

# The hyperthyroidism

## Abstract

Hyperthyroidism is a clinical syndrome caused by an excess of thyroid hormones into the bloodstream. The most frequent cause of hyperthyroidism is due to the Graves' disease or to toxic nodular goiter and toxic adenoma. The hyperthyroidism treatment should initially be medical. In case of relapse of hyperthyroidism must be suggested the possibility of a radiodine therapy with  $^{131}\text{I}$  or surgical intervention.

**Keywords:** hyperthyroidism, thyrotoxicosis, pediatric, arrhythmia, anxiety, insomnia, tremor, excitation, hyperactivity, polyphagia, diarrhea, heart rhythm, ectopic beats, graves' disease, fatigue, goitre, diplopia

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## Introduction

Hyperthyroidism is a clinical syndrome caused by an excess of thyroid hormones into the bloodstream. The term "hyperthyroidism" or thyrotoxicosis is related to an inappropriately high synthesis and secretion of thyroid hormones by the thyroid.<sup>1</sup> "Syndrome" because of many organs of the body as heart, muscular system, skin, brain, intestine, bone, etc. are involved. The prevalence of hyperthyroidism is approximately 1.2% in the United States<sup>2</sup> and its incidence is between 20 and 40 years. Hyperthyroidism, like the majority of thyroid disease, interests more frequently the women than men (10:1). Hyperthyroidism can also affect the pediatric patients and its frequency increases with age, peaking during adolescence<sup>3</sup> Hyperthyroidism instead of the elderly can be very sneaky with the appearance as the first evidence of a cardiac arrhythmia. The most common symptoms are usually sudden and represented by the acceleration rate (tachycardia) or by the occurrence of ectopic beats (palpitations) or by alterations in heart rhythm (atrial fibrillation or atrial flutter).<sup>4</sup> The patient shown feeling of excessive heat with sweating, rapid loss of weight (in muscular component), fatigue, increased sense of anxiety, insomnia, tremor of the superior extremities, excitation, hyperactivity, polyphagia, diarrhoea, etc.

The most frequent cause of hyperthyroidism is due to the Graves' disease (an autoimmune thyroid disease characterized by the presence of thyroid stimulating antibodies, TRAb or TSAb),<sup>5</sup> or to toxic nodular goiter and toxic adenoma. May also be present as a transient hyperthyroidism in some forms of thyroiditis (Hashitoxicosis or in the subacute thyroiditis). In such circumstances, the hyperthyroidism is generally less aggressive and can be evaluated in the differential diagnosis with Graves' disease by measuring the value of circulating thyroglobulin (so high in the subacute thyroiditis), the absence of TRAb and the extent of uptake of iodine-131 in the thyroid gland which is high in Graves' disease while very low in subacute thyroiditis. Hyperthyroidism can be presented by an excess of thyroid hormones intake (thyrotoxicosis factitia) and often unjustified (for example in slimming diets) and also here easily recognizable by the low value of circulating thyroglobulin and low thyroid uptake. The administration of amiodarone (important antiarrhythmic but so rich in iodine) can determine an alteration of thyroid function with both hyper and hypothyroidism.<sup>6</sup> In rare cases (1.5-0.3%) of patients with Graves' disease may be an ocular involvement (ophthalmopathy) or lower leg's extremities dermatitis (pretibial myxedema).<sup>7</sup>

The ophthalmopathy can be interest both the eyeball (proptosis unilateral or bilateral), sensitivity to light (photophobia), irritation of the conjunctiva, tearing, and eyelid (edema) or eyelid retraction (Graefe sign), that the orbital muscles with the appearance of double vision (diplopia) or inability to follow the movement of an object to the paralysis of some of the orbital muscles. The thyroid dermopathy which has the characteristic of being lazy, of brownish red colour and hard consistency with infiltrated inflammatory. The diagnostic tests to be performed in the first instance are: a) circulating free thyroid hormones (FT4 and FT3) and TSH. Equally important are the anti-thyroid antibodies (ABTG and AbTPO). b) The thyroid ultrasound volume with color-doppler in the second step can be executed both thyroid scintigraphy and/or thyroid uptake of  $^{131}\text{I}$ , both antibodies to the TSH receptor (TRAb or TSAb) and thyroglobulin testing assets. For thyroid scan  $^{99\text{m}}\text{Tc}$  or  $^{123}\text{I}$  could be used, but for the measurement of the thyroid uptake  $^{131}\text{I}$  is considered now more effective.

