



loving life

YOUR GUIDE TO YOUR THYROID



Singapore
General Hospital

SingHealth

one
THE THYROID

two
HYPOTHYROIDISM

three
HYPERTHYROIDISM

four
TREATING HYPERTHYROIDISM

five
THYROID NODULES
AND GOITRES

one THE THYROID

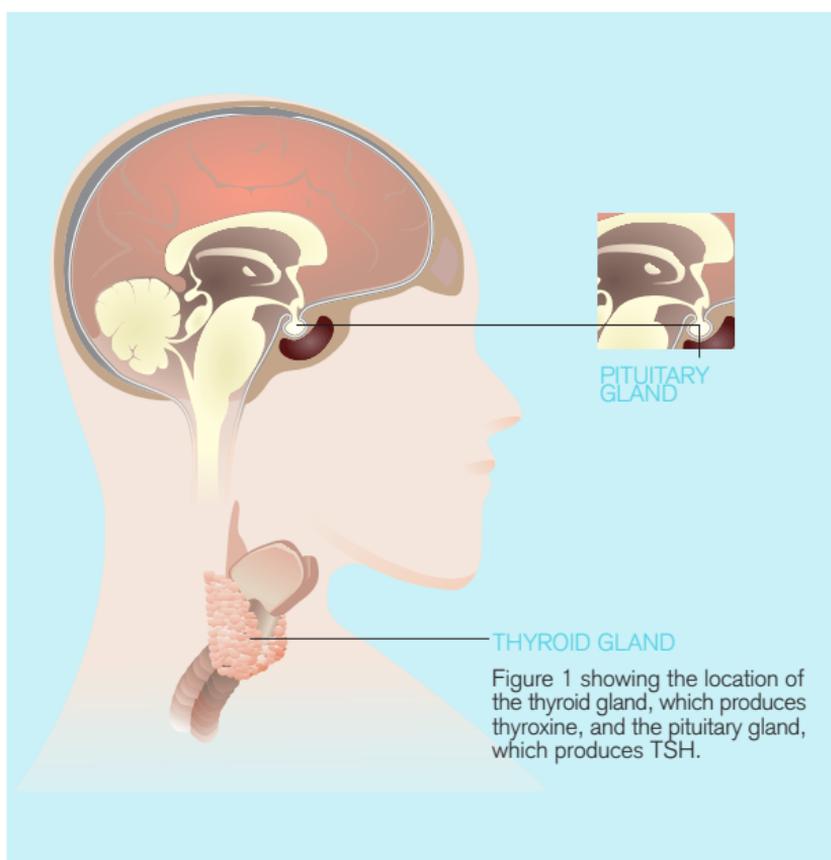
What is the thyroid?

The thyroid is a small gland shaped like a butterfly that sits in the lower part of your neck in front of your windpipe. The function of the gland is to produce hormones. The main hormones released by the gland is thyroxine (T4) and tri-iodothyronine (T3). The normal action of thyroid hormones is to keep all bodily functions occurring at a correct rate. It therefore has actions on the heart rate, bowel activity, skin, muscle and other organs. The production of T4 is controlled by another hormone known as thyroid stimulating hormone (TSH), which is produced by the pituitary gland, a control centre in the brain (see Figure 1).

What are the common problems encountered with the thyroid gland?

Problems with the thyroid gland are either caused by abnormal function (overactivity or underactivity) or abnormal growth of the gland. Thyroid overactivity is known as hyperthyroidism, while thyroid underactivity is known as hypothyroidism. Abnormal growth of the gland may be in the form of a localized swelling, or multiple swellings within the thyroid.

FIG. 1



two HYPOTHYROIDISM

What is hypothyroidism?

Hypothyroidism refers to underactivity of the thyroid gland. In this condition, the thyroid gland produces less thyroid hormone than normal. This may cause a “slowing down” of many bodily functions. Hypothyroidism is usually permanent, although it may sometimes be temporary.

