Pediatric Endocrinology Fact Sheet

Hyperthyroidism: A Guide for Families

What is hyperthyroidism?

Hyperthyroidism refers to too much thyroid hormone in the blood coming from the thyroid gland. The signs and symptoms are listed below. It can occur at any age but more often above age 10 and more often in girls than in boys. Children and adolescents may have some, but not all the typical signs and symptoms of hyperthyroidism.

What are the possible signs and symptoms of hyperthyroidism?

- Enlargement of the thyroid gland (goiter); usually painless
- Weight loss, despite a typical or even an increased appetite
- Excessive sweating
- Feeling too warm when others are comfortable
- Rapid heart rate or heart palpitations
- Poor school performance
- Mood swings
- Difficulty sleeping
- Bulging or prominence of the eyes
- Tremors of the hands
- Hyperactivity or restlessness
- Increased frequency of bowel movements or diarrhea

What causes hyperthyroidism?

In children, the most common cause of hyperthyroidism is *autoimmune hyperthyroidism* (also known as *Graves' disease*). The body's immune system makes antibody proteins that stimulate the thyroid gland to make too much thyroid hormone.

Less common causes include

- *Chronic lymphocytic thyroiditis* (also known as *Hashimoto disease*). One's own body generates an immune reaction to the thyroid gland that causes inflammation and release of preformed thyroid hormone.
- *Subacute thyroiditis.* A viral infection causes thyroid gland inflammation and release of preformed thyroid hormone. Unlike other causes of hyperthyroidism, subacute thyroiditis results in a painful thyroid gland.
- *Certain thyroid nodules.* These are growths on the thyroid gland that can occasionally produce too much thyroid hormone.

How is hyperthyroidism diagnosed?

A detailed history and thorough physical examination may suggest hyperthyroidism. The diagnosis of hyperthyroidism is confirmed by blood tests that show elevated thyroid hormone levels (total or free levothyroxine [T_4] and triiodothyronine [T_3]) and very low thyroid-stimulating hormone (TSH) levels. Sometimes, additional tests are done to help the physician determine the structure (thyroid scan) and function (radioiodine uptake) of the thyroid gland.

How is hyperthyroidism treated?

There are 3 main ways to treat hyperthyroidism: antithyroid medications, radioactive iodine ablation, and surgery. Sometimes, medications called *beta* (β)*-blockers* are used initially to help relieve the symptoms of hyperthyroidism, but they do not reduce thyroid hormone levels. Optimal treatment will depend on the underlying cause of hyperthyroidism.

- *Antithyroid medications.* Methimazole is the first-line medical therapy in children. It is generally well tolerated. Potential side effects include hives, and rarely joint aches, high liver enzymes, and low white blood cell counts. (Propylthiouracil, a drug related to methimazole, is used less often in children because of a higher risk of serious liver side effects.)

  Approximately 1 out of every 3 children or adolescents who take methimazole for Graves' disease will be able to stop after 2 years. Some may never need to restart treatment; others may experience hyperthyroidism again.

- *Radioactive iodine ablation.* Radioactive iodine is swallowed as a capsule or drink. It painlessly destroys the thyroid gland slowly over several months, so that the thyroid gland no longer makes thyroid hormone. The individual eventually has hypothyroidism (too little thyroid hormone) and must take a pill containing thyroid hormone every day.

  This treatment is very well tolerated and safe in children. It should not be given to women of childbearing age without first ensuring that they are not pregnant.

- *Surgery.* Surgical removal of the thyroid gland causes a rapid decrease in thyroid hormone levels. Subsequently, the individual has hypothyroidism and must replace thyroid hormone by taking a pill each day.

  Thyroid surgery is more risky than radioiodine and should be performed by an experienced surgeon. Possible risks include damage to the nearby parathyroid glands (which control blood calcium levels) and recurrent laryngeal nerve (which controls the voice).

- β*-Blockers.* In the early stage of treatment, β-blocker medicines, like propranolol or atenolol, are sometimes used to increase the comfort level of the young person with hyperthyroidism by decreasing the severity of symptoms caused by hyperthyroidism. Although these drugs will not affect the blood levels of thyroid hormones, they can help the patient feel better by decreasing symptoms such as palpitations, rapid heart rate, tremors, and anxiety.

Ask the pediatric endocrine doctors to explain these types of treatments. The doctors will help you to select the most appropriate treatment for your child.

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