Causes, Symptoms and Prevention of Thyroid Diseases

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1. Introduction

Thyroid disease is a medical condition that affects the function of the thyroid gland (the endocrine organ found at the front of the neck that produces thyroid hormones). The symptoms of thyroid disease vary depending on the type. There are four general types: (1) **hypothyroidism** (low function) caused by not having enough thyroid hormones, (2) **hyperthyroidism** (high function) caused by having too much thyroid hormones, (3) **structural abnormalities**, most commonly an enlargement of the thyroid gland, **tumors** which can be benign or cancerous, and (4) **abnormal thyroid function tests** without any clinical symptoms. Common hypothyroid symptoms include fatigue, low energy, weight gain, inability to tolerate the cold, slow heart rate, dry skin and constipation. Common hyperthyroid symptoms include irritability, weight loss, fast heartbeat, heat intolerance, diarrhea, and enlargement of the thyroid. In both hypothyroidism and hyperthyroidism, there may be swelling of a part of the neck, which is also known as **goiter.**

Hypothyroidism affects 3-10% percent of adults, with a higher incidence in women and the elderly. An estimated one-third of the world's population currently lives in areas of low dietary iodine levels, making iodine-deficiency the most common cause of hypothyroidism and **endemic goiter**. In regions of severe iodine deficiency, the prevalence of goiter is as high as 80%. In areas where iodine-deficiency is not found, the most common type of hypothyroidism is an autoimmune subtype called **Hashimoto's thyroiditis**, with a prevalence of 1-2%. As for hyperthyroidism, **Graves' disease**, another autoimmune condition, is the most common type with a prevalence of 0.5% in males and 3% in females. Although thyroid nodules are common, thyroid cancer is rare. Thyroid cancer accounts for less than 1% of all cancer in the UK, though it is the most common endocrine tumor and makes up greater than 90% of all cancers of the **endocrine glands.**

2. Thyroid gland

2.1. Anatomy of Thyroid gland. The thyroid gland is located in the lower part of the neck, below the Adam's apple, wrapped around the trachea (windpipe). It has the shape of a butterfly: two wings (lobes) attached to one another by a middle part called the isthmus. Typically four parathyroid glands are found, two each at the back of thyroid lobe.

2.2. Functions Thyroid Gland. The thyroid uses iodine, a mineral found in some foods and in iodized salt, to make its hormones. The two most important thyroid hormones are thyroxine (T4) and triiodothyronine (T3). Thyroid stimulating hormone (TSH), which is produced by the pituitary gland, acts to stimulate hormone production by the thyroid gland. The thyroid gland also makes the hormone calcitonin, which is involved in calcium metabolism and stimulating bone cells to add calcium to bone.

