HYPERTHYROIDISM

BACKGROUND
The thyroid gland is a small butterfly shaped gland weighing about one ounce (28 gm) located in your neck on either side of the trachea (windpipe). Its function is to make and release thyroid hormone, an iodine containing substance which has an important role in the regulation of the body’s metabolism. The presence of an excessive amount of thyroid hormone in the bloodstream leads to a condition called hyperthyroidism. Symptoms a person with hyperthyroidism may experience would include palpitation, fast heart rate, a sensation of excessive warmth, hand tremor, weight loss despite good appetite, irritability, mood swings, weakness or fatigue, sweating, itching, difficult sleeping, menstrual irregularities, frequent bowel movements or diarrhea, muscle weakness or cramps, ankle swelling and eye irritation.

DIAGNOSIS
If your doctor suspects hyperthyroidism, he or she will probably order blood tests to confirm the diagnosis. The tests will usually consist of thyroid hormone (free T4) and TSH levels. TSH is a pituitary hormone which is usually very low or absent from the blood of patients with hyperthyroidism. These blood tests will generally confirm the presence of hyperthyroidism but will not distinguish between the various types. A thyroid scan is necessary for this purpose in most patients. Thyroid scanning requires two visits to the Nuclear Medicine Department: to take a capsule containing trace amount of radioiodine the first day, and to return the next day to “take picture” of the thyroid gland and measure the amount of iodine captured by the thyroid. One should have nothing to eat for about 3 hours before coming for the appointment the first day, but can take the usual medication with water.

TYPES OF HYPERTHYROIDISM
There are three relatively common types of hyperthyroidism. These include Graves’ Disease, toxic multinodular goiter and thyroiditis. The first two types are associated with overproduction of thyroid hormone whereas thyroiditis causes only temporary hyperthyroidism due to release of stored thyroid hormone by an inflamed or damaged gland.

GRAVES’ DISEASE
Graves’ disease is an autoimmune disorder in which lymphocytes make antibodies which stimulate the thyroid gland to produce too much thyroid hormone. Many patients
with this disorder also develop an enlarged thyroid also known as a goiter. Additionally, a small percentage of Graves’ patients may develop prominent or bulging eyes; this is called Graves’ Ophthalmopathy. The details of why some people develop Graves’ Disease remains a mystery; however it does seem to cluster in families, and occurs more in Asian females. This is by far the most common type of hyperthyroidism.

TOXIC MULTINODULAR GOITER (TMNG)

TMNG is almost always a disease of people over forty who have had an enlarged thyroid (goiter) for some time. As opposed to patients with Graves’ Disease who tend to have smooth and evenly enlarged thyroid glands, patients with TMNG have lumpy-bumpy thyroids. These lumpy-bumpy areas are referred to as nodules, and over time these nodules seem to lose the normal mechanisms for producing precisely the proper amount of thyroid hormone. This process is usually gradual but ultimately the person may have symptoms indistinguishable from someone with Graves’ Disease.

THYROIDITIS

There are several causes of thyroiditis, but all are associated with inflammation of the thyroid gland and the release of thyroid hormone which has been stored for later use. Because the thyroid becomes damaged during the inflammation it will generally stop making new thyroid hormone. This means that within four to six weeks, the hyperthyroidism caused by thyroiditis disappears. Usually no treatment of hyperthyroidism is required for these patients. Medication may be required to control neck discomfort that could accompany the inflammation, and to control hyperthyroid symptoms. In time, patients may require thyroid hormone replacement pills if the damage to the gland is severe enough.

TREATMENT OF HYPERTHYROIDISM

There are three types of treatment which can control or eradicate the hyperthyroid state: antithyroid drugs, radioactive iodine and surgery. Beta-blockers are often given to relieve troublesome symptoms; they do not affect the underlying hyperthyroid process.

ANTITHYROID DRUGS

There are two antithyroid drugs available in the U.S., propylthiouracil (PTU) and methimazole (tapazole). These drugs function by interfering with the thyroid gland’s ability to take up iodine, incorporate the iodine into active thyroid hormone and limit action of thyroid hormone on the body’s tissues. These drugs are most useful inpatients with Graves’ Disease. If persons with Graves’ Disease use these drugs for six to twenty-four months, they may experience a remission and are able to stop using the medicine and are no longer hyperthyroid. Unfortunately many patients who do experience remission may suffer recurrence of hyperthyroidism within weeks, months or several years of stopping the medication. Antithyroid drugs generally do not cause significant shrinkage of the goiter.

Depending on the severity of the hyperthyroid symptoms, patients may need to take the medication multiple times a day. Dosage of medication needs to be adjusted
according to blood test results and symptoms over the treatment period. The main side effects of these drugs include a rash which occurs in 3 to 5%, a more serious reaction called agranulocytosis (temporary loss of infection fighting white blood cells), hepatitis (a noninfectious inflammation of the liver) and arthritis with painful swollen joints. Although serious, these latter side-effects are very rare, occurring in two or three patients per thousand treated. Importantly, these all improve following cessation of the drug.

RADIOACTIVE IODINE

Because the thyroid requires iodine for the production of thyroid hormone, it has developed a very efficient system for trapping iodine from the bloodstream. In hyperthyroid patients this system will trap radioactive iodine which damages the thyroid gland, and over the course of weeks to a few months cures the hyperthyroidism. Radioactive iodine therapy requires the administration of a single capsule, and its effect on the thyroid may not be apparent for three or four weeks, and its full effect not realized up to several months. In some cases, hyperthyroidism persists or recurs after the first treatment, requiring a second treatment. In most cases, there will be noticeable reduction in size of the goiter within several weeks. Immediately after taking the radioactive iodine capsule, patients are generally asked to avoid close and prolonged contact with people at home and at work, especially children, pregnant women and young adults.

Radioactive iodine treatment has been used for more than sixty years and there has been no discernible increase in the risk of thyroid or other cancers. Likewise there has been no reduction in fertility among treated patients. Women are usually advised to postpone plans to become pregnant for three to six months after the treatment dose. Pregnant women however may not be treated with radioactive iodine as it may be deleterious to the developing fetus.

SURGERY

Surgical removal of the overactive thyroid gland effects a rapid improvement in hyperthyroidism. This form of therapy was more widely employed in the past, but is now used only in special circumstances because of the risk of surgical complications which can include damage to the vocal cord nerves and the parathyroid glands which control the body’s calcium metabolism. Surgery also requires hospitalization and several weeks to recuperate. The safety and efficacy provided by radioactive iodine and antithyroid drugs have relegated surgery to a secondary role, and it is generally not offered as first line therapy in the United States and Europe.

Each of these therapies can provide an effective treatment for hyperthyroidism. Maybe due to the underlying autoimmune process, so irrespective of the treatment choice, the chance of eventual hypothyroidism (under production of thyroid hormone, with symptoms opposite to those of hyperthyroidism) is higher than in the general population. Although more convenient than the multiple daily dosing of antithyroid drugs, radioactive iodine treatment is more likely to lead to hypothyroidism, and at an earlier
time. Fortunately this can be easily managed by the daily use of a single thyroid hormone supplement tablet.