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A REVIEW ON HYPERTHYROIDISM

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ABSTRACT
Hyperthyroidism is a condition where the thyroid gland produces and secretes inappropriately high amounts of thyroid hormone which can lead to thyrotoxicosis. There are many different causes of hyperthyroidism, and the most common causes include Graves' disease (GD), toxic multinodular goiter and toxic adenoma. The diagnosis can be made based on clinical findings and confirmed with biochemical tests and imaging techniques including ultrasound and radioactive iodine uptake scans. This condition impacts many different systems of the body including the integument, musculoskeletal, immune, ophthalmic, reproductive, gastrointestinal and cardiovascular systems. Management options for hyperthyroidism include anti-thyroid medications, radioactive iodine, and surgery. Anti-thyroid medications are often used temporarily to treat thyrotoxicosis in preparation for more definitive treatment with radioactive iodine or surgery, but in select cases, patients can remain on antithyroid medications long-term. Radioactive iodine is a successful treatment for hyperthyroidism but should not be used in GD with ophthalmic manifestations. Recent studies have shown an increased concern for the development of secondary cancers as a result of radioactive iodine treatment. In the small percentage of patients who are not successfully treated with radioactive iodine, they can undergo re-treatment or surgery. Surgery includes a total thyroidectomy for GD and toxic multinodular goiters and a thyroid lobectomy for toxic adenomas. Surgery should be considered for those who have a concurrent cancer, in pregnancy, for compressive symptoms and in GD with ophthalmic manifestations. Surgery is cost effective with a high-volume surgeon. Preoperatively, patients should be on anti-thyroid medications to establish a euthyroid state and on beta blockers for any cardiovascular manifestations. Thyroid storm is a rare but life-threatening condition that can occur with thyrotoxicosis that must be treated with a multidisciplinary approach and ultimately, definitive treatment of the hyperthyroidism.

Keywords: Hyperthyroidism; Graves' disease (GD); toxic multinodular goiter; toxic adenoma; surgery; radioactive iodine (RAI)

INTRODUCTION

Hyperthyroidism is a pathological disorder in which excess thyroid hormone is synthesized and secreted by the thyroid gland. Thyrotoxicosis is the clinical condition where the effect of excess thyroid hormone on the tissues causes systemic clinical manifestations (Ross DS, Burch HB, Cooper DS, et al. 2016 American Thyroid Association Guidelines for Diagnosis and Management of Hyperthyroidism and Other Causes of Thyrotoxicosis. Thyroid 2016;26:1343-421. 10.1089/thy.2016.0229 [PubMed] [CrossRef] [Google Scholar]). Hyperthyroidism can be overt or subclinical. Overt hyperthyroidism is characterised by low serum thyroid-stimulating hormone (TSH) concentrations and raised serum concentrations of thyroid hormones: thyroxine (T4), tri-iodothyronine (T3), or both. Subclinical hyperthyroidism is characterised by low serum TSH, but normal serum T4 and T3 concentrations.(De Leo S, Lee SY, Braverman LE. Hyperthyroidism. Lancet 2016;388:906-18. 10.1016/S0140-6736(16)00278-6 [PMC free article] [PubMed] [CrossRef] [Google Scholar])We do not discuss subclinical hyperthyroidism here, but it was recently reviewed in another *Lancet Seminar.2* .

OBJECTIVE

To discuss the causes of hyperthyroidism, the clinical manifestations and how to diagnose it, and the different management options for the most common types of hyperthyroidism, including thyroid storm (TS), a rare but serious complication of hyperthyroidism.

Epidemiology

The prevalence of hyperthyroidism in the United States is 1.2% with overt hyperthyroidism accounting for 0.5% and subclinical hyperthyroidism accounting for 0.7%(Wartofsky L. Hyperthyroidism. In: Diseases NIoDaDaK. editor. NIDDK. Bethesda, MD: National Endocrine and Metabolic Diseases Information Service, 2012. [Google Scholar]). Hyperthyroidism increases with age and is more frequent in women. Data