have this surgery if he/she has other high risk factors, such as having a large thyroid tumor or multiple thyroid tumors, being older, or if the patient has been exposed to radiotherapy to the head or neck area in the past. Because the entire thyroid gland is removed, patients who have this surgery must take replacement thyroid hormone medication for the rest of their lives.

Lymph node dissection

This involves removal of lymph nodes in the center or sides of the neck that are known or suspected to contain metastatic cancer.

Parathyroid gland autografting

Parathyroid glands are four or five pea-sized glands that rest on each corner of the thyroid gland (*Figure 1*). The name of the parathyroid glands comes from their location near the thyroid, but their function is completely unrelated to the thyroid gland. Parathyroid glands produce “parathyroid hormone,” which keeps the calcium in blood at a normal level. Sometimes, blood circulation to one or more of the parathyroid glands is affected during thyroid surgery.

Occasionally, a parathyroid gland may be located inside of the thyroid gland and is removed during surgery. In either case, the healthy parathyroid gland is carefully identified whenever possible and placed in a muscle of the neck or forearm using a procedure called “parathyroid autografting” (also called “parathyroid autotransplantation”). It is important to preserve the parathyroid glands to maintain the normal level of calcium in the blood and prevent a condition called “hypoparathyroidism.” Sometimes, patients need to take calcium and/or vitamin D pills for a short time after surgery and only occasionally for a longer period of time. Rarely, lifelong replacement of additional calcium is required beyond the regular supplements that are recommended for all normal adults (especially post-menopausal women).

A lobectomy or total thyroidectomy usually takes one to two hours, but if lymph nodes are removed, the surgery takes more time. The location and length of the incision will depend on several factors — the natural crease lines in the skin, the location of any prior incisions, the size of the tumor(s) to be removed, and the surgeon’s preference. Common types of incisions for thyroid surgery with or without lymph node dissection are illustrated in *Figures 2 and 3*. A more detailed description of the incision will be explained to the patient by his/her individual surgeon.

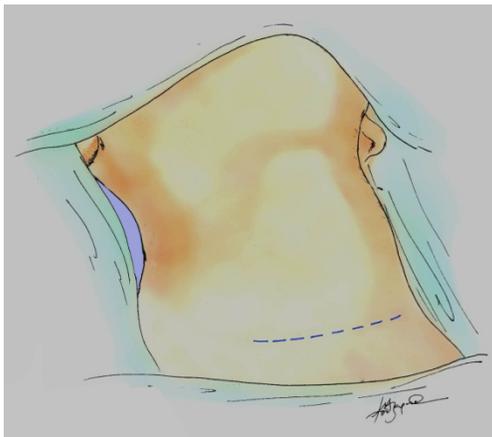


Figure 2: Incision for thyroidectomy

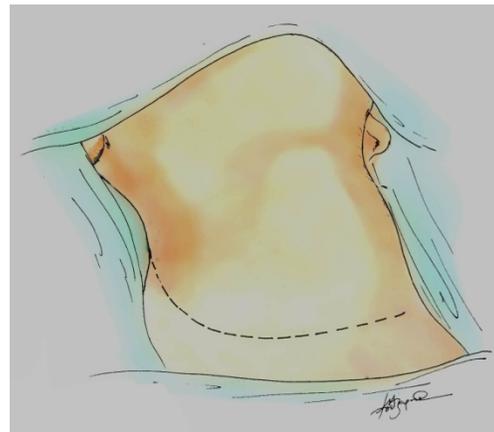


Figure 3: Incision for thyroidectomy with lymph node dissection

What are some of the possible complications of thyroid surgery?

- Infection or bleeding
- Hoarseness, if the nerves (recurrent laryngeal nerves) that control the vocal cords are injured. These nerves are just behind the thyroid gland. Injury to nerves occurs in 1 to 3 out of 100

operations (1 to 3 percent risk). Hoarseness normally improves with time, but sometimes it can be permanent.

- Difficulty swallowing, if the recurrent laryngeal nerves are injured or must be removed because of thyroid tumor involvement (*Figure 1*).
- Injury to the parathyroid glands. If all the parathyroid glands are injured (which occurs in 1 to 3 percent of operations), the level of calcium in the blood will be too low. This can be treated with calcium and vitamin D pills, which may be needed for a variable period of time after surgery and occasionally for a longer period of time or permanently. See “parathyroid autografting” section for more information.

What happens after surgery?

Most patients will have a small drain (tube) placed near the incision to collect fluid that drains after thyroid surgery. This drain is often removed before the patient leaves the hospital, but sometimes it is removed during a follow-up visit. Patients will often return to the hospital for a checkup one to two weeks after surgery.

The incision will fade as it heals. However, exposure to the sun will make the scar more visible, so it is important to cover the scar with sunscreen when outdoors.