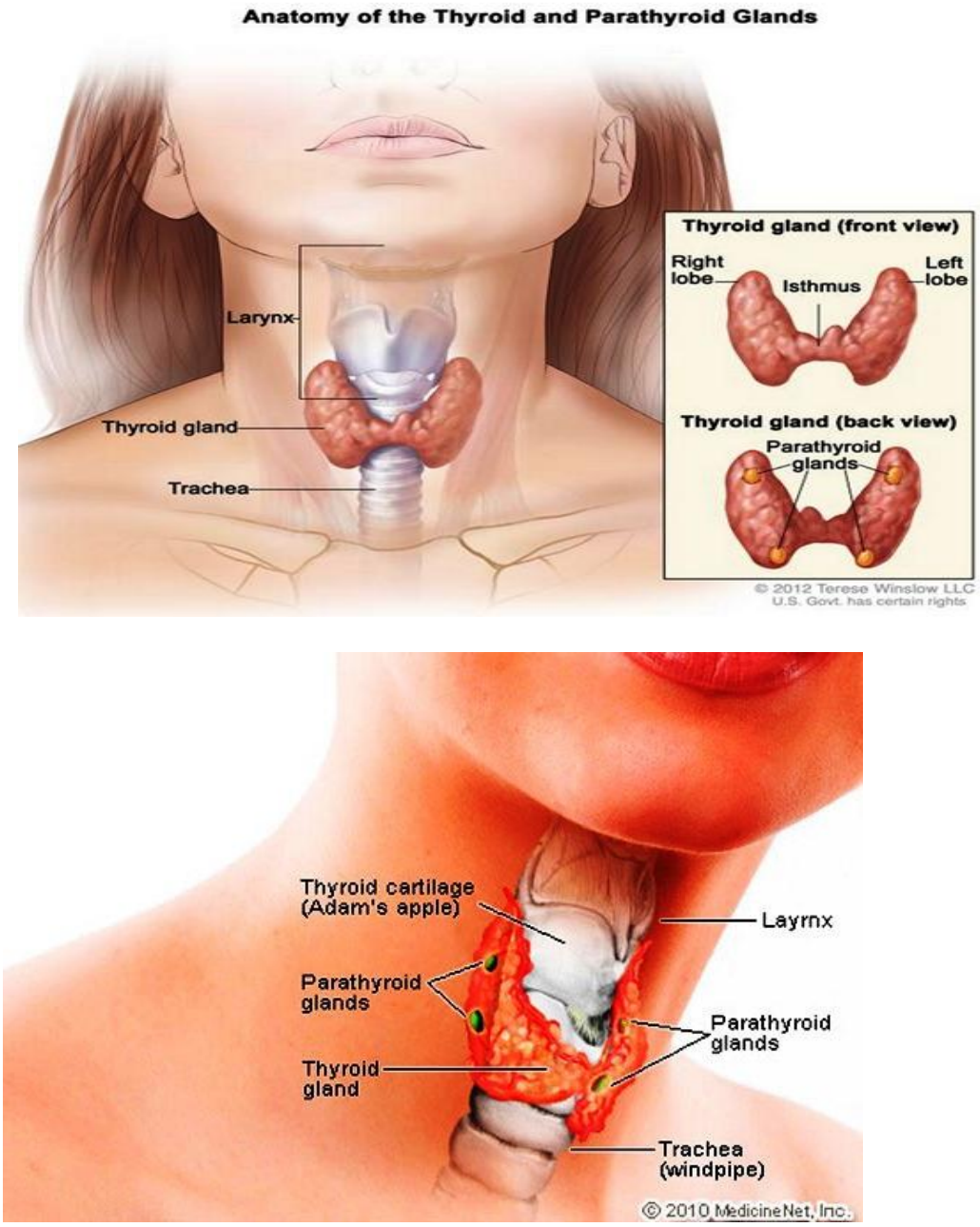

Figure 1. Anatomy of Thyroid Gland

Thyroid gland that makes and stores hormones that help regulate the heart rate, blood pressure, body temperature, and the rate at which food is converted into energy. Thyroid hormones are essential for the function of every cell in the body. They help regulate growth and the rate of chemical

It is important that T3 and T4 levels are neither too high nor too low. Two glands in the brain—the hypothalamus and the pituitary communicate to maintain T3 and T4 balance.The hypothalamus produces TSH Releasing Hormone (TRH) that signals the pituitary to tell the

thyroid gland to produce more or less of T3 and T4 by either increasing or decreasing the release of a hormone called thyroid stimulating hormone (TSH). When T3 and T4 levels are low in the blood, the pituitary gland releases more TSH to tell the thyroid gland to produce more thyroid hormones. If T3 and T4 levels are high, the pituitary gland releases less TSH to the thyroid gland to slow production of these hormones.

T3 and T4 travel in your bloodstream to reach almost every cell in the body. The hormones regulate the speed with which the cells/metabolism work. For example, T3 and T4 regulate your heart rate and how fast your intestines process food. So if T3 and T4 levels are low, your heart rate may be slower than normal, and you may have constipation/weight gain. If T3 and T4 levels are high, you may have a rapid heart rate and diarrhea/weight loss.

3. Thyroid Diseases

Thyroid diseases sometimes result from inappropriate TSH levels, or may be caused by problems in the thyroid gland itself.

3.1. Goiters. A thyroid goiter is a dramatic enlargement of the thyroid gland. Goiters are often removed because of cosmetic reasons or, more commonly, because they compress other vital structures of the neck including the trachea and the esophagus making breathing and swallowing difficult. Sometimes goiters will actually grow into the chest where they can cause trouble as well. Several nice x-rays will help explain all types of thyroid goiter problems.

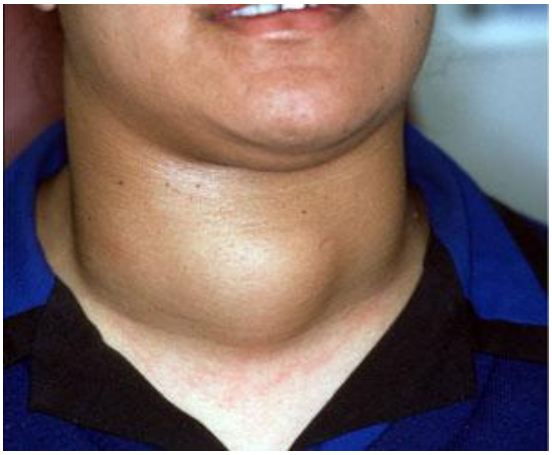

Figure 3. Goiter (Enlarged Thyroid Gland)

3.1.1. Hashimoto's disease. A goiter can also result from an underactive thyroid (hypothyroidism). Hashimoto's disease damages your thyroid so that it produces too little hormone. Sensing a low hormone level, your pituitary gland produces more TSH to stimulate the thyroid, which then causes the gland to enlarge. Surgical removal and certain medications (e.g., amiodarone, lithium) can also cause hypothyroidism.

