

CHAPTER IV.
DISEASES OF THE THYROPARATHYROID
APPARATUS.

DISORDERS DUE TO DEFICIENT ACTIVITY OF THE
THYROPARATHYROID APPARATUS.

IN the light of the data and conclusions submitted in the preceding chapter, the phenomena awakened by functional disorders of any kind in the parathyroid apparatus should be of two kinds: those due to excessive functional activity now known as "hyperthyroidism," and those due to inadequate functional activity, and designated as "hypothyroidism." A third class, termed by Léopold-Lévi and Rothschild "thyroid instability," introduces both the former types, but either in alternation or concomitantly in the same subject. In the present chapter we shall consider the first type, viz., that in which, as stated in the above heading, the functions of the thyro-parathyroid apparatus are inadequate, in that the secretion it supplies the organism is insufficient to carry on normally the functions described in the foregoing pages.

The classification of the disorders due to deficient activity of the thyroid apparatus being in its formative stage, so to say, many expressions and terms have been introduced, such as "thyroid insufficiency" or "inadequacy"; "hypothyroidism," or "attenuated," "benign," "incomplete myxœdema"; "myxœdeme fruste," and others, to denote the milder forms of this disorder; and quite as many others to designate the severe forms considered in the next chapter. None of these terms seem to me to interpret satisfactorily the morbid process in question. Restricting ourselves for the moment to the milder forms, such terms as "thyroid insufficiency" or "inadequacy" are too cumbersome; "hypothyroidism" implies the presence of a habit such as "alcoholism"; "incomplete myxœdema" and "myxœdeme fruste" are not applicable in most instances of this disorder, since no myxœdema of the skin, mucous membranes, etc., is discernible.

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Worst of all is the term "athyrea," which perverts the name of the gland, "thyro-" or "thyroid" being necessary in composition to indicate a connection with the "shield-like cartilage." It has appeared to me, therefore, that the simplest term would fill our needs best, until the many morbid states and syndromes it covers will have been, to say the least, more accurately identified. Of all the terms available is that adapted from the French "hypothyroïdie," i.e., *hypothyroidia*, which also presents the advantage of corresponding as to its terminal with anemia, hyperchlorhydria, and many other terms in current use.

As to the pathogenesis of this condition, it must also be said that at the present time little or no effort is made by writers to explain the manner in which thyroid insufficiency brings about each of its characteristic symptoms. The functions I have attributed to the thyroid and to the adrenals in the preceding chapters enable us to do otherwise. In the present connection, therefore, it is essential to recall that, with these functions in abeyance or depressed, we shall have to deal with three essential morbid factors:—

1. Deficient tissue oxidation, the rate of metabolism and nutrition in all tissues, particularly those rich in phosphorus, such as the nervous system, cellular nuclei, etc., being retarded.
2. Deficient breaking down of waste products, fats, etc. (slowed metabolism entailing deficient catabolism), with accumulation of fat, detritus, wastes, etc., in the blood and tissues as a result.
3. Deficient resistance of the body to infection and intoxication, owing to insufficient production of opsonin (the thyro-parathyroid secretion) and of the other antitoxic and germicidal blood constituents and phagocytic cells, as a result of the slowed metabolism in all organs producing them.

HYPOTHYROIDIA.

(Chronic Benign Hypothyroidia; Hypothyroidism; Incomplete Myxœdema; Myxœdème Fruste.)

The term "hypothyroidia" is intended to include all conditions of the organism that are due to deficiency of the thyro-parathyroid secretion, but not the advanced types of this condition, such as myxœdema and cretinism, which are reviewed

farther on. It includes the so-called "incomplete" form, and, as such, is far more important clinically than even myxœdema, since, as we shall see, it forms part of, or complicates pathogenically, many diseases that we meet almost daily in practice.