Patients with certain types of thyroid cancer (papillary, follicular, or Hürthle cell carcinoma) usually have a radioactive iodine scan, four to six weeks after surgery to search for metastatic disease or remaining thyroid tissue left in the neck. If metastatic disease or remaining thyroid tissue is present, treatment with radioactive iodine is usually recommended to destroy these cells. See the “radioiodine therapy” section for more information.

MTC and anaplastic thyroid cancer do not usually respond to radioiodine therapy. Patients with either of these cancer types and certain patients with other thyroid cancers may be candidates for *radiation therapy* or *chemotherapy* in certain situations.

Follow-up care is very important for patients with thyroid cancer. Patients will discuss with their doctors the best schedule for regular checkups. Checkups include physical examination, X-rays, other radiologic tests (e.g., ultrasound of the neck). Periodic blood tests will be done to measure thyroglobulin levels and ensure proper suppression of TSH levels in patients with papillary, follicular, or Hürthle cell cancers. Similarly, blood tests will be done to check the levels of calcitonin for signs of cancer recurrence in patients with MTC.

What is radioiodine therapy?

Radioiodine therapy is also called thyroid ablation or thyroid cancer treatment. This treatment uses radioactive iodine (¹³¹Iodine) to destroy any metastatic disease leftover microscopic thyroid cancer cells, and any normal thyroid tissue that might remain after surgery. Destroying these cells makes it easier for doctors to follow patients for signs of thyroid cancer recurrence. Radioiodine therapy is used in most patients with papillary, follicular, and Hürthle cell cancers.

The thyroid gland absorbs the iodine contained in foods that we eat. The thyroid gland then uses the iodine to produce thyroid hormones. After the thyroid is surgically removed, thyroid tissue or thyroid cancer cells that remain in the body can still collect iodine, including therapeutic radioactive iodine. The iodine that is not absorbed by normal or cancerous thyroid cells is carried out of the body along with saliva, perspiration, stool, and urine.

Patients may be instructed by their doctor to stop taking thyroid hormone medication approximately two to four weeks before their thyroid scan. Two weeks before the thyroid scan, patients are also advised to limit their daily intake of foods and medicines that contain iodine (e.g., fish, seafood, iodized table salt, certain vitamin and mineral supplements, and cough medication). A whole body thyroid scan is often done first with a small dose of radioactive iodine to measure the amount of remaining normal or cancerous thyroid cells in the neck or the spread of cancerous cells to other organs in the body. This scan also helps the doctor determine the proper treatment dose of ¹³¹Iodine that the patient might need.

Patients who need radioiodine therapy are either admitted to the hospital for treatment or treated within the Department of Nuclear Medicine as an outpatient. The therapeutic dose of iodine is a liquid that the patient will drink. If admitted to the hospital, the patient will ingest the dose of ¹³¹Iodine and must remain isolated in a private room with limited exposure to other people until the patient's radiation level is at a safe, low level (usually 24 hours later). Patients who receive ¹³¹Iodine treatment as an outpatient will be monitored for a minimum of two hours in the Department of Nuclear Medicine.

Although the ¹³¹Iodine treatment is intended to be beneficial, it does use a radioactive substance, so patients must follow some precautions to protect themselves and others. Women must have a negative pregnancy test prior to this treatment (unless they have had a hysterectomy or tubal ligation, also referred to as having your tubes tied), and they should avoid pregnancy for one year following treatment. Women who are breastfeeding will need to stop because ¹³¹Iodine will be secreted in breast milk and can damage the thyroid gland in the baby. Special instructions for proper care of personal hygiene and resuming replacement thyroid hormone medication will also be discussed.

Will my voice or ability to swallow be affected by surgery or thyroid therapy?

Although it is rare, a malignant thyroid tumor may sometimes involve the vocal cords, which control the voice and critical nerves in the neck called "recurrent laryngeal nerves," which control the ability to speak and swallow (*Figure 1*). Surgery to remove thyroid cancer and/or postoperative treatment may cause paralysis of the vocal cord(s) or require removal of the recurrent laryngeal nerve(s). Fortunately, new approaches in speech therapy and surgery can improve voice and swallowing in these patients, thereby allowing most patients to significantly improve voice and swallowing function. Some of these procedures include medialization of paralyzed vocal cords, vocal cord injections, speech and swallowing interventions and rehabilitation.

If a patient experiences any hoarseness of the voice or difficulty swallowing after surgery, the surgeon will refer him/her to our team of expert speech pathologists who will evaluate and design specific treatment plans to help correct the problems. The speech pathologist will work closely with the patient to rehabilitate and restore functioning. Treatment is usually short-term and is coordinated with other patient appointments for convenience.

Can I live without my thyroid gland?

