

of antithyroid drugs to render the patient euthyroid may be required.

### Toxic Multinodular Goiter

Toxic multinodular goiter occurs in older patients with longstanding multinodular goiter, especially in patients from iodine-deficient regions when they are exposed to increased dietary iodine or receive iodine-containing radiocontrast dyes. The presenting clinical features are frequently tachycardia, heart failure, and arrhythmias. Physical examination shows a multinodular goiter. The diagnosis is confirmed by laboratory features of suppressed TSH, elevated  $T_3$  and  $T_4$ , and a thyroid scan showing multiple functioning nodules. The treatment of choice is often  $^{131}\text{I}$  ablation. It is especially effective in patients with small glands and a high degree of radioactive uptake. Larger glands may require surgery.

### Subclinical Hyperthyroidism

In subclinical hyperthyroidism, total or free  $T_4$  and  $T_3$  levels are normal and TSH is suppressed. The causes of this condition include early presentation of any form of hyperthyroidism (e.g., Graves' disease, toxic adenoma, toxic multinodular goiter). Because these patients, especially those who are older, are at an increased risk for cardiac dysrhythmias, many patients with a persistently suppressed TSH should be treated with thiocarbamide drugs or radioactive iodine. A decreased bone mineral density is another indication for treatment.

### Thyroiditis

Thyroiditis may be classified as acute, subacute, or chronic. Although thyroiditis may eventually result in clinical hypothyroidism, the initial presentation is often that of hyperthyroidism as a result of acute release of  $T_4$  and  $T_3$ . Hyperthyroidism caused by thyroiditis can be readily differentiated from other causes of hyperthyroidism by suppressed uptake of radioactive iodine in the thyroid gland, reflecting decreased hormone production by damaged cells.

A rare disorder, acute suppurative thyroiditis, is caused by infection, usually bacterial. Patients exhibit high fever, redness of the overlying skin, and thyroid gland tenderness; the condition may be confused with subacute thyroiditis. If blood cultures are negative, FNA should identify the organism. Intensive antibiotic treatment and, occasionally, incision and drainage are required.

### Subacute Thyroiditis

Subacute thyroiditis (also known as de Quervain's thyroiditis or granulomatous thyroiditis) is an acute inflammatory disorder of the thyroid gland that probably is caused by a viral infection and resolves completely in 90% of cases. Patients with subacute thyroiditis complain of fever and anterior neck pain. The patient may have symptoms and signs of hyperthyroidism. The classic feature on physical examination is an exquisitely tender thyroid gland. Laboratory findings vary with the course of the disease. Initially, the patient may be symptomatically thyrotoxic with elevated serum  $T_4$ , depressed serum TSH, and low radioactive iodine uptake on the thyroid scan. Subsequently, the thyroid status fluctuates through euthyroid and hypothyroid

phases and may return to euthyroidism. An increase in radioactive iodine uptake on the scan reflects recovery of the gland. Treatment usually includes high-dose aspirin or other nonsteroidal anti-inflammatory drugs, but a short course of prednisone may be required if pain and fever are severe. During the hypothyroid phase, replacement therapy with levothyroxine may be indicated.

Postpartum thyroiditis resembles subacute thyroiditis in its clinical course. It usually occurs within the first 6 months after delivery and goes through the triphasic course of hyperthyroidism, hypothyroidism, and then euthyroidism, or it may develop with only hypothyroidism. Some patients have underlying chronic thyroiditis.

### Chronic Thyroiditis

Chronic thyroiditis (Hashimoto's or lymphocytic thyroiditis), caused by destruction of the normal thyroidal architecture by lymphocytic infiltration, results in hypothyroidism and goiter. Riedel's struma is probably a variant of Hashimoto's thyroiditis; it is characterized by extensive thyroid fibrosis resulting in a rock-hard thyroid mass. Hashimoto's thyroiditis is more common in women and is the most common cause of goiter and hypothyroidism in the United States. Occasionally, patients with Hashimoto's thyroiditis have transient hyperthyroidism with low radioactive iodine uptake owing to the release of  $T_4$  and  $T_3$  into the circulation. Chronic thyroiditis can be differentiated from subacute thyroiditis in that, in the former, the gland is nontender to palpation and antithyroid antibodies are present in high titer. TPO Ab is usually present early and typically remains present for years. Presence of TgAb does not reflect Hashimoto's thyroiditis and does not provide additional information beyond the TPO Ab finding. Serum  $T_3$  and  $T_4$  levels are either normal or low; when they are low, the TSH is elevated. FNA of the thyroid shows lymphocytes and Hürthle cells (enlarged basophilic follicular cells). Hypothyroidism and significant glandular enlargement (goiter) are indications for levothyroxine therapy. Adequate doses of levothyroxine are administered to normalize TSH levels and shrink the goiter.

### Thyrotoxicosis Factitia

Patients with thyrotoxicosis factitia ingest excessive amounts of thyroxine, often in an attempt to lose weight, and exhibit typical features of thyrotoxicosis. Serum  $T_3$  and  $T_4$  levels are elevated and TSH is suppressed, as is the serum thyroglobulin concentration. Radioactive iodine uptake is absent. Patients may require psychotherapy.

### Rare Causes of Thyrotoxicosis

Struma ovarii occurs when an ovarian teratoma contains thyroid tissue that secretes thyroid hormone. A body scan confirms the diagnosis by demonstrating uptake of radioactive iodine in the pelvis.

Hydatidiform mole is caused by proliferation and swelling of the trophoblast during pregnancy, with excess production of chorionic gonadotropin, which has intrinsic TSH-like activity. The hyperthyroidism remits with surgical and medical treatment of the molar pregnancy.