The history of hypothyroidia is linked with that of its more severe form, myxœdema. The results of surgical removal of the thyroid by the brothers Reverdin were reviewed early in the preceding chapter. The medical side of the question, as regards the milder form with which we are now concerned, was first described by J. L. Reverdin,¹ one of the two brothers referred to above, in 1887, who gave it the name of *myxœdème fruste*. Valuable articles on the subject were then contributed by Thibierge,² Chantemesse and Marie,³ Murray⁴ and Brissaud,⁵ and others, in which many cases were reported, but that of Hertoghe,⁶ of Antwerp, in which he termed the disorder "chronic benign hypothyroidia" is worthy of special attention owing to the multiplicity of clinical features introduced and the accuracy of the author's conclusions.

While many symptoms of hypothyroidia are witnessed in myxœdema, the latter in its typical form is a comparatively rare disease. The former is also thought to be infrequent, but this is merely because it generally passes unrecognized. This is mainly due to its classic association with the frank type of myxœdema, which leads the clinician to seek for the most salient symptoms, *e.g.*, cutaneous myxœdema, dry skin, the mask-like face, etc. Not finding these phenomena he transfers his analysis of the case to other possible morbid processes. In truth, the symptom-complex of hypothyroidia does not, in the great majority of cases, include the prominent symptoms of myxœdema. Moreover, while the latter disease is progressive when left untreated by modern methods, hypothyroidia is not; but it keeps the patient in a state of perpetual torment. The physician, failing to recognize the true identity of the trouble, leaves the patient a prey to acute suffering from so-called rheumatism, neuralgia,

¹ Reverdin: *Revue méd. de la Suisse Romande*, vol. vii, p. 275, 1887.

² Thibierge: *Gazette des hôpitaux*, vol. lxi, p. 117, 1891.

³ Chantemesse and Marie: *Bull. et mém. de la Soc. méd. des hôpitaux de Paris*, vol. xi, p. 124, 1894.

⁴ Murray: *British Medical Journal*, Oct. 1, 1898.

⁵ Brissaud: "*Nouv. iconographie de la Salpêtrière*," p. 240, 1897.

⁶ Hertoghe: *Ibid.*, p. 261, 1898.

tic douloureux, sciatica, etc. The sufferer finally abandons treatment—at least that offered by medical men.

Another perhaps still broader field in which the recognition of hypothyroidia is of great practical importance is the process of development, physical and mental, of the child. We have sufficient evidence of the effects of athyroidia (complete deficiency of normal thyro-parathyroid secretion) in cretinism, *i.e.*, infantile myxœdema. That a reduction of the same secretion should compromise correspondingly the physical and mental welfare of a child without necessarily branding it with the physical signs of cretinism is an established, though little recognized, fact. Indeed, a large proportion of backward children and the oft-punished laggards of the class-room are but sufferers of hypothyroidia.

Finally, certain diseases, syphilis, tuberculosis, and other infections, and also certain abuses of the physical powers, such as multiple pregnancies, prolonged lactation, excessive venery, or masturbation, so weaken the thyro-parathyroid apparatus and the adrenals, with which it is, we have seen, intimately linked functionally, that hypothyroidia results. The recognition of this condition as an underlying factor means not only a marked development of our diagnostic resources, but it affords also opportunities for successful therapeutics where, before, failure was the rule.

A definition which appears to me to facilitate the recognition of this disease is the following:—

Hypothyroidia is a constitutional disease due to deficient functional activity of the thyro-parathyroid apparatus, when the secretory activity of the latter is not sufficiently impaired to give rise to the most advanced and progressive type of the disease: myxœdema. The symptoms of hypothyroidia most frequently met with, separately or unitedly, are: severe occipital and interscapular pain, obesity with supraclavicular fat pads, hypothermia, loss of hair and teeth, lassitude, stubborn constipation, and mental torpor, supplemented in children by slow physical, mental, and irregular skeletal development, enlargement of the lymphatic glands, and, occasionally, enuresis.

SYMPTOMATOLOGY.—The symptomatology of hypothyroidia includes many of the symptoms of the asthenic disorders of

nutrition, but, as there exist many gradations of this condition, hypothyroidia representing as many degrees of thyroparathyroid secretory activity, its symptoms are more or less prominent both in number and intensity.

