

Understanding
Thyroid Disorders

Dr Anthony Toft

Published by Family Doctor Publications Limited
in association with the British Medical Association

IMPORTANT

This book is intended not as a substitute for personal medical advice but as a supplement to that advice for the patient who wishes to understand more about his or her condition.

Before taking any form of treatment
YOU SHOULD ALWAYS CONSULT YOUR MEDICAL PRACTITIONER.

In particular (without limit) you should note that advances in medical science occur rapidly and some information about drugs and treatment contained in this booklet may very soon be out of date.

All rights reserved. No part of this publication may be reproduced, or stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording and/or otherwise, without the prior written permission of the publishers. The right of Dr Anthony Toft to be identified as the author of this work has been asserted in accordance with the Copyright, Designs and Patents Act 1988, Sections 77 and 78.

© Family Doctor Publications 1995–2008
Updated 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002,
2003, 2004, 2006, 2008

Family Doctor Publications, PO Box 4664, Poole, Dorset BH15 1NN

ISBN-13: 978 1 903474 19 8
ISBN-10: 1 903474 19 1

Contents

Introduction	1
Overactive thyroid	8
Underactive thyroid	37
Thyroid disease and pregnancy.....	50
Enlarged thyroid.....	60
Thyroid cancer.....	73
Thyroid blood tests.....	85
‘Hypothyroidism’ with normal blood tests.....	90
Questions and answers.	95
Glossary.....	100
Useful addresses	105
Index	111
Your pages.....	121

About the author



Dr Anthony Toft CBE, MD, FRCP

is a Consultant Physician and Endocrinologist at the Royal Infirmary of Edinburgh where he specialises in the diagnosis and management of patients with thyroid disease. Dr Toft has been President of the British Thyroid Association and President of the Royal College of Physicians of Edinburgh.

Introduction

What is the thyroid gland?

The thyroid gland lies in the front of the neck between the skin and the voice box. It has a right and left lobe each about five centimetres in length and joined in the midline. The entire gland weighs less than an ounce (about 20 grams). Despite its small size it is an extremely important organ which controls our metabolism and is responsible for the normal working of every cell in the body.

Thyroid hormones

The thyroid gland achieves this control by manufacturing the hormones (see Glossary, page 100) thyroxine (T_4) and triiodothyronine (T_3) and secreting them into the bloodstream.

Iodine is an important constituent of these hormones. There are four atoms of iodine in each molecule of thyroxine, hence the abbreviation T_4 , and three atoms of iodine in each molecule of triiodothyronine or T_3 .

Doctors believe that T_4 starts to be active only when it is converted, mainly in the liver, to T_3 by the removal of one atom of iodine. In parts of the world where there is a severe lack of iodine in the diet, such as the

Iodine-deficiency goitre

The red areas on this world map show the regions of the world in which iodine-deficiency goitre is a common disorder. This occurs largely as the soil, and consequently food, lacks sufficient iodine.



Himalayas, there is not enough iodine for the thyroid gland to make adequate amounts of T_3 and T_4 . In an attempt to compensate, the thyroid gland enlarges to form what is known as a goitre, which is visible. If this extra manufacturing capacity is still inadequate, the patient develops an underactive thyroid gland (see page 37).

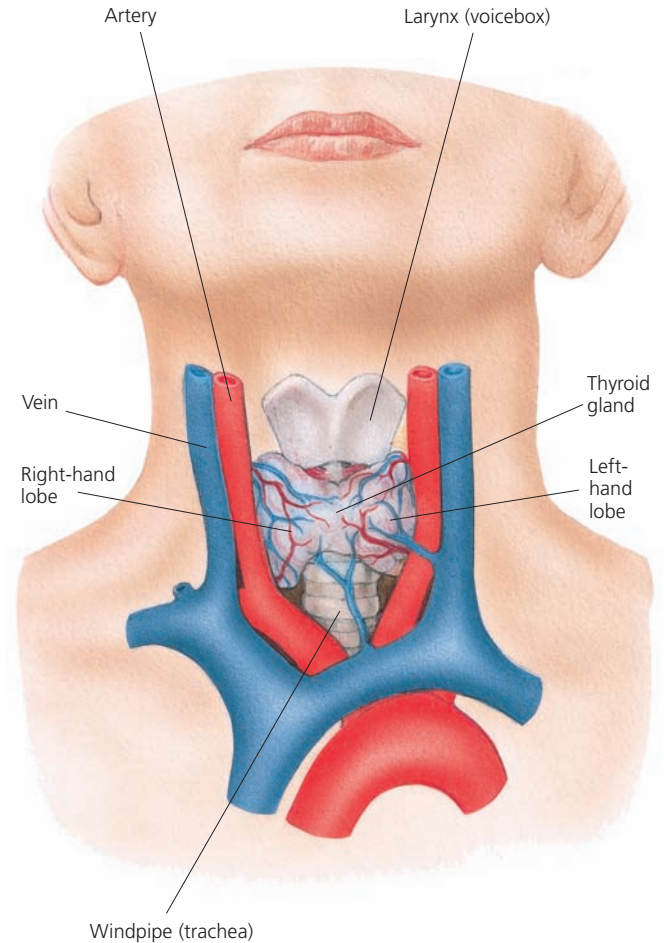
Iodine deficiency is not present in the UK. Sometimes too much iodine in the diet causes the thyroid gland to produce excessive amounts of thyroid hormones. This can also be a result of medication.