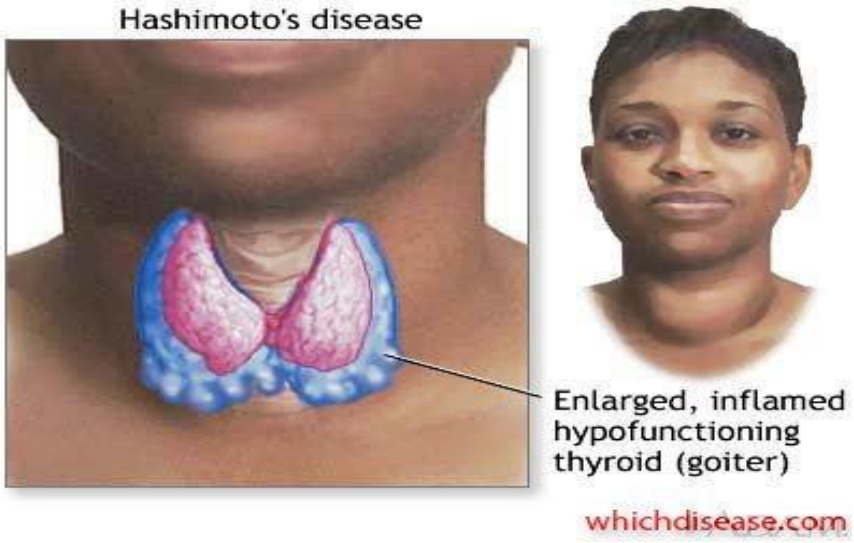

Figure 4. Hashimoto's disease

3.1.2. Graves' disease. A goiter can sometimes occur when your thyroid gland produces too much thyroid hormone (hyperthyroidism). In Graves' disease, antibodies produced by your immune system mistakenly attack your thyroid gland, causing it to produce excess thyroxine. This overstimulation causes the thyroid to swell.

3.1.3. Multinodular goiter. In this condition, several solid or fluid-filled lumps called nodules develop in both sides of your thyroid, resulting in overall enlargement of the gland. Less than 5 percent of thyroid nodules are cancerous.

Figure 5. Multinodular goiter

3.1.4. Solitary thyroid nodule. In this case, a single nodule develops in one part of your thyroid gland. There are several characteristics of nodules of the thyroid which make them suspicious for malignancy. Although as many as 50% of the population will have a nodule somewhere in their thyroid, the overwhelming majority of these are benign. Occasionally, thyroid nodules can take on characteristics of malignancy and require either a needle biopsy or surgical excision.

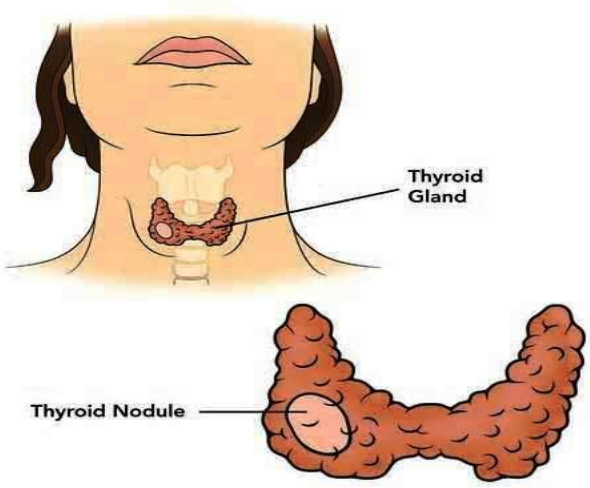

Figure 6. Solitary thyroid nodule

3.2. Thyroiditis. Another possible cause of hyperthyroidism is a condition called **thyroiditis.** This condition occurs when the thyroid gland becomes inflamed. Depending on the type of thyroiditis, this may lead to temporary hyperthyroidism that might be followed by hypothyroidism.

3.3. Thyroid cancers. Thyroid cancer is a disease in which malignant (cancer) cells form in the tissues of the thyroid gland. Most thyroid nodules are not cancer. There are four types of thyroid cancers**: papillary, follicular, anaplastic, and medullary cancer**. Medullary thyroid cancer is sometimes caused by a change in a gene that is passed from parent to child.

