Hashimoto's Thyroiditis

An evidence-based practitioners guide

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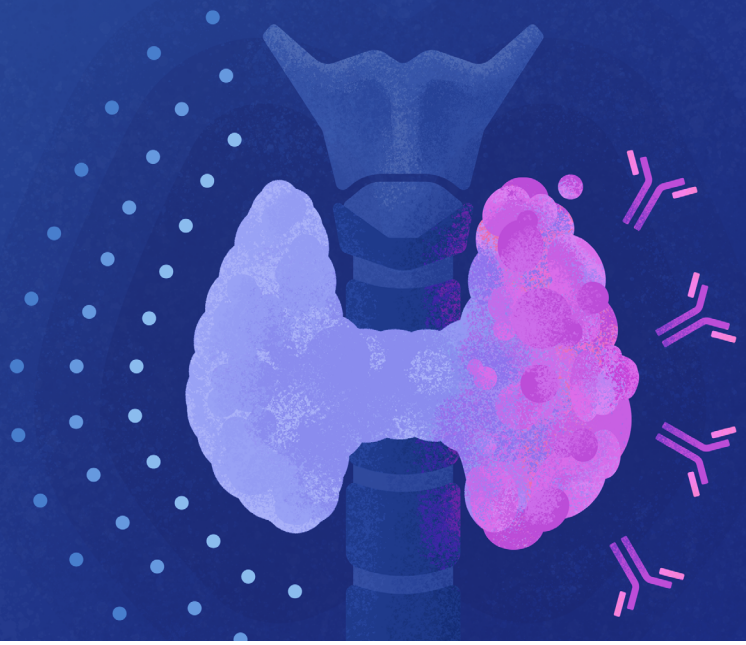


Hashimoto's thyroiditis (HT) is the most prevalent autoimmune thyroid disorder (AITD) globally, with a prevalence of 17.5% in women and 6% in men.

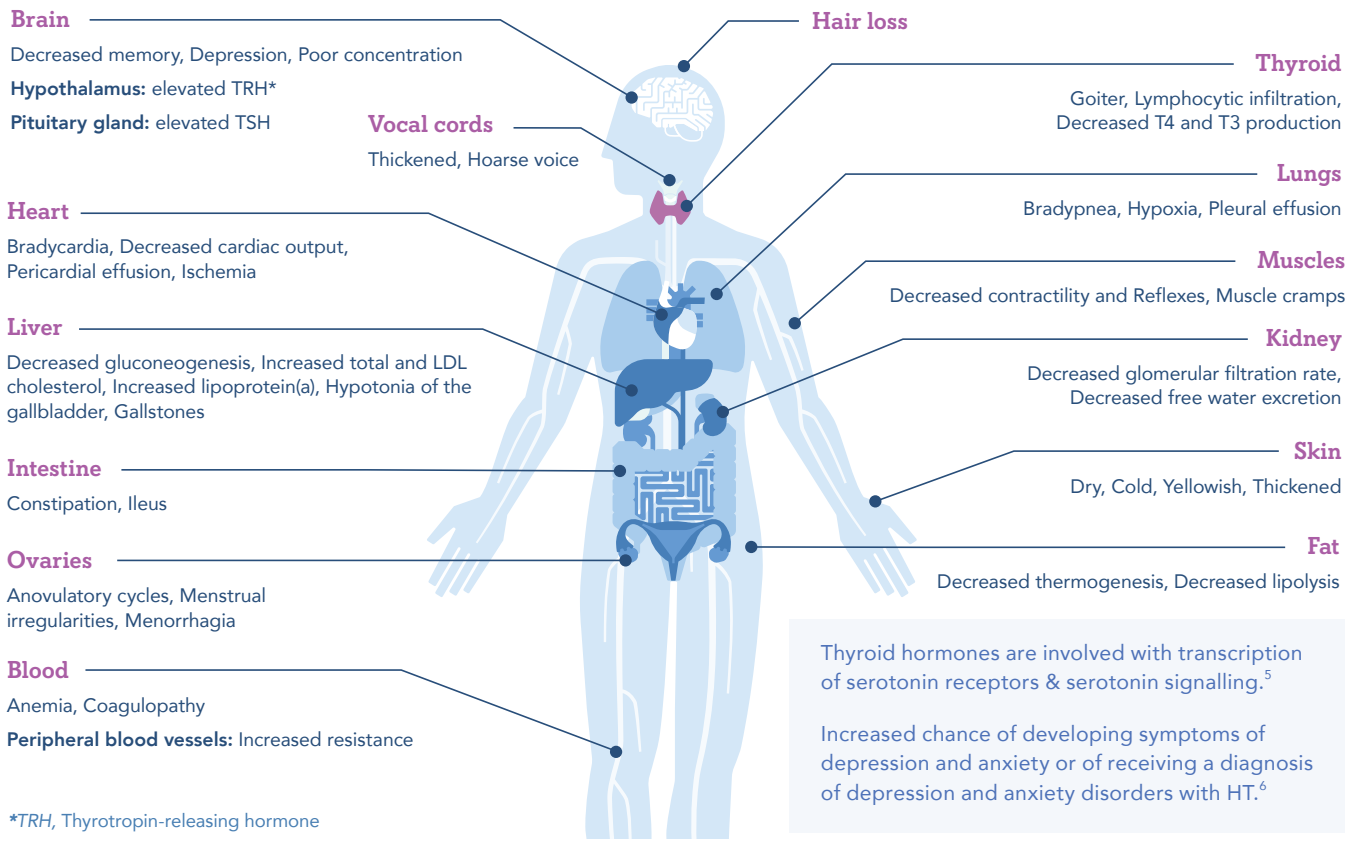
Characterised by loss of self-tolerance by the immune system, with T-cell attack and subsequent lymphocytic infiltration and destruction of the follicular cells by anti-thyroid antibodies, HT leads to fibrosis, atrophy, and loss of function of the thyroid gland.

