

THYROID ENLARGEMENT IN BATU PAHAT DISTRICT

BY

T. N. C. ROE

Medical Officer-in-Charge, Government Hospital, Batu Pahat

The subject matter on which I base this talk has been compiled from cases seen by me between the months of July 1958 to May 1960, a period of 23 months. The figures are not at all complete, as not all cases in the District come for treatment, and many go down to Johore Bahru, without ever having come to this Hospital for preliminary investigation. Nevertheless the cases reported here have been clinically investigated by me. They do not give a true percentage of Thyroid enlargements in the District of Batu Pahat.

Simple Goitre					Thyrotoxic Goitre				
Sex		Race			Sex		Race		
M.	F.	Mal.	Chi.	Ind.	M.	F.	Mal.	Chi.	Ind.
2	2	—	2	2	—	12	3	9	—
4					12				

Exophthalmic Thyrotoxic					Adenoma Thyroid				
Sex		Race			Sex		Race		
M.	F.	Mal.	Chi.	Ind.	M.	F.	Mal.	Chi.	Ind.
1	4	—	5	—	—	9	2	7	—
5					9				

Nodular Goitre with toxic manifestation					Thyroglossal Cyst				
Sex		Race			Sex		Race		
M.	F.	Mal.	Chi.	Ind.	M.	F.	Mal.	Chi.	Ind.
—	1	1	—	—	—	2	—	2	—
1					2				

Cancer Thyroid				
Sex		Race		
M.	F.	Mal.	Chi.	Ind.
1	—	—	1	—

1

Total Thyroid enlargements	=	34
Percentage of Malays.	=	17.6%
" " Chinese.	=	76.5%
" " Indians.	=	5.9%
Male Percentage.	=	11.8%
Female Percentage.	=	88.2%
Average age.		25 - 30 years.
Cancer Thyroid.		57 years of age.

The enlarged thyroid gland in childhood and goitre in adult are the result of the body's efforts to maintain thyroid hormone production whenever dietary iodine is insufficient, or when goitrogenic substances in food stuffs prevent the utilization of iodine by the gland. Such enlargement is prevented by the administration of extra iodine. Genetic factors influencing the synthesis of thyroid hormone may also cause thyroid enlargement, but such conditions are rare. The enlarged gland in adolescence is often regarded as a normal physiological response because it diminishes and disappears at about the age of 20. There is no doubt however, that, in regions where the incidence of enlarged thyroid gland in adolescents is high, goitres also occur more often in adults.

The District of Batu Pahat extends from Minyak Beku in the west to Yong Peng in the East and from Semerah in the North to Rengit in the South, an area of about 600 square miles, and has a population of nearly 200 000 inhabitants. The Town of Batu Pahat, the Headquarters of the District has a population of about 44,000 people. The amount of Iodine in the soil and circulating water is not known, but a level below 3 to 5 micro gram per litre is generally regarded as goitrogenic. (Mc Clendon and Williams 1923). Again if the calcium content of the water is high, such water is believed to interfere with the utilization of Iodine. (Taylor 1958).

The main sources of Iodine in the dietary, apart from sea fish, are milk, vegetables, and cereals. The iodine in drinking-water contributes to a lesser degree directly but also influences the iodine content of locally grown farm produce. Of the 100 to 150 micro gram of Iodine needed

daily to maintain good health, about one-half to one-third may be derived from milk. Sea foods are readily available, and also supply a large part of the Iodine necessary for the body.

The work of McCarrison and others indicates that dietary factors, other than iodine deficiency, are also concerned in the production of goitre. Diets deficient in the fat-soluble vitamins and in Vitamin C appear to be conducive to its development. The ingestion of excessive quantities of fat or protein (especially of liver) also predisposes to it. Members of the Brassica family, (e.g.) cauliflower, Brussels sprouts, etc. are also goitrogenic. Cases of goitre in man resulting from a diet containing a large proportion of cabbage have been reported. This is due to the high cyanogen content in vegetables of the Brassica family. The goitrogenic effect of cyanides is dependent upon their property of depressing tissue oxidations, increased Thyroid function being a compensatory reaction instituted to oppose this action.

The possibility of infected drinking water in some instances, plays a role in the development of goitre. It is also possible that certain micro-organisms in the intestinal tract may reduce the quantity of iodine absorbed from the food.

Goitre is a generic term which may be applied to almost any non-inflammatory and non-malignant swelling of the thyroid gland. They may be classified as follows:—

- A. Simple goitres. These are unaccompanied by constitutional factors. They are subdivided upon a histological basis into 3 groups.
 - (1) Colloid (diffuse).
 - (2) Parenchymatous (diffuse).
 - (3) Adenomatous (nodular).
- B. Goitres associated with a deficiency of the thyroid hormone (hypothyroidism).
 - (1) Cretinism.
 - (2) Myxoedema.
- C. Goitres associated with an excess of the thyroid hormone (hyperthyroidism).
 - (1) Exophthalmic goitre.
 - (2) Toxic adenoma.

DIFFUSE COLLOID GOITRE

The alveoli are large, distended with colloid and lined by low cuboidal or flattened epithelial cells. The iodine content per gramme of gland tissue is low.

