

BMSH4302 | Week 4: Diabetes and Metabolic Disease

Resource Sheet A

Hypothyroidism and Hashimoto's Thyroiditis

Your task: Read this sheet carefully. You will first discuss it with a partner who has the same sheet, then teach it to someone who has NOT seen it. Focus on what the condition is, what causes it, what the signs and symptoms are, and how it affects quality of life.

What is hypothyroidism?

Hypothyroidism means the thyroid gland is underactive. It does not produce enough thyroid hormones (T3 and T4). These hormones control the body's metabolic rate, so when levels are low, everything slows down. Heart rate, digestion, temperature regulation, energy production, and brain function are all affected. Think of it as the body's thermostat being turned too low.

What is Hashimoto's thyroiditis?

Hashimoto's thyroiditis is the most common cause of hypothyroidism in the UK. It is an autoimmune disease. The immune system produces antibodies that gradually attack and destroy the thyroid gland. Over time, the damaged thyroid can no longer produce enough hormone.

This is the same type of immune malfunction seen in Type 1 diabetes, where the immune system attacks the insulin-producing beta cells of the pancreas. The pattern is the same: the body's own immune system destroys a hormone-producing organ. The target differs, but the underlying problem is identical.

Prevalence and incidence

Hypothyroidism affects approximately 2 to 4% of the UK population. That equates to roughly 2 to 3 million people receiving treatment. Women are 5 to 10 times more likely to be affected than men, and the risk increases significantly with age. More than 1 in 10 people over the age of 70 have the condition. In addition, an estimated 4 to 10% of the population have subclinical hypothyroidism (mildly abnormal blood results without obvious symptoms), meaning the true burden is considerably larger than diagnosed numbers suggest.

A 2024 study using the SAIL Databank in Wales identified nearly 200,000 people with subclinical hypothyroidism between 2000 and 2021, with 63.8% being female (Bauer et al., 2024).

Aetiology

The principal cause in the UK is Hashimoto's thyroiditis, driven by autoimmune destruction of thyroid tissue. There is a strong genetic component; if a close relative has thyroid disease or another autoimmune condition such as Type 1 diabetes, rheumatoid arthritis, or coeliac disease, the risk increases substantially. Other causes include iodine deficiency (historically significant, less so in the UK today), previous thyroid surgery or radioactive iodine treatment, and certain medications including lithium and amiodarone. Environmental triggers such as stress, smoking, infection, and hormonal changes (pregnancy, menopause) may initiate the autoimmune process in genetically susceptible individuals.

Pathology

In Hashimoto's, autoantibodies infiltrate the thyroid gland and cause chronic inflammation. Thyroid cells are progressively destroyed. The pituitary gland responds by producing more TSH (thyroid-stimulating hormone), essentially trying to shout louder at the failing thyroid. Elevated TSH with low T4 is the key diagnostic pattern. With insufficient thyroid hormone, metabolic rate drops across all body systems. Every cell receives the signal to slow down.

Signs and symptoms

Because metabolism slows, symptoms reflect everything running too slowly. Patients typically experience fatigue, lethargy, and depression, often described as "brain fog" or difficulty concentrating. Weight gain occurs despite normal or reduced food intake because the body is burning fewer calories. Cold intolerance is common, with patients feeling cold when others are comfortable. Heart rate slows (bradycardia) and cholesterol levels rise, increasing cardiovascular risk.

Physical changes include dry, coarse skin, brittle and thinning hair, and brittle nails. The face and hands may become puffy due to a condition called myxoedema. The voice may become hoarse or deeper. Constipation develops because gut motility slows down. Women may experience heavy or irregular periods and reduced fertility. Muscle aches, stiffness, and weakness are also common.

Many of these symptoms overlap with depression, menopause, chronic fatigue, and what is often dismissed as "normal ageing". This means hypothyroidism is frequently underdiagnosed, particularly in women. A simple blood test measuring TSH and T4 can confirm the diagnosis.

Risk factors

Non-modifiable risk factors include female sex, older age, family history of thyroid or autoimmune disease, and the presence of other autoimmune conditions. Modifiable or environmental risk factors include iodine intake, smoking, high stress, and certain medications.

Quality of life

Chronic fatigue significantly limits daily activities and can be profoundly debilitating. Weight gain is distressing and difficult to manage when metabolism is suppressed. Depression and cognitive difficulties affect work performance, relationships, and self-esteem. Many patients report feeling dismissed by healthcare professionals who attribute their symptoms to stress or menopause before testing thyroid function. This is a recurring theme in chronic disease affecting women.

Treatment with levothyroxine (a synthetic thyroid hormone taken daily for life) is effective, and most people feel significantly better within weeks of starting. However, finding the right dose can take time, and some patients report persistent symptoms even when blood results appear normal.