Why does it occur?

Hypothyroidism most often occurs due to the failure of the thyroid gland to produce enough thyroid hormone. The main causes include:

- a. Hashimoto's disease. This is the most common cause of hypothyroidism. It is an “autoimmune”, or “self-attacking-self” disease. This means that proteins (antibodies) produced by our own white blood cells target the thyroid gland, and gradually destroy its ability to produce thyroid hormone. Over time, the thyroid gland fails, causing hypothyroidism.
- b. Radioactive iodine treatment. Hypothyroidism often develops as a desired treatment goal after the use of radioactive iodine treatment for high thyroid hormone production (hyperthyroidism).
- c. Thyroid operation. Previous thyroid surgery can cause hypothyroidism, especially if most of the thyroid gland has been removed.
- d. Medication. Some medication including amiodarone and lithium can cause hypothyroidism.
- e. Subacute thyroiditis. This causes a painful inflammation of the thyroid. After a period of overactivity (hyperthyroidism), hypothyroidism may occur.
- f. Congenital hypothyroidism. A baby may be born with an insufficient amount of thyroid tissue or a problem that does not allow normal thyroid hormone production.

Rarely, hypothyroidism can also be caused by problems in the pituitary gland, not the thyroid.

How do I know if I have hypothyroidism?

Some symptoms and physical signs associated with hypothyroidism include feeling constantly tired, having dry skin, hair loss, constipation, leg cramps and weight gain. In women, menstrual periods may become heavier. However, many of these symptoms are not very specific and may be experienced by otherwise normal individuals. The best way to diagnose hypothyroidism is by performing a blood test which measures both your T4 and TSH levels. In hypothyroidism, your T4 level would be low, while your TSH level would be high.

How is hypothyroidism treated?

It is treated with thyroxine replacement. This is given as a small pill daily, has very few side effects and almost no allergic reactions. Once the dose of thyroxine that you require has been established, it is usually stable for life (except during pregnancy) and blood tests may only need to be repeated once a year. The correct dose is determined from blood tests including both T4 and TSH levels.



do you know?

Thyroid hormone replacement therapy

- Is completely safe
- Is not the same as post-menopausal hormone replacement therapy
- Should be taken separately from calcium- or iron-containing foods and medication



three

HYPERTHYROIDISM

What is hyperthyroidism?

Hyperthyroidism refers to overactivity of the thyroid gland. It is also known as “thyrotoxicosis”. In this condition, the thyroid gland produces too much thyroid hormone. This may cause a “speeding up” of many bodily functions.

Why does it occur?

- Graves' disease. This is the most common cause of hyperthyroidism. It is an “autoimmune”, or “self-attacking-self” disease. This means that proteins (antibodies) produced by our own white blood cells overstimulate the thyroid gland to produce too much thyroid hormone. The antibody which causes this is called TSH receptor antibody, or TRAb (Figure 2). In some patients, TRAb may also cause swelling of the muscles and other tissues around the eyes, causing the eyes to appear more prominent.
- Toxic multinodular goiter. Multiple nodules can develop in the thyroid gland, especially as we age. Some of these nodules may produce excessive thyroid hormone, causing hyperthyroidism.
- Toxic nodule. A single thyroid nodule may also produce excessive thyroid hormone and hyperthyroidism.
- Excessive iodine ingestion . Some sources of high iodine concentrations eg drugs like amiodarone may sometimes cause hyperthyroidism in certain patients.