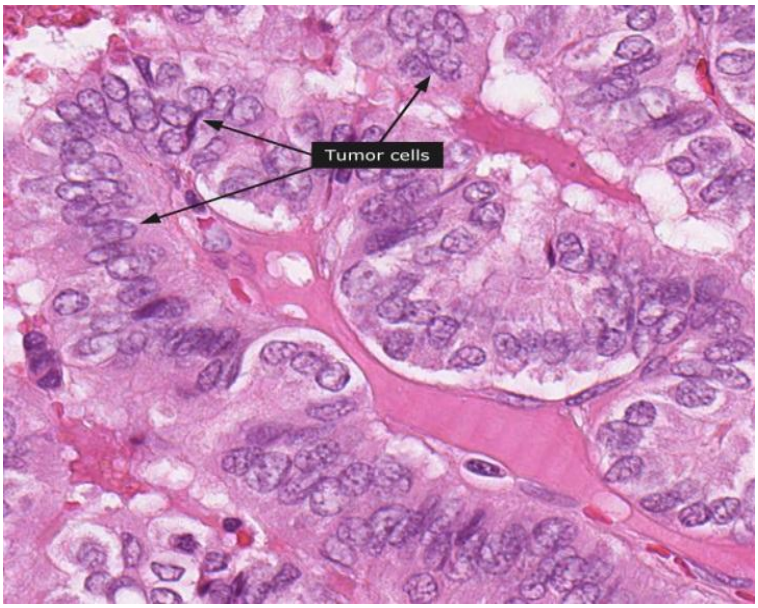

Figure 7. Cancer (Tumor) cells in Thyroid gland

4. Symptoms and causes of Thyroid diseases

4.1. Symptoms and causes of Goiter (Enlarged thyroid)

Symptoms. The symptoms of a **goiter** include:

- Swelling at the front side of the base of the neck, ranging from a small lump to a general enlargement.
- If you have **hyperthyroidism** (an overactive thyroid gland), symptoms may also include weight loss despite an increased appetite, an increased heart rate, elevated blood pressure, nervousness, diarrhea, muscle weakness, and hand tremors.
- If you have **hypothyroidism** (an underactive thyroid gland), your symptoms may include lethargy, slowed physical and mental functions, depression, a lower heart rate, an intolerance to cold, constipation, easy weight gain, and tingling or numbness in your hands.

Thyroid conditions, in general, frequently cause symptoms in the neck area where your thyroid is located. Some of the symptoms that can point to hypothyroidism, Hashimoto's disease, hyperthyroidism, Graves' disease, various types of thyroiditis, and thyroid cancer include:

- An enlarged neck
- Palpable enlargement in the thyroid gland itself (goiter)
- A visible or palpable lump or lumps in your neck
- Feeling of a lump in your throat when swallowing
- A sore throat
- Pain or tenderness in the neck
- Your neck or throat feels sensitive, and ties, scarves, or turtlenecks don't feel comfortable
- Evidence of increased blood flow to the thyroid, detected by stethoscope

Causes

Goiters can occur when the thyroid gland produces either too much thyroid hormone **(hyperthyroidism)** or not enough (hypothyroidism). Much more rarely, the problem may arise when the pituitary gland stimulates thyroid growth to boost production of the hormone. Enlargement could also occur with normal production of thyroid hormone, such as a nontoxic multinodular gland.

Another type of thyroid growth, called a sporadic goiter, can form if your **diet** includes too many goiter-promoting foods, such as soybeans, rutabagas, cabbage, peaches, peanuts, and spinach. Keep in mind you would have to eat huge amounts of these foods to cause a goiter. These foods can suppress the manufacture of thyroid hormone by interfering with your thyroid's ability to process iodide. Historically, the most common cause used to be a lack of iodide in the diet, however in the 1920s iodized salt was introduced in the U.S. now making this a rare cause of goiters. Iodine is added to other foods as well.

Goiters can affect anyone. They may be present at birth and occur at any time throughout life. Some common risk factors for goiters include:

- **A lack of dietary iodine.** People living in areas where iodine is in short supply and who don't have access to iodine supplements are at high risk of goiters.
- **Being female.** Because women are more prone to thyroid disorders, they're also more likely to develop goiters.
- **Age.** Goiters are more common after age 40.
- **Medical history**. A personal or family history of autoimmune disease increases your risk.
- **Pregnancy and menopause.** For reasons that aren't entirely clear, thyroid problems are more likely to occur during pregnancy and menopause.
- **Certain medications.** Some medical treatments, including the heart drug amiodarone (Cordarone, Pacerone, others) and the psychiatric drug lithium (Lithobid, others), increase your risk.
- **Radiation exposure.** Your risk increases if you've had radiation treatments to your neck or chest area or you've been exposed to radiation in a nuclear facility, test or accident.