These patients usually apply for relief of pain of some kind, particularly pain in the back or in the occipital region, and occasionally for migraine or neuralgia. The "backache" may consist of sacrolumbar pains, of coccygodynia, or in most instances of very severe deep-seated pain between the shoulder-blades, which rest in bed tends to aggravate rather than to improve. These phenomena are due to deficient catabolic activity, the blood being laden with toxic products—a known cause of such symptoms. That rest in bed should aggravate the condition is self-evident: it merely slows still more the oxidation process and thereby encourages the catabolic torpor. They complain of feeling fatigued, languid, somnolent on rising, and of being in every way worse; while, as the day wears on, their condition improves. Their temperature is low, and they complain of always feeling cold, especially at the extremities. Their hands are flabby, damp, though cold chills may even be complained of. We have here an evidence of the slow metabolic activity referred to above, every sign of deficient oxidation being present. This explains also why a copious meal, especially if it includes the use of alcoholic beverages, should be a source of great relief in these cases, and why, also, they readily become addicted to the immoderate use of alcohol as a "stimulant."

A close examination then reveals other morbid phenomena which are obviously due to the defective nutrition of all tissues which hypothyroidia entails. The patient appears much older than her age—women constituting a large proportion of these cases. The hair may be prematurely gray, showing a marked tendency to fall in patches from the forehead and median line, which tends to become wider, and from the occiput. This loss, which is attributed by the patient to the headaches, may be such as eventually to cause complete alopecia. In marked cases the hair may be coarse, dry, and brittle, as in the cretin. The eyebrows also show a tendency to fall, but, a characteristic sign of hypothyroidia: the loss is limited to the external or outer ends. This shortening of the eyebrows and the occipital loss of hair

denote, jointly, rather marked cases, though the shortened eyebrows are frequently met in the less severe. In the former, the skin of the face may also appear infiltrated and be hard to the touch, as in myxœdema, its color being waxy, with perhaps a reddish patch below each cheek-bone. Although the skin of the body may be normal, that of the legs, especially below the knees, usually feels rough, rasp-like, and may be scaly, the scales, which are readily detached, recalling dandruff, which is also present in most cases. Pads of fat especially prominent over the clavicle seem characteristic of rather marked cases. Such symptoms, which belong to true myxœdema, are rarely observed, however, though a waxy hue of the facial skin and puffy lids are not uncommon.

Dyspnoea or oppression, due to deficient oxygenation of the blood, is complained of on climbing stairs or during continued speaking. Palpitations, sometimes of a distressing character and with severe pain, may also occur. The heart is often found dilated with weak systole and occasional murmurs. The blood-pressure is low, from 80 to 110 mm. Hg., and the pulse weak and rapid. All these symptoms are directly traceable to the existing impairment of the oxidation and nutrition, the cardiac and vascular muscles suffering from this condition as well as all other organs. The blood-forming organs being also inadequately nourished, anæmia is the rule, the erythrocytes being usually reduced to about 3,000,000, with more or less anisocytosis. Every type of cellular alteration seems to have been observed in this disorder, but, as a rule, what changes occur are not very marked. The hæmoglobin may be considerably reduced.

The teeth, especially the molars, tend to become loose and carious unduly early, owing to the deficient calcium and phosphorus metabolism which deficient thyroparathyroid secretion entails, and need the constant attention of the dentist, who, as a rule, informs them that they are gouty—with "uric acid" as main cause of the dental trouble—not a misleading statement so far as the "gouty diathesis" is concerned, for it is closely linked also with hypothyroidia. The teeth are also exceedingly prone to become tartrous and require frequent cleansing. Where the teeth are neglected, as in the poor, they are rapidly lost, frequent toothache causing them to be drawn. The gums tend

to bleed readily when brushed and to recede from the teeth, and are red and swollen unless the toilet of the mouth be carefully attended to.

The deficiency of germicidal activity (phagocytic and humoral) manifesting itself where protection is usually quite active, *i.e.*, along mucous surfaces, the nasopharyngeal mucous membrane is also apt to be congested through the local accumulation of germs, the tonsils showing, for the same reason, a predilection to acute inflammation. The nasal mucosa is often found turgescient, owing to passive congestion of the underlying tissues. This gives the voice the nasal "twang," but it may also be husky or otherwise modified or veiled, through infiltration of the laryngeal mucosa. The singing voice tends to be false from the same cause, especially during the menstrual period. A "crick" in the larynx is commonly complained of.