FIG. 2

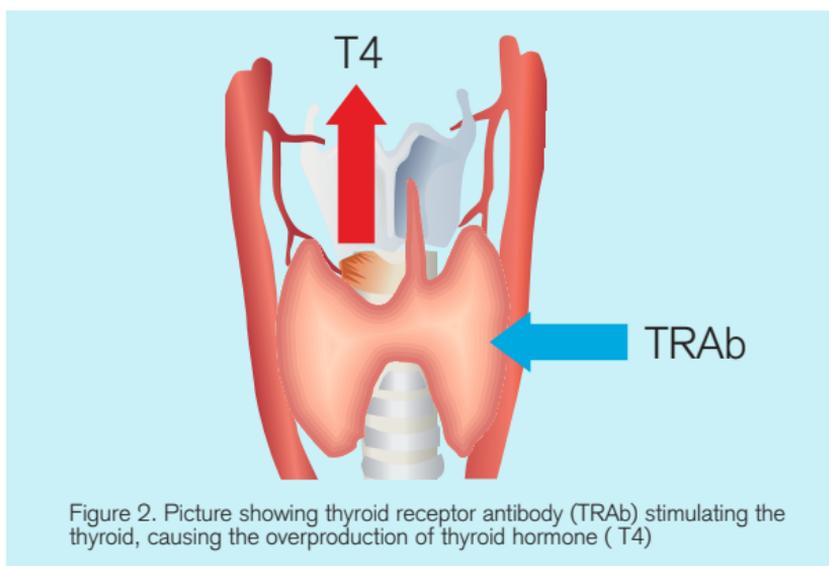


Figure 2. Picture showing thyroid receptor antibody (TRAb) stimulating the thyroid, causing the overproduction of thyroid hormone (T4)



How do I know if I have hyperthyroidism?

Some symptoms and physical signs associated with hyperthyroidism include anxiety and nervousness, trembling hands, weight loss, constantly feeling warm, frequent bowel movements and a fast heart rate. In women, menstrual periods may become irregular. In patients with Graves' disease, their eyes may become more prominent. Hyperthyroidism is confirmed by performing a blood test which measures both your T4 and TSH levels. In hyperthyroidism, your T4 level would be high, and the TSH level would be very low.

do you know?

- Graves' disease is named after a doctor called Robert Graves, and does not mean that your condition is grave or very serious
- Graves' disease affects women five times more commonly than men
- Hyperthyroidism can run in families.



four

TREATING HYPERTHYROIDISM

How is hyperthyroidism treated?

Hyperthyroidism is treated in three main ways; with medication, radioactive iodine therapy (RAI) and surgery. All three forms of treatment are able to decrease thyroid hormone production by the thyroid gland.

What types of medication are used to treat hyperthyroidism, and how do they work?

The two most common types of medication used are called beta-blockers and anti-thyroid drugs. Beta-blockers (eg propranolol, atenolol) block the effect of thyroid hormone on other parts of your body, so they quickly improve many of the symptoms caused by hyperthyroidism. However, they do not have an effect on the amount of thyroid hormone being produced and do not cure hyperthyroidism.

Anti-thyroid drugs act directly on the thyroid gland to decrease thyroid hormone production. The commonly used drugs include carbimazole, thiamazole and propylthiouracil (PTU). When taken daily, these medications are very effective at controlling hyperthyroidism within a few weeks.



What side effects of medication should I look out for?

Beta-blockers should be avoided if you have asthma.

Anti-thyroid drugs can have side effects such as rash, itching or joint pains but these are uncommon. Very rarely, patients taking these medications may develop a low white blood cell count, making them prone to serious infection. The main problem with anti-thyroid drugs is that the hyperthyroidism often comes back after they are stopped. This is why many patients with hyperthyroidism are advised to consider more permanent treatment for their condition.

What is radioactive iodine treatment (RAI)?

RAI is the most widely recommended permanent treatment of hyperthyroidism. It is based on the fact that only thyroid cells take up iodine in our body. A small dose of radioactive iodine is given which is absorbed by the thyroid cells. The radioactivity destroys the thyroid cells slowly over time. This medication is naturally removed from your body after a few days, but it takes about 2-3 months to achieve its full effect. Most patients only require one dose of RAI, although occasionally more than one dose may be required to completely treat the hyperthyroidism. RAI is not suitable for pregnant women and very young children.

How is RAI given?