4.1.1. Hashimoto's Disease (Hypothyroidism)

Clinical Signs

There are some observable clinical signs of **hypothyroidism** that can be measured, detected, or identified in a clinical examination or testing with your practitioner. These clinical hypothyroidism signs include:

- An unusually low pulse
- Unusually low blood pressure
- Lower-than-normal body temperature
- Slow or sluggish reflexes
- Puffiness in your face, especially around your eyes
- Puffiness or swelling of your hands and feet (edema)
- Hair loss and, in particular, a unique hypothyroidism sign: the loss of hair in the outer edge of your eyebrows
- High cholesterol levels that are unresponsive to cholesterol-lowering medication
- Chronic or severe constipation that is unresponsive to treatment

Common Hypothyroidism Symptoms

Some common hypothyroidism symptoms you may experience including:

- Fatigue/Low Energy: You feel run down, sluggish, and exhausted, even after a lengthy sleep.
- Mood Changes: You feel depressed or blue; you have feelings of sadness or worthlessness; you feel anxious or restless; your moods change easily.

- Weight and Metabolism: You are unexpectedly gaining weight, despite no change to your healthy diet and exercise. You are unable to lose weight, or you may even be gaining weight on a healthy, reduced-calorie diet with increased exercise.

- Concentration and Memory: You have "brain fog," difficulty concentrating, and difficulty remembering.
- Body Temperature: You feel cold when others feel hot.
- Hair Changes: Your hair is coarse and dry, breaking, brittle, or falling out.
- Skin Changes: Your skin is coarse, dry, scaly, and thick, especially the soles of your feet.
- Voice Changes: You have a hoarse or gravelly voice.
- Pain: You have aches and pains in your joints, shoulders, hands, feet, or pain-related conditions like frozen shoulder, carpal tunnel syndrome, tarsal tunnel syndrome, and plantar fasciitis.
- Sex Drive: You have no sex drive or a lower sex drive.
- Snoring/Apnea: You're snoring more lately, or you have developed sleep apnea.
- Eye Changes: Your eyes feel gritty, dry, and sensitive to light.

There are some hypothyroidism signs that are unique to women:

- Puberty: Hypothyroidism can cause both early puberty and onset of menstruation, as well as delayed puberty.
- Menstrual Changes: You have severe menstrual cramps, unusually heavy menstrual periods, or irregular menstrual cycles.
- Fertility/Pregnancy: You have had trouble conceiving a baby, a history of failed assisted reproduction treatments, a history of recurrent miscarriage, postpartum depression, and/or problems with breastfeeding.
- Perimenopause/Menopause: Your perimenopause is starting earlier than typical, or you are having especially difficult perimenopausal or menopausal symptoms.

4.1.2. Graves' Disease (Hyperthyroidism)

Clinical Signs

There are some observable signs of **hyperthyroidism** that can be measured, seen, or detected in a clinical examination by your practitioner. These signs of hyperthyroidism include:

- Goiter (an enlarged thyroid)
- An unusually high pulse
- Unusually high blood pressure
- Fever
- Fast or hyperresponsive reflexes
- Evidence of heart palpitations, rhythm irregularities, or atrial fibrillation
- Hair loss and, in particular, a unique hypothyroidism sign: the loss of hair in the outer edge of your eyebrows
- Unusually low cholesterol levels
- Chronic or severe diarrhea that is unresponsive to treatment

Eye Changes

Changes to your eyes are common in hyperthyroidism and Graves' disease, but can also be due to a related condition, known as Graves' ophthalmopathy or thyroid eye disease. Symptoms include:

- Your eyes feel gritty and dry.
- Your eyes are red, dry, swollen, puffy, or watery.
- Your eyes are sensitive to light.
- Your vision is blurry.
- You are having double vision.
- Your eyeballs appear to be bulging (proptosis); your eyes aren't completely covered when your eyelids are closed.
- You have "lid lag," when your upper eyelid doesn't smoothly follow downward movements of the eyes when you look down.