Balancing the hormones

In healthy people the amounts of T_3 and T_4 in the blood are maintained within narrow limits by a hormone

Thyroid gland

The thyroid gland lies in the neck between the skin and the voice box (larynx). The thyroid gland is a butterfly-shaped gland consisting of two lobes, one on each side of the trachea (windpipe).

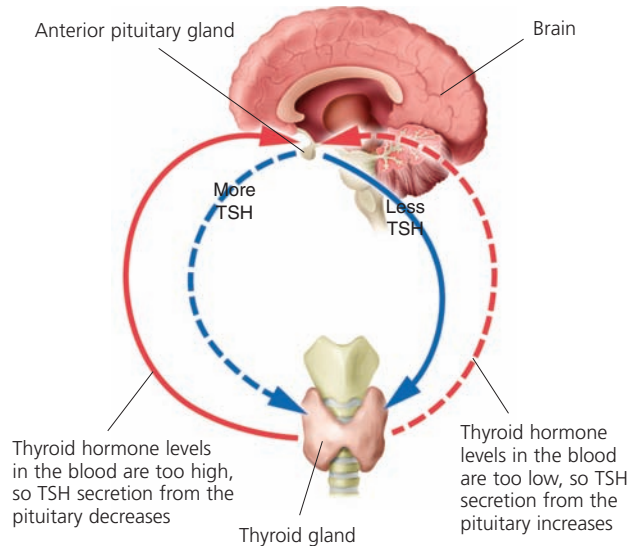


known as thyroid-stimulating hormone (TSH) or thyrotrophin. TSH is secreted by the anterior pituitary gland which is a pea-size structure, hanging from the undersurface of the brain just behind the eyes, and enclosed in a bony depression in the base of the skull.

When thyroid disease causes thyroid hormone levels in the blood to fall, TSH secretion from the pituitary is increased; when thyroid hormone levels rise, TSH secretion is switched off – a relationship known as ‘negative feedback’, familiar to engineers and biologists.

Thyroid hormone production

The production of thyroid hormones by the thyroid gland is regulated by the pituitary gland, which produces thyroid-stimulating hormone (TSH) in response to the levels of thyroid hormones in the blood.



Hypothyroidism and hyperthyroidism

If your GP suspects that you may have an underactive thyroid gland (hypothyroidism), his or her diagnosis can be confirmed by sending a sample of your blood to the laboratory for analysis. Low levels of T_3 and T_4 and high levels of TSH in your blood mean that your doctor was right. Similarly, the diagnosis of an overactive thyroid gland (hyperthyroidism) is confirmed by high levels of T_3 and T_4 and low levels of TSH. The results will be available within a few days.

Patients with uncomplicated hypothyroidism will not usually be referred to hospital and your GP can prescribe and monitor your treatment. Most patients with hyperthyroidism or with abnormal growth of the thyroid gland will be referred to a hospital specialist for further investigation and advice about treatment.

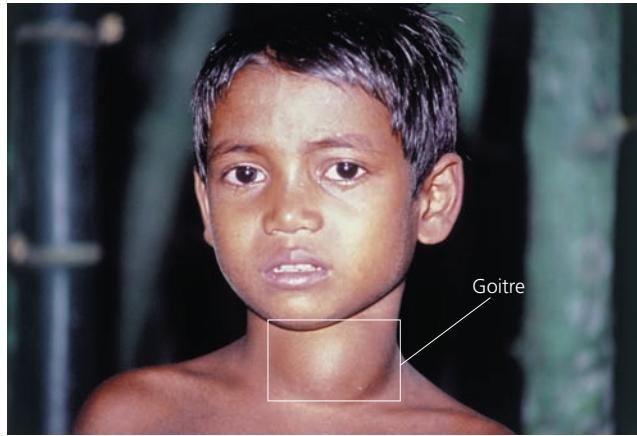
Thyroid disease is common and hyperthyroidism, hypothyroidism or abnormal growth or enlargement of the gland (goitre or thyroid nodule) affects about one in 20 people. Most diseases of the thyroid can be successfully treated, and even thyroid cancer, which is rare, may not lead to a reduction in life expectancy if detected early and treated appropriately.

Thyroid disease often runs in families but in an unpredictable manner, and certain forms are associated with an increased risk of developing conditions such as diabetes mellitus or pernicious anaemia. All types of thyroid disease are more common in women.

The following chapters deal with each of the most common thyroid disorders individually.