Deficient metabolism and nutrition account for the general asthenia with lassitude and weakness of the knees, which is present in practically all cases. Fibrillary motions of the muscles and trembling occur in severe cases from the same cause. Constipation due to deficient peristalsis is also the rule, and it is often sufficiently obstinate to demand constant purgation—which tends to increase the intestinal torpor. Fecal impaction is not uncommon. The liver is passively congested and enlarged—a fact due to the low general vascular tension which explains also the presence of varicose veins, varicocele, and kindred vascular disorders frequently observed in these cases. They seem also to suffer frequently from biliary or renal calculi, a condition due mainly to deficient germicidal activity of the blood. The urine is often high-colored and scanty, and occasionally contains albumin, casts, sugar, or blood.

Flat-foot is sometimes observed, a condition due to relaxation of the interosseous muscular and ligamentous supports; foetid hyperidrosis is also marked in some cases. The osseous framework is often defective, "pigeon-breasts," narrow chests, and a predisposition to caries being common.

The organs of generation are often the seat of functional disorders. The uterus is often found retroflexed. Impotence or loss of sexual desire is common. Amenorrhœa is common, but metrorrhagia may also occur, owing to the low vascular tone,

particularly of the arterioles. In one of my cases, a girl of 16 years, there was what the parents termed "a constant leak," *i.e.*, a slight, but continuous menorrhagia. In the male, spermatorrhœa and prostatic hypertrophy are often witnessed. Menstruation sometimes fails to appear, especially in congenital cases, owing to inadequate development. The menstrual period is attended by severe lumbosacral pains. Pregnancy often affords considerable relief of all symptoms, owing to the fact that the activity of the thyroparathyroid apparatus is greatly enhanced, though it may be attended by hæmorrhages. Parturition is likewise accompanied by copious hæmorrhages in a larger proportion of cases; such parturients are exposed also to eclampsia, owing to imperfect catabolism of toxic wastes.

Lactation may act in different ways. The pallor tends to increase in some, and œdema, especially of the ankles, anæmia, lassitude, and intellectual torpor may intervene and last until the infant is weaned. As milk is mainly composed of blood-plasma containing adrenoxidase (as shown by the guaiac and other tests), lactation imposes increased activity upon the adrenals. These organs being weakened by the hypothyroidia, we have seen, all the above hæmorrhagic phenomena occur. In other cases there is marked improvement during the whole period, and the symptoms of hypothyroidia return only after the secretion of milk ceases. In occasional cases, the improvement is permanent.

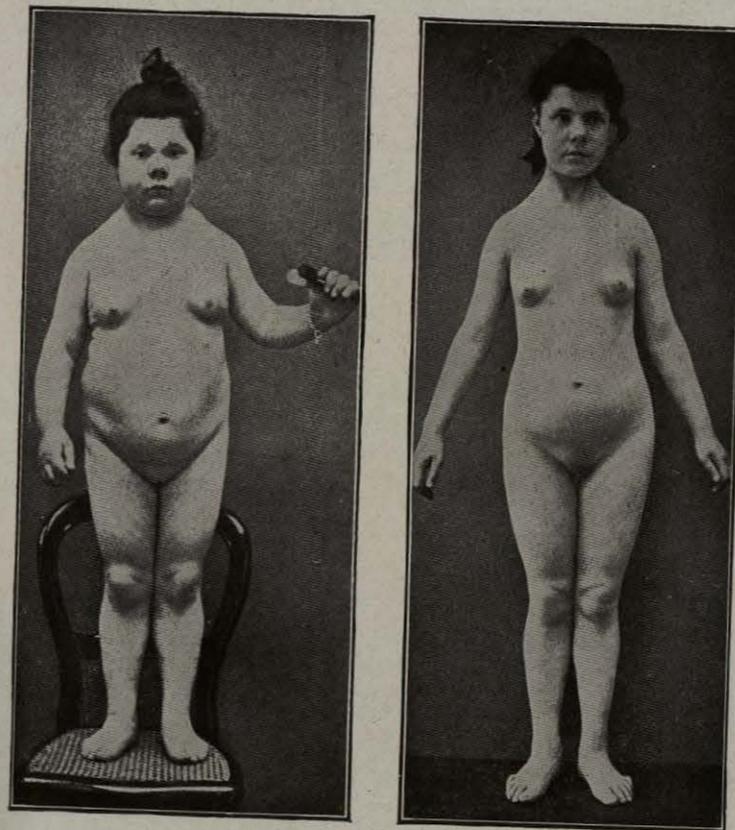
Hallucinations of sight—as of small animals running across the room—and hearing, rumbling noises or running water, and various forms of tinnitus may occur. These are due to the same loss of vascular tone, and imperfect circulation in the sensory organs.