Signs & symptoms

Signs and symptoms[3,4] of HT may be mild and non-specific, particularly in the early stages of disease (see Figure 1). They include but are not limited to:

- Fatigue
- Weight gain
- Low mood
- Anxiety
- Cold intolerance
- Dry, scaly skin
- Poor concentration
- High cholesterol
- Bradycardia
- Sleep disturbances

Fig. 1. Signs and symptoms of Hypothyroidism



Adapted from: Klubo-Gwiezdzinska[6]

Diagnosis

Diagnosis of HT includes the presence of circulating antibodies against the thyroid including anti-thyroid peroxidase (Anti-TPO) and anti-thyroglobulin antibodies (TG-Abs) with or without symptoms of hypothyroidism. It is important to note that a small percentage of individuals will present with clinical symptoms, positive ultrasound but seronegative antibodies.[7,8] Physical signs of Hashimoto's Thyroiditis are listed in Table 1.

Table 1. Naturopathic physical signs of Hashimoto's Thyroiditis:

Puffiness/fluid retention	Accumulation of mucopolysaccharides (myxedema) leads to puffy eyes and the nose broadening; facial expressions may appear blunted.[9]
Dry skin, coarse brittle hair	Peripheral cutaneous vasoconstriction, hypohidrosis (reduced perspiration), and decline in epidermal sterol biosynthesis and sebaceous gland secretion lead to xerosis (dry eye).[10]
Yellow soles/palms	Impaired hepatic conversion of beta-carotene to vitamin A (meditated by thyroid hormones) results in excessive carotene deposition in stratus corneum of soles of feet/palms.[11]
Hair loss/early greying, madarosis/milphosis (loss of eyelashes, loss of outer third of eyebrows)	Hair follicles have receptors for thyroid hormones and T4 & T3 impact hair cycle, including anagen prolongation and stimulation of both hair matrix keratinocyte proliferation and pigmentation.[12,13] Hypothyroidism can cause prolongation of the telogen phase.
Examination of the tongue	Macroglossia (enlarged, swollen tongue with teeth imprints) commonly seen due to accumulation of mucopolysaccharides.
Galactorrhea	Patients (non-breastfeeding) may experience galactorrhoea. This is due to an increase in prolactin, due to compensatory increases in the discharge of central hypothalamic thyrotropin-releasing hormone (TRH) due to low T4.[14]

Causes

HT is believed to be triggered by a complex interplay between genetic and environmental factors.

Genetics[15]

Polymorphisms in:

- Human leukocyte antigens (HLA) I & II
- Immunoregulatory genes
- Thyroid-specific genes e.g., thyroglobulin (TG)
- Genes associated with antibody synthesis (e.g. BACH2)

Environmental factors[16]

- Age: occurs at any age, however, peaks in 30-50yr females
- Environmental toxins e.g., phthalates and flame retardants
- Presence of other autoimmune diseases increases risk
- Infections
- Sex steroids

Sex steroids

HT shows sex-specific and age-dependent incidences with females showing higher susceptibility than males hypothesised to be due to activation of genes on the X-chromosome.[17] HT is commonly diagnosed in pregnancy,[18] post-partum and perimenopause[19] triggered by the complex interplay occurring between the immune system and sex hormones.

Practitioners should therefore be mindful to investigate the sex hormones and the menstrual cycle of a patient to ascertain whether these are a trigger for AIT dysfunction.

Stress & burnout

Sustained stress and trauma have been implicated in the pathogenesis of HT.[20,21] It is believed that exposure to stressors result in activation of the hypothalamic-pituitary-adrenal-thyroid axis[22] as well as redirection of the immune response from Th1 to Th2 dominance contributing to the development of HT. Prolonged psychological stress also impairs intestinal barrier function, driving dysbiosis and potential further autoimmune disease.[23]

Supplementation

Iodine

Iodine is necessary for optimal functioning of the thyroid gland including the manufacture of thyroid hormones. Excessive supplementation with iodine may damage thyrocytes via excess inflammation and oxidative stress induced by high amounts of iodine. Excess iodine can also induce autoimmunity, promoting the production of antibodies that function to damage and destroy thyroid hormones.[24,25]

Daily intake of iodine should remain at the RDI 150 mcg/day, increasing to 220 mcg/day in pregnancy and 270 mcg/day while breast-feeding.