Common Hyperthyroidism Symptoms

Some other common hyperthyroidism symptoms you may experience including:

- Sleep: You may have insomnia, or find it difficult to fall asleep or stay asleep.
- Fatigue/Energy: In some cases, hyperthyroidism may make you feel wired and unusually energetic, but it is also common to feel fatigued, run down, sluggish, and exhausted
- Mood Changes: You feel anxious, panicky, irritated, angry, or unusually stressed. You may be easily startled. You may also feel depressed or blue, have feelings of sadness or worthlessness, and your moods change easily.
- Weight and Metabolism: You are unexpectedly losing weight, despite no change to your healthy diet and exercise. Or, your appetite has increased and you are eating more, but you are not gaining weight.
- Concentration and Memory: You have "brain fog," difficulty concentrating, and difficulty remembering.
- Body Temperature/Sweating: You feel hot when others feel hot; you are sweating and feel thirsty more.
- Hair Changes: Your hair is falling out. Your hair is thinning or has become fine.
- Skin Changes: You have developed unusually smooth and young looking skin. You have developed hives. You have unusual rashes or blister-like bumps on your forehead and face (milaria bumps). You have spider veins your face and neck area.
- Voice Changes: You have a hoarse or gravelly voice.
- Pain/Weakness: You have aches and pains in your joints, shoulders, hands, feet, or extreme muscle weakness, particularly in your upper arms and legs.
- Sex Drive: You may have an unusually exaggerated sex drive, or you may have a drop in your normal sex drive.
- Tremors/Movements: You have tremors or shakiness in your hands, or hyperkinetic movements (i.e., table drumming, tapping feet, jerky movements); this is often more severe in children.
- Fingers/Nails: You have swollen fingertips (acropachy) or a separation of fingernails from your underlying nail bed (onycholysis or Plummer's nails).
- Shins: You have lesions on your shins or patches of thickened skin, known as pretibial myxedema or dermopathy.

Signs and Symptoms in Women

There are some hyperthyroidism signs that are unique to women:

- You are pregnant but losing weight.
- You are rapidly losing weight after having a baby.
- You are pregnant and having excessive nausea or vomiting.
- You have a history of irregular menstrual cycles, especially skipped periods, shorter and lighter periods, and longer periods of time between periods.
- You have history of **infertility** or recurrent miscarriage.

4.2. Thyroid Nodule

A thyroid nodule is an unusual growth (lump) of thyroid cells in the thyroid gland. Sometimes the thyroid begins to grow (overgrowth), causing one or more nodules to form. The reason why this happens is not known. Cancer is the biggest concern when nodules form. Fortunately, cancer is very rare – it is found in less than 5 percent of all nodules. Nodules develop more often in people who have a family history of nodules, and in people who don't get enough iodine. Iodine is needed to make thyroid hormone.

Symptoms

Most thyroid nodules do not produce any symptoms. However, if you have several nodules, or large nodules, you may be able to see them. Although rare, nodules can press against other structures in the neck and cause symptoms, including:

- Trouble with swallowing or breathing
- Hoarseness or voice change
- Pain in the neck
- Goiter (enlargement of the thyroid gland)
- Weakness/irritability

Risk factors for developing cancerous thyroid nodules include:

- Family history of nodules
- A nodule that is hard or is stuck to a nearby structure
- Male gender
- Age younger than 20 and older than 70
- Radiation exposure

4.3. Thyroiditis Signs and Symptoms

Some cases of thyroiditis have no symptoms at all. There are also situations where the thyroiditis is either slowing down or speeding up the thyroid, so the symptom patterns will fit into those of hypothyroidism or hyperthyroidism described above.

Some unique symptoms that are found in certain types of thyroiditis include the following:

- Enlargement of the thyroid (goiter)
- Pain, tenderness, or soreness in the neck or throat area
- Difficulty swallowing
- Fever
- Enlarged lymph nodes near the thyroid.
- Hoarseness in your voice

A form of thyroiditis known as acute infectious thyroiditis is characterized by more significant symptoms, including:

- The rapid onset of neck pain and tenderness, usually only one side of the neck
- The onset of pain is accompanied by fever, chills and other symptoms of infection
- An enlargement or mass in your neck area; it may be "movable" to your touch

4.4. Thyroid Cancer Signs and Symptoms

Thyroid cancer, especially early in its development, may not cause any symptoms at all. But as a thyroid cancer grows and develops, it's more likely to cause localized symptoms in your neck and throat. Some of the symptoms that may point to thyroid cancer include the following:

- A lump or nodule in the neck, especially in the front of the neck in the area of the Adam's apple (Note: Sometimes the lump or nodule may grow quickly.)
- Enlargement of the neck
- Enlarged or swollen lymph nodes in the neck
- Changes to your voice, including hoarseness, scratchiness, and difficulty speaking
- Difficulty swallowing or a choking feeling
- Difficulty breathing
- Pain in your neck or throat, including pain from the neck to the ears
- Sensitivity in the neck; discomfort with neckties, turtlenecks, scarves, necklaces
- A persistent or chronic cough not due to allergies or illness

5. Prevention of Thyroid Diseases

The thyroid is known as your metabolic master because it controls every single cell in the body. Without enough of the crucial thyroid hormone, every system in the body slows down, resulting in fatigue, weight gain, constipation, hair loss, dry skin and more.