Case history

Ahmed was born in a village in the high mountains of northern Pakistan where he spent most of his childhood.



At the age of 20 he came to London to study engineering when, at a routine medical examination, he was noticed to have a goitre. He felt well and all the thyroid tests were normal.

The cause of the goitre was attributed to iodine deficiency when Ahmed told the doctor that most of the people in his village also had a goitre. His diet had contained enough iodine to prevent the development of hypothyroidism, but his goitre is likely to remain, even though he has decided to live the rest of his life in a part of the world where there is an adequate amount of iodine in his diet.

KEY POINTS

- Thyroid disease is common, affecting around one in 20 people
- More women than men are affected
- Your GP can diagnose the condition with a simple blood test
- Treatment is usually successful, and even thyroid cancer can be cured if caught early

Overactive thyroid

Graves' disease

An overactive thyroid gland (hyperthyroidism or thyrotoxicosis) results from the over-production of the thyroid hormones, thyroxine or T_4 and triiodothyronine or T_3 , by the thyroid gland. In three-quarters of patients this is the result of the presence in the blood of an antibody (see Glossary, page 100) that stimulates the thyroid, not only to secrete excessive amounts of thyroid hormones but also, in some, to increase the size of the thyroid gland, producing a goitre.

This type of hyperthyroidism is known as Graves' disease, named after one of the physicians who described the condition in considerable detail over 200 years ago.

The cause of the antibody production is not known but, as Graves' disease runs in families, genes (see Glossary, page 100) must play a part. There is thought to be some environmental trigger that starts off the disease in genetically susceptible individuals, but the culprit has not been identified. Stress, in the form of major life events, such as divorce or death of a close relative, may play a role.

Some patients with Graves' disease develop prominent eyes (exophthalmos or proptosis) and a few



Robert Graves, 1796–1853

also suffer from raised, red, itchy areas of skin on the front of the lower legs or on the top of the feet, which are known as pretibial myxoedema. These, like the production of the thyroid-stimulating antibodies, are caused by an abnormality in the patient's immune system which doctors don't yet fully understand. Most other patients with hyperthyroidism have a goitre containing one or more nodules or 'lumps'. These over-produce thyroid hormones in their own right and are not under the control of TSH, as is the normal thyroid gland.

Graves' disease can come on at any age but most commonly affects women aged 40 to 50 years. Between a third and a half of all patients will have a single episode of hyperthyroidism lasting several months. The rest will have successive episodes of hyperthyroidism over many years. Unfortunately, it is not possible to predict the

pattern of hyperthyroidism when it first occurs. Hyperthyroidism resulting from a nodular goitre is unusual before the age of 40 and, unlike in some patients with Graves' disease, it persists indefinitely once it has developed.

What is the pattern of development?

In retrospect, most patients will have had symptoms for at least six months before they go to see their doctors, but in some, usually teenagers, the onset is more rapid with symptoms present for only a few weeks. Not all patients with hyperthyroidism have all the symptoms listed below. In elderly people the predominant features, in addition to weight loss, are often a reduction in appetite, muscle weakness and apathy. A young woman, on the other hand, may appear to be full of energy and be unable to sit still for more than a few seconds.

Symptoms of an overactive thyroid

Weight loss

This happens to almost all patients as a result of a 'burning off' of calories caused by the high levels of thyroid hormones in the blood. You will probably find you're hungry all the time, and that you even have to get up in the night to get something to eat. The degree of weight loss varies from 2–3 kilograms to as much as 35 kilograms or more, but a few people find that their appetite increases to such an extent that they may gain a little weight. If you are severely overweight when the condition first starts, you'll probably be delighted to find that you're losing weight and put it down to dieting, but sadly you'll put the weight back on once you're being treated.

Heat intolerance and sweating

As metabolism is increased, your body produces excessive heat which it then gets rid of by sweating. You won't enjoy warm weather or a centrally heated environment and may feel comfortable scantily dressed on a crisp winter's day. In extreme cases, your inability to tolerate heat may lead to disagreements with friends and colleagues as you're constantly turning heating thermostats down, opening windows and tossing blankets or duvet off the bed.

Irritability

This most often affects women with a young family. You may find yourself increasingly unable to cope with the demands and stresses of looking after the children, lose your temper frequently, and find that you're abnormally sensitive to criticism, bursting into tears for no apparent reason. You may find it difficult to concentrate, which can adversely affect your performance at school, college or work.

Sleep disturbance and altered energy levels

Hyperthyroidism acts on the brain in a way that is similar to an overdose of caffeine, initially creating a feeling of extra energy. With mild hyperthyroidism, this may be felt as a benefit initially, but quickly gives way to disturbed sleep, an inescapable feeling of useless energy and a sensation of being unable to rest or even sit still.

It often results in worsening fatigue or even exhaustion, partly because of sleep deprivation. This in turn worsens the irritability, emotional instability and lack of concentration, which also come from hyperthyroidism.