DIFFUSE PARENCHYMATOUS GOITRE

Hypertrophy and multiplication of the cells lining the alveoli, with great reduction in the amount of colloid material are characteristic features of this type. The epithelial cells are high columnar. The iodine content is low, much less than 0.1% of its dried substance. The quantity of iodine in the normal human thyroid is about 2 mgms per gram of dried tissue; the average total store in the gland is from 10 to 15 mgms: A content below 1 mgm per gram of dry gland, is indicative of definite thyroid abnormality.

ADENOMATOUS GOITRE

As a result of the formation of isolated tumour like masses of thyroid tissue (adenomata) the glandular enlargement is asymmetrical or nodular. The minute structure of the adenoma may resemble a section of colloid or of parenchymatous goitre, or it may undergo cystic changes. The alveoli may be unusually small contain little colloid and resemble foetal thyroid tissue. The iodine content of the nodule may be normal or high, while that of the rest of the gland is usually low.

Enlargement of the thyroid gland may occur at puberty, or during pregnancy. A certain degree of thyroid enlargement at these times is physiological.

EXOPHTHALMIC GOITRE

The gland usually shows a picture typical of parenchymatous goitre, i.e. hypertrophy and hyperplasia, its iodine content is low. The blood iodine is elevated. The blood supply of the gland is greatly increased, the rush of blood through the superior thyroid arteries often produces a loud bruit or a distinct thrill. In addition to this thyroid enlargement, the chief features of the fully developed condition are:

(a) Accelerated pulse 100 to 160 per minute; cardiac dilatation and hypertrophy; auricular fibrillation; flushing of the skin, and moistness of the palms, feet and other exposed parts of the body.

(b) Nervous excitability.

(c) A fine involuntary tremor.

(d) General muscular weakness.

(e) Protrusion of the eyeballs, widening of the palpebral fissure due to retraction of the upper lid, tremor of the closed lids and sometimes palsies of ocular muscles may occur.

(f) Increased metabolic rate to varying degrees up to 80% above normal.

(g) Wasting.

(h) Nitrogen and calcium excretion increased with rarefaction of the skeleton.

(i) Disturbance of carbohydrate metabolism as is evidenced by hyperglycaemia, glycosuria and reduced sugar tolerance.

TOXIC ADENOMA

A simple adenomatous goitre may undergo increased functional activity and produce the features of pure hyper thyroidism. In toxic adenoma the rest of the gland is usually atrophic.

I have not touched on cretinism and myxoedema as I did not come across any such cases in this Hospital. They do not fall within the category of Thyroid enlargement on which this paper is based.

Chatin from 1850 to 1860 carried out some of the first scientific investigations into the relationship between iodine and goitre; he showed that the iodine content of the soil, water and air of goitrous districts was very low. He attributed the thyroid enlargement to this deficiency, and recommended iodine administration as a preventive. Goitre is not usually seen along the sea-board; but cases do occur, as is shown in this report. The sea contains an inexhaustible supply of iodine which has been leached from the soil. Sea water contains about 0.02 mgms of iodine per litre; fresh water, as a rule, very much less. The further away from the ocean, and the more mountainous the country, the lower is the concentration of iodine in the food and water, and the higher in consequence is the incidence of goitre. The employment of small amounts of iodine in goitre districts has proved to be a preventive measure of the utmost value. Many preparations of table salt have this essential added in a proportion of 1 part in 10,000. Once goitre has become established iodine administration is of much less value but, as already mentioned, a hyperplastic parenchymatous goitre may be converted to the less severe colloid type.

Iodine in the form of lugol's solution (Iodine, 1 grm; potassium Iodide, 2 grms; water 30 c.c.) 10 to 40 minimums daily, is invaluable in the treatment of exophthalmic goitre. The symptoms abate, there is a pronounced fall in the Basal metabolic rate and the danger of a thyroid crisis is reduced, or if a crisis has commenced, it may be ameliorated or checked.

Thiourea, and thiouracil, propyl thiouracil, methyl thiouracil, and neo-mercazol, depress thyroid hormone production and lower the metabolic rate. Other compounds, (e.g.) Sulphonamide drugs, potassium thiocyanate and amino benzene compounds, including para-amino benzoic acid also inhibit thyroxine production.

These drugs when administered to cases of thyrotoxicosis, produce a functional or chemical thyroidectomy. They induce thyroid hyperplasia, together with a low metabolic rate and other evidence of hypothyroidism. They prevent the oxidation of the iodide to iodine. They do not inhibit the action of thyroid hormone upon the tissue cells.

From a recent survey of thyroid enlargement among schoolchildren in North Oxfordshire. Taylor (1958) in discussing the evolution of toxic goitre from simple nodular goitre has pointed out that the cost to England of not using iodised salt must be immense if calculated in terms of the demands made on the medical services by the loss of working-time. This may be true also of Malaya.

REFERENCES

1. British Encyclopaedia of Medical Practice.
2. Physiological Basis of Medical Practice — Best and Taylor.
3. British Medical Journal — January 31, 1959.



Aberrant Thyroid with a large Thyroglossal cyst. No Thyroid tissue seen in normal anatomical site. Woman aged 50 years.



Nodular Goitre.
Woman aged 34 years.



Cancer Thyroid gland. Man aged 57 years.