5.1. Try your best to avoid environmental toxins

According to the National Institute of Environmental Health Sciences, long-term exposure to **endocrine disruptors**—chemicals that interfere with your body's endocrine system—may trigger endocrine problems in humans. A few to be aware of are perfluorinated chemicals (PFCs) in some carpets, flame-resistant and waterproof clothing, and non-stick cookware, all of which were linked to thyroid disease in a 2010 study. Similarly, in 2011 researchers found that exposure to phthalates (found in fragranced products and soft plastics) and bisphenol-A (found in

some hard plastics and canned food linings, although many manufacturers are removing them) could cause disruptions in thyroid hormone levels.

It is also recommended avoiding antibacterial soaps that contain triclosan, an ingredient that has altered hormone regulation in studies of animals (human studies are still ongoing), according to the FDA.

Although it would be impossible to avoid these completely, the key is to reduce your exposure as much as you can, especially if you're pregnant or have little ones in the house—developing fetuses, infants, and children are more vulnerable to any effects of environmental chemicals. Other things you can do include, choosing more fresh or frozen foods over canned, storing food in porcelain or glass rather than plastics, and keeping your home well-ventilated.

5.2. Protect yourself against X-rays

The thyroid gland is one of the organs most sensitive to the risk of radiation – whether it's from a dental X-ray, mammogram, MRI or general background radiation. A study from **National Cancer Institute** compared the number of dental X-rays received by a group of thyroid cancer patients prior to their diagnosis with the number received by a group of similar individuals without thyroid cancer. Overall, those who had dental X-rays were twice as likely to develop thyroid cancer. The patients who received more than 10 X-rays had more than five times the risk of developing cancer than someone who had not had any dental X-rays.

To protect yourself it is recommend requesting a thyroid shield (a lead apron that covers your neck area) whenever you have to undergo radiation, especially for children and young adults when the thyroid is still developing.

5.3 Stop smoking

Cigarette smoke has various toxins -- thiocyanate in particular -- that are especially dangerous to the thyroid, and can trigger thyroid disease in susceptible people. Cigarette smokers also are more likely to develop thyroid eye complications of Graves' disease, and treatments for those eye problems are less effective in smokers. One study also suggested that smoking may increase the risk of hypothyroidism in patients with **Hashimoto's thyroiditis**, a common autoimmune disease.

5.4. Test for and treat thyroid antibodies

In the study of 21 patients with euthyroid Hashimoto's Thyroiditis, who had normal range TSH, but elevated antibody levels, half of the patients were treated with levothyroxine for a year, the other half were not treated. After 1 year of therapy with levothyroxine, the antibody levels and lymphocytes (evidence of inflammation) decreased significantly only in the group receiving the medication. Among the untreated group, the antibody levels rose or remained the same.

The researchers concluded that preventative treatment of normal TSH range patients with Hashimoto's disease reduced the various markers of autoimmune thyroiditis, and speculated that

that such treatment might even be able to stop the progression of Hashimoto's disease, or perhaps even prevent development of the hypothyroidism.

5.5. Detox to save your thyroid

There are thyroid disruptors all around us — in plastic water bottles, pop cans and even lurking in your shampoo bottles. A connection between common chemicals called phthalates and thyroid hormone levels was confirmed by **the University of Michigan** in a large-scale study. Researchers at the **University of California** also linked canned soups to changes in thyroid hormone levels. They discovered that as BPA levels doubled, participants experienced a decrease in T4 levels, putting them on the path towards hypothyroidism.

5.6. Too much soy is not healthy

Overconsumption of soy has been linked to increased risk of thyroid disease. In particular, the craze for soy powders, smoothies, soy patties, and potions -- everything from Revival Soy to Isoflavone pills -- has been problematic, as too much of these unnatural forms of soy may put a strain on your immune system and trigger thyroid problems in susceptible people. Stick to natural forms of soy -- tofu, tempeh, miso soup -- in moderation, and you should be fine, but stay away from the pills, powders, smoothies, creams and other may actually ruin your health.

5.7. Try Selenium: A Thyroid Super-Nutrient

An inexpensive supplement may help prevent certain forms of thyroid disease. The mineral selenium can help prevent thyroiditis and some autoimmune hypothyroidism conditions.

5.8. Keep Potassium Iodide on hand for a Nuclear Emergency

Potassium iodide is an over-the-counter supplement that, when taken within hours after a nuclear accident -- or attack on nuclear facilities -- may help protect the thyroid from risk of thyroid disease and thyroid cancer.