Yes. Patients who have had their entire thyroid gland removed can live long and completely normal lives. It is only necessary to take one thyroid hormone pill each day and have occasional blood tests to check the level of thyroid hormone.

Where can I get additional support?

Thyroid Cancer Survivors' Association, Inc. has additional information on thyroid cancer and resources for patient and family support. For more information, visit <http://thyca.org> or call (877) 588-7904.

In addition, clinical genetic counseling services are available at our institution to patients at risk for hereditary forms of thyroid cancer.

Glossary

Biopsy

A biopsy is the removal and study of a small sample of tissue, cells, or fluid under the microscope.

Calcitonin

Calcitonin is a hormone produced by the parafollicular cells (C-cells) of the thyroid gland. Patients with medullary thyroid cancer (MTC) have too much of this hormone in their blood. Calcitonin is called a "marker" for MTC; when measured, it can be used to detect even a very small number of cancer cells.

CT (Computerized Tomography) Scan

A CT scan is a method that uses X-rays and computers to show internal organs in detail. It can show the complete shape and inside of the organs.

Chemotherapy

Chemotherapy is the introduction of chemicals into the bloodstream that can stop or slow the growth of cancer cells. It is often used with other treatments (radiation therapy or surgery). It is usually given into a vein (intravenously). The duration and specific medications used in chemotherapy depend on the type and stage of cancer, the patient's condition and other treatments the patient may be getting.

Chemotherapy affects fast-growing cells and is targeted toward the cancer cells, but it can also destroy some normal cells, such as hair and bone marrow cells. Therefore, side effects from some types of chemotherapy include hair loss, weakened immune system, mouth sores, nausea and vomiting. Chemotherapy is typically not given for treatment of papillary, follicular, or Hürthle cell cancer, except in very rare cases. On the other hand, chemotherapy is frequently used in the management of anaplastic thyroid cancer and in some cases of medullary thyroid cancer.

Fine-needle Aspiration (FNA)

FNA is a procedure using a needle and syringe to obtain a sample of cells, fluid, or tissue. The needle is passed through the skin, and a small sample is collected in the syringe. Ultrasound is often used to help guide the needle into a small thyroid tumor or suspicious lymph node.

General Anesthesia

Anesthesia means “without feeling” and refers to the use of drugs that block pain during surgery. All patients who have surgery receive some type of anesthesia. The drugs used in anesthesia are called anesthetics; they work by blocking pain messages that go to the nervous system. General anesthesia affects the entire body and puts patients to sleep. It is given before surgery so that the patient’s muscles relax and the body loses all feeling and sense of movement. The patient’s heartbeat, breathing, and other body functions are carefully watched during general anesthesia. As general anesthesia wears off after surgery, the patient slowly wakes up.

Magnetic Resonance Imaging (MRI)

A procedure in which magnetic fields are used to create detailed pictures of areas inside the body.

Metastasize

This is the spread of cancer from the first (primary) tumor to a second cancer site or multiple cancer sites. Cancer cells usually spread through the bloodstream or lymphatic system away from the original site of cancer.

Radiation Therapy

This treatment uses radiation to kill cancer cells and keeps them from growing and spreading. This treatment delivers radiation from an external source, usually as a beam, which passes through the skin to reach the original location of the tumor. This treatment differs from radioiodine therapy, in which a liquid dose of radiation is given by mouth. General side effects may include fatigue, skin changes, and loss of appetite. Other side effects may occur depending on the location on the body where radiation is given.

Thyroglobulin (Tg)

This is a protein that is only made by the follicular cells of the thyroid gland (either normal follicular cells or cancerous cells). Once the thyroid gland is surgically removed and any remaining thyroid tissue is destroyed by radioiodine therapy, the Tg level in the bloodstream should be undetectable. Tg is used as a “marker” (blood test) to check patients for the recurrence of certain types of thyroid cancer (papillary, follicular, or Hürthle cell carcinoma).

Patients with these types of thyroid cancer have blood tests periodically to detect any changes in Tg levels over time (six months or yearly intervals). However, approximately 15 to 20 percent of patients with thyroid cancer have antibodies to Tg circulating in the bloodstream. These antibodies can interfere with the measurement of Tg, which affects the reliability Tg to be used as a marker to check for tumor recurrence.

Thyroid Scan

A thyroid scan is a scan in which a radioactive substance (such as iodine or technetium) is ingested by mouth or injected into a vein and collects in the thyroid gland or residual thyroid tissues. The radioactivity is measured using a special detector and then converted by a computer into a picture.

Ultrasound

This is also called a “sonogram.” This is a test that uses sound waves to create a picture of internal organs. The scanner has a device called a transducer that sends out sound waves and receives the echoes as they bounce off structures within the body. These echoes create electronic pictures on a small television screen.