RAI is given as a few sips of colourless liquid with no smell or taste. It is taken by mouth with no need for hospitalization.

What are the side effects of RAI?

Since iodine is not taken up significantly by other cells, there are very few side effects on the rest of the body. The only common side effect of radioactive iodine treatment is underactivity of the thyroid gland, or hypothyroidism. This happens because too many thyroid cells are destroyed so that the remaining gland does not produce enough hormone. Hypothyroidism can be easily diagnosed and treated with thyroid hormone replacement. This fully replaces the deficiency, and when given in the correct dose, can be taken safely for the rest of the patient's life without side effects or complications.

Sometimes, if you have Graves' disease and your eyes are seriously affected by the disease, RAI may cause a worsening of your eyes. In these cases, your physician may give you a form of medication called steroids to take after the RAI to protect you from worsening eye disease. Some physicians may discuss alternative treatment and avoid RAI completely.

I've just taken RAI, is there anything special I should do over the next few days?

Although the amount of radioactivity used to treat hyperthyroidism is extremely small, most physicians will still advise you to avoid close contact with pregnant women or young children for a few days. This would mean maintaining at least a 1 m distance and not sharing food or utensils. Remember to maintain good general hygiene by washing your hands frequently, and flush after using the bathroom. All these precautions are only necessary for a few days since the radioactivity disappears very quickly.

My hormone levels are now controlled on anti-thyroid medication. Why is my doctor recommending RAI?

Although anti-thyroid medication is very effective at controlling your thyroid hormone levels, more than 50% of all patients with hyperthyroidism recur once medication is stopped. If hyperthyroidism has already recurred before, then the chance of another recurrence may be more than 90%. This is because TSH receptor antibodies (TRAb) tend to persist in your blood stream, and continuously stimulate the thyroid gland to be hyperactive. Long term poorly controlled hyperthyroidism can cause serious damage to the heart and bones.

Most patients will become hypothyroid after RAI. However, this is easily and safely treated with thyroid hormone replacement. Once the appropriate dose of thyroid hormone is chosen, most patients with hypothyroidism feel completely normal, and only need to be seen once or twice a year. This is usually preferable to the frequent follow ups and side effects of uncontrolled hyperthyroidism.



When should I go for surgery?

Thyroid surgery involves removing most of the thyroid gland. This is an effective treatment for hyperthyroidism, and is particularly recommended if the goiter is very big and cosmetically unattractive to you. It is also used if there is a concern about cancer in the thyroid, and in certain women considering pregnancy who do not want to be on anti-thyroid medication. Your thyroid hormone levels need to be normalized with anti-thyroid drugs first before this operation can be done.

What are the side effects of surgery?

There is a risk of hypothyroidism if too much thyroid tissue is removed, while a small number of patients may remain hyperthyroid if insufficient tissue is removed. There will also be a scar on your neck, but this usually becomes pale and unnoticeable after a while. Rarely, the parathyroid glands, which lie very close to the thyroid and control calcium levels in the blood, may be damaged. In this case, long term treatment with calcium and vitamin D tablets may be necessary. Uncommonly, the nerves supplying the voice box may be damaged during surgery, resulting in a hoarse voice.

do you know?

- Radioactive iodine therapy for hyperthyroidism has been used for more than 50 years
- Former US president George Bush and his wife both had radioactive iodine therapy for Graves' disease
- There is no evidence that it causes cancer of the thyroid gland or other parts of the body
- It does not affect a woman's chances of becoming pregnant or delivering a healthy baby in the future

five

THYROID NODULES AND GOITRES



What is the difference between a thyroid nodule and a multinodular goitre?

A thyroid nodule is a localized “swelling” within the thyroid gland. Sometimes this occurs as a single swelling in an otherwise normal gland. If multiple nodules are found within the same thyroid gland, it is known as a multinodular goitre.

What causes thyroid nodules?