After the Chernobyl accident, residents of Poland received mass distribution of this supplement in the time when the radioactive cloud was passing over them, while residents of the Ukraine and Russia did not. Subsequently, thyroid cancer and thyroid disease rates have skyrocketed in the unprotected areas, while Poland has had no similar increase in thyroid problems.

If you live within 50-100 miles of a nuclear plant, it's wise to have your own stockpile of potassium iodide on hand for each member of your family, and keep some at work, and in the car. Only take it if warnings are issued and the government instructs you via the Emergency Broadcast System to take potassium iodide, and the specific levels recommended.

5.9. Watch out for Fluoride: What's good for teeth may be bad for the Thyroid

Fluoride is used as a drug to treat hyperthyroidism, an overactive thyroid, because it makes the thyroid underactive quite effectively. This is why you need to be particularly careful in

today's over-fluoridated world, where water supplies, plus toothpastes, plus dental rinses, and other treatments all want to put more fluoride into our systems. Some experts recommend you avoid fluoridated water -- try a bottled water that you've verified is fluoride free, and avoid fluoride treatments and fluoridated toothpaste.

6. Conclusion

Thyroid disorders, in particular, goiter, thyrotoxicosis, and hypothyroidism are common in daily clinical practice in Myanmar. Patients with goiter are commonly seen in the northern and eastern parts of the country where most of the people live in hilly regions. Goiter is also common in the delta and coastal region of the country since the soil in these regions is usually deficient in iodine content. On the recommendation of the 24th National Health Committee meeting (1997), the Ministry of Mines issued a regulation which stated that all factories should be licensed for production on iodized salt for animal and human consumption in 1999. Universal Salt Iodization (USI) is the major intervention for elimination of iodine deficiency disorders.

When a goiter becomes very large, it can press against other structures in the neck and cause symptoms including: trouble with swallowing or breathing, hoarseness or voice change, pain in the neck and weakness. So you have to make self-examination of your neck that will help you find Thyroid conditions including goiters, nodules and thyroid cancer. Here is how to do a thyroid neck check.

1. Stand in front of a mirror, so that you can see your neck without any obstruction by taking off scarves, neckties, turtlenecks, so your view of your neck area is clear.
2. Stretch your neck back, chin toward the ceiling.
3. With your neck still stretched back, drink a glass of water.
4. Check your neck, looking for any enlargement in the thyroid area. Feel the area around the thyroid to see if you can detect any enlargement, bumps or lumps.

If you can detect any sort of problem, feel any enlargement or lump, you should see a doctor for evaluation right away. The goiter may be pressing on your jugular vein, windpipe, esophagus, or the nerve that runs to your larynx. The enlarged thyroid requires treatment and may need to be surgically removed. The doctor will usually need to order one or more of the following tests:

- **Thyroid hormone level test**. This **blood test** checks the levels of hormones secreted by the thyroid gland. The hormone levels are usually normal even if there are nodules. However, there are times when abnormal hormone levels are also benign. Therefore, your doctor will probably order other tests.
- **Thyroid ultrasound**. This test uses sound waves to determine if a nodule is solid or a fluid-filled cyst. (The risk of cancer is higher in solid nodules.) This test also checks on the growth of nodules and helps find nodules that are difficult to feel. In addition, thyroid **ultrasound** is sometimes used to help guide placement of the needle during a fine needle biopsy.
- **Fine-needle biopsy of the thyroid gland**. With this test, the doctor uses a very thin needle to take a sample of cells from one or more thyroid nodules. The samples are then sent to a laboratory, and most turn out to be noncancerous. However, if the test results are

"suspicious," your doctor may repeat this test. The doctor may also suggest you have surgery to remove the nodules in order to make an accurate diagnosis.

- **Thyroid scan**. In this test, a small amount of radioactive iodine is given orally. The doctor will check to see how much of the radioactive iodine is absorbed by the nodules and how much is absorbed by normal thyroid tissue. This will help diagnose if the nodules are malignant (cancer).
- **CT scan (CAT scan):** A procedure that makes a series of detailed pictures of neck areas, taken from different angles. The pictures are made by a computer linked to an x-ray machine.

As prevention is better than cure, you should avoid radiation exposure to the neck. Thyroid cancer is not preventable, but the possibilities of cancer can be lowered with sensible life style choice such as not smoking and avoid environmental toxins. You can further protest your health by eating a balanced diet, getting enough sleep, exercising several times a week, and getting fresh air and relaxation. Healthy living is an important part of recovery from thyroid conditions.

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