Selenium

Selenium plays an important role in management of HT via the role of selenoproteins which are involved in iodothyronine deiodinase (ID), glutathione peroxidase (GSH-Px), and thioredoxin reductase (TR); supplementation has been shown to significantly decrease circulating TPO-Abs and TG-Abs in individuals with HT as well as decrease fT4/fT3 ratio, oxidative stress and inflammation.[26,27]

Optimal dosage appears to be 200 mcg/day for 3-6 months.[28]

Myo-inositol

Myo-inositol assists with biosynthesis of thyroid hormones. Supplementation has been shown to decrease thyroid antibodies and reduce pro-inflammatory chemokines.[29] Combining myo-inositol and selenium appears to be beneficial.

In a randomised controlled trial involving 168 individuals with HT, supplementation with a combination of myo-inositol (600 mg/day) plus selenium (83 mcg/day) taken over 6 months was more effective in improving levels of TSH and decreasing TPO-Ab and Tg-Ab compared to using selenium (83 mcg/day) alone.[30]

Iron

Iron is required for the synthesis of thyroid hormones. Deficiency blocks the activity of thyroid peroxidase preventing synthesis of thyroid hormone and reduces conversion of T4 to T3.[31] It is important that iron deficiency in HT may not always be due to dietary deficit; lack of thyroid hormone itself may be a driver of anaemia since thyroid hormones stimulate erythropoiesis by acting directly on bone marrow.[32] In this situation, increasing levels of thyroid hormone will assist with improving iron status more successfully than just trying to supplement with iron alone. Where the anaemia is not responsive to supplementation (resistant anaemia) this may be due to anaemia of chronic disease (HT) or because of another co-existing condition such as coeliac disease that may be impairing absorption.

Optimal dosage of iron is dependant on deficiency and nutritional status.

Vitamin D

Low levels of vitamin D are associated with increased risk of HT. Meta-analysis reveal that vitamin D supplementation may reduce TGAb and TPOAb titres in individuals with HT.[33] Beneficial effects of vitamin D supplementation appear to be increased if individuals received vitamin D3 and the duration of treatment was >3 months.[34] The actions of vitamin D appear to be multifaceted but are hypothesised to involve immune modulation as well as its ability to reduce inflammation. Polymorphisms of the VDR gene have been implicated with increased risk of HT and may subsequently decrease vitamin D activity.[35] This may explain why some individuals do not respond to vitamin D supplementation.

Research suggests up to 7000 IU/day of vitamin D to assist with modulating the immune system (depending on deficiency status).[41,42]

Zinc

Zinc is needed for the synthesis of TRH & TSH and functions as a co-factor for the deiodinases 1 & 2 assisting with conversion of T4 to T3.[36] Zinc is also required for expression of thyroid transcriptase factor 2 and subsequent gene expression of thyroglobulin and thyro-peroxidase.

Optimal dosage of zinc is dependant on deficiency and nutritional status.

Nutrition

Gluten free

A gluten free diet has been shown to assist with reducing serum titres of TPO-Ab and Tg-Ab in women with HT over a 6-month period.[37,38] Consumption of gluten is associated with IP; Intestinal hyperpermeability is associated with auto-immune processes and the development of HT by promoting bacterial translocation and subsequent inflammation.

Autoimmune Protocol (AIP)

While the AIP diet is commonly recommended as a dietary strategy for the management of HT, it has not been shown to beneficially impact thyroid function in clinical studies. In a small study involving 17 women implementing the AIP diet, no statistically significant changes were noted in TSH, FT, FT3 or thyroid antibodies, however hs-CRP - a measure of inflammation - decreased significantly by 29% at the end of the intervention, suggesting it may be useful to decrease systemic inflammation in this population.[39]

Stress management

An 8-week RCT involving 60 women with HT observed a statistically significant decrease in TG-Abs as well as an improvement in mood (anxiety, depression) and perceived stress compared to the control group. Individuals in the intervention group were provided 8 weekly sessions of lifestyle modification and stress management, including diaphragmatic breathing, cognitive reconstruction, guided imagery, and diet adjustments compared to standard care.[40] Changes in anti-TPO Abs and TSH were not statistically significant between the groups. The improvement in mood, stress, and decrease in TG-Abs highlights the efficacy of stress management as a tool for the management of HT.

Hashimoto's protocol

- Stress management – yoga, diaphragmatic breathing, cognitive reconstruction
- Identify and manage triggers e.g., sex hormones
- Myo-inositol (600 mg/day) + selenium (200 mcg/day)
- Vitamin D – dose dependent on vitamin D status
- Diet - gluten free, whole food diet, avoid fasting and include dietary seaweed as a source of iodine.

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