Most are either simple “overgrowths” of normal thyroid tissue, fluid-containing cysts or slowly growing benign tumours called adenomas. A small percentage of these nodules can be cancerous. The risk of thyroid cancer is higher if you had a history of radiation to the head and neck for other medical conditions, or if you have a family history of thyroid cancer.

What causes multinodular goitres?

The most common cause of multinodular goitres is iodine deficiency. However, it may still develop in some individuals who have enough iodine. In these people, the cause is not well understood.

How do I know if I have a thyroid nodule?

Most thyroid nodules do not cause symptoms. Thus, most people may only realize they have a thyroid nodule when it is large enough to be noticed in the mirror, or found by chance during a physical examination, or incidentally picked up on investigations like ultrasounds, CT scans or PET scans.

Sometimes, bleeding into a thyroid cyst or nodule may cause a sudden painful swelling in the neck. Occasionally, advanced thyroid cancer may cause a hoarse voice or difficulty swallowing.

How do I know if I have a benign or cancerous thyroid nodule?

It is usually not possible to tell if a thyroid nodule is cancerous or benign based on the physical examination or blood tests. The two specialized tests which help us make this differentiation are an ultrasound of the thyroid, and a fine needle aspiration and biopsy (FNAB).

What is a fine needle aspiration and biopsy (FNAB)?

This is a simple procedure that can be performed in the doctor's office. A tiny needle is introduced into the thyroid nodule to obtain cells which are then analysed in the laboratory. Most doctors take a few samples from the same nodule to increase its accuracy. The actual procedure generally only takes a few minutes, and you can usually return home or to work with no ill effects.

What are the possible results of a fine needle aspiration and biopsy?

The results may fall into three main categories; benign (non-cancerous), malignant (cancerous), or indeterminate. More than 80% of all FNAs will be benign. Benign nodules can be left alone but should still be monitored for changes in size. Malignant nodules should be removed by surgery. Indeterminate FNAs refer to those that are neither clearly benign nor malignant, and no definite conclusion could be drawn from the FNA. Most of these nodules will still be benign, although your doctor will discuss its management with you.

Occasionally, not enough cells may have been extracted to make a conclusive diagnosis. This is usually due to the nature of the thyroid nodule. In these cases, the FNA may need to be repeated.

How are thyroid nodules treated?

Most patients with benign thyroid nodules do not require any specific treatment, and are usually followed up once or twice a year for changes in size. If cancer is suspected, surgery would be recommended.

do you know?

- 50% of those above the age of 60 may have a thyroid nodule
- 80-90% of all thyroid nodules are benign (non-cancerous)

The Department of Endocrinology at Singapore General Hospital

The Department of Endocrinology at Singapore General Hospital is a tertiary referral center for patients with thyroid problems. Our clinics are staffed by highly trained specialists who have extensive experience in managing all types of thyroid disorders. We also offer state-of-the-art ultrasound guided fine needle aspirations of thyroid nodules. We provide comprehensive and holistic care for our patients by working in close collaboration with surgical doctors, ENT (ear, nose, throat) doctors and nuclear medicine physicians.

Our services include:

- Diagnostic testing including thyroid scans, thyroid antibody testing and hormonal profiles
- Physical examination and treatment recommendations by our physicians
- Management of hyperthyroidism and hypothyroidism
- Management of thyroid nodules and thyroid cancer
- Treatment of thyroid disease in pregnancy
- Ultrasound-guided fine needle aspirations of thyroid nodules
- Referrals to nuclear medicine physicians for radioactive iodine therapy
- Referrals to surgical and ENT doctors for thyroid surgery

My name is:

My doctor is:

The Department of Endocrinology at Singapore General Hospital

Location

Clinic B Block 3, Singapore General Hospital

Appointments

For medical appointments and enquiries, please call 6321 4377.

Alternatively, your family or polyclinic physician can provide you with a referral to any of our Endocrine Clinics as well as assistance in arranging the appointment.



Singapore
General Hospital

SingHealth