The hyperthyroidism treatment should initially be medical (antithyroid drugs as methimazole or propylthiouracil).<sup>8</sup> In the case of Grave's disease the medical treatment shall include the hormonal values in the standard and may be continued for up to 18 months with the restoration of normal thyroid function. However, the incidence of recurrence of hyperthyroidism is quite high (70%).<sup>9</sup> Other therapy recently used is selenium (food supplement) that can modulate well the autoimmune system and obtain excellent results.<sup>10,11</sup> In case of relapse of hyperthyroidism must be suggested the possibility of a radiodine therapy with  $^{131}\text{I}$  or surgical intervention (total or subtotal thyroidectomy). In particular, the radioiodine  $^{131}\text{I}$  therapy is safe and effective in adult patients with Graves' disease associated by a prednisone treatment. Even in patients with hyperthyroidism from toxic adenoma or toxic multinodular goiter the treatment of choice is represented by radioiodine  $^{131}\text{I}$ . The radioiodine  $^{131}\text{I}$  generally does not cause side effects on the patient (rarely may occur actinic thyroiditis however, is short-lived and controllable with treatment with painkillers). More important precautions have been shown that the patient needs to know to avoid to be able to radiate other subjects: a personal hygiene (own bathroom) for the first 3 days after  $^{131}\text{I}$  treatment, avoid for 15 days of care for children under 2 years old or women who are pregnant, avoid for 7 days of attending public places (such as bars or cinemas or theatres) where you can have direct contact with unknown persons.

In case of Graves' disease or uni or multinodular goitre with considerable ultrasound volume, the surgical treatment with total or subtotal thyroidectomy appears to be preferred.<sup>12,13</sup> Before the surgery the patient must have normal thyroid function (in relation to the treatment with antithyroid drugs), must still prepare for intervention using a solution of potassium iodide in order to saturate the cells and thus reduce bleeding during surgery.

The patient affected by hyperthyroidism in medical treatment should have a balanced diet with care not to use foods containing excess iodine (some types of shellfish) while the iodized salt should be used regularly and does not represent a case of iodine excess.

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## Conflicts of interest

The author declares there is no conflict of interest.

## References

1. Bahn CR, Burch HB, Cooper DS, et al. Hyperthyroidism and other causes of thyrotoxicosis: management guidelines of the American Thyroid Association and American Association of Clinical Endocrinologists. *Thyroid*. 2011;21(6):593–646.
2. Singer PA, Cooper DS, Levy EG, et al. Treatment guidelines for patients with hyperthyroidism and hypothyroidism. *JAMA*. 1995;273(10):808–812.
3. Léger J, Kaguelidou F, Alberti C, et al. Graves' disease in children. *Best Pract Res Clin Endocrinol Metab*. 2014;28(2):233–243.
4. Vargas-Uricoechea H, Sierra-Torres CH. Thyroid hormones and the heart. *Horm Mol Biol Clin Investig*. 2014;18(1):15–26.
5. Gimenez-Barcons M, Colobran R, Gomez-Pau A, et al. Graves' disease TSHR-stimulating antibodies (TSAbs) induce the activation of immature thymocytes: a clue to the riddle of TSAbs generation? *J Immunol*. 2015;194(9):4199–4206.
6. Jabrocka-Hibel A, Bednarzuk T, Bartalena L, et al. Amiodarone and the Thyroid. *Endokrynol Pol*. 2015;66(2):176–186.
7. Bartalena L, Fatourechhi V. Extrathyroidal manifestations of Graves' disease: a 2014 update. *J Endocrinol Invest*. 2014;37(8):691–700.
8. DeGroot LJ. Diagnosis and treatment of Graves' Disease. In: De Groot LJ, et al. (Eds.) *Endotext* (internet), South Dartmouth (MA), USA; 2012.
9. Piantanida E, Lai A, Sassi L, et al. Outcome prediction of treatment of Graves' hyperthyroidism with antithyroid drugs. *Horm Metab Res*. 2015;47(10):767–772.
10. Calissendorff J, Mikulski E, Larsen EH, et al. A Prospective Investigation of Graves' Disease and Selenium: Thyroid Hormones, Auto-Antibodies and Self-Rated Symptoms. *Eur Thyroid J*. 2015;4(2):93–98.
11. Lacka K, Szeliga A. Significance of selenium in thyroid physiology and pathology. *Pol Merkur Lekarski*. 2015;38(225):345–353.
12. Sung TY, Lee YM, Yoon JH, et al. Long-term effect of surgery in Graves' disease: 20 years experience in a single institution. *Int J Endocrinol*. 2015;54:2641.
13. Querat C, Germain N, Dumollard JM, et al. Surgical management of hyperthyroidism. *Eur Ann Otorhinolaringol Head Neck Dis*. 2005;132(2):63–66.