Melancholia or, at least, an uncontrollable sadness, due to deficient nutrition of the cerebrum, is often witnessed in severe cases, especially during menopause. Maniacal excitement is occasionally observed, owing probably to accumulation of toxic wastes in the blood. The mind, even in the milder cases, is usually obtuse, in the sense that they lack *esprit*, *i.e.*, the ability to grasp the finer points of an argument or of a question treated in the abstract, but they are not in any way comparable to true myxœdematous subjects in this particular, some of whom ap-

proach closely the mental status of cretins. Like the latter, however, even average cases may have the arched brow and wrinkled forehead, the expressionless and sorrowful face, though to all intents and purposes of average commonplace intelligence. In most instances, however, none of these purely myxœdematous features can be discerned and a high grade of intelligence even exist, as in one of my cases, whose family—including a high-grade imbecile brother—and descendants show distinct traces of hypothyroidia.

The thyroid affords very little information under physical examination in these cases. One lobe may feel smaller than the other when, on the patient being asked to swallow, the organ is raised under the palpating fingers; the organ may seem unusually small, and the neck unusually flat; but again, it may appear enlarged. On the whole, the organic changes are not such in these cases as to alter sufficiently the outline of the organ to furnish any serious diagnostic aid.

Most authors refer to the disease as one of middle life, but this is an error. This type of hypothyroidia occurs frequently, we have seen, among children, and represents a large proportion of those termed "backward" in the schools, and among those accused of being "lazy," "slow," and "dull." This applies as well to adolescence, particularly, as in children, in those who are abnormally stout. All these cases may not present the syndrome just described; it is, in fact, rarely met with in any one case, but the superfluous fat, the mental torpor, the slow development, and the carious teeth are sufficient to indicate that the oxidations and metabolism are inadequate. The familiar influence of thyroid preparations on adiposis also points to hypothyroidia as the underlying cause of this condition. It may also assert its presence through a few phenomena of another order in a bright child, to-wit: irregular bony growth, a slight scoliosis perhaps, or true rachitis, flat feet, a narrow thorax, some pallor, hypothermia, undue vulnerability to infection, or one or more of the many other symptoms described above. Some, on reaching the fourth or fifth decade—particularly women approaching or undergoing the menopause—begin to show typical symptoms and soon lapse into full-fledged cases—recalling that several of the symptoms now revealed as part of complete syndrome, sensitive-



HYPOTHYROIDIA. [Léopold-Lévi and de Rothschild.]

Physical development under thyroid treatment.

ness to cold, neuralgia, anæmia, menorrhagia, etc., had been present many years.

ETIOLOGY AND PATHOLOGY.—The causes of hypothyroidia may be divided into two classes, the hereditary and acquired.

The most important *hereditary* causes which entail defective development, morphological and secretory, are syphilis, alcoholism and the gouty diathesis. Even far back in the parental lines on either side, these transmit their influence through the intermediary of the ductless glands, especially the thyroid, adrenals, and pituitary body, which, jointly, in the light of the data submitted, carry on oxidation and metabolism and thus constitute, so to say, the tripod of the vital process. The maternal line is generally thought to transmit hypothyroidia in the majority of instances. It happens that some of the most marked cases I have had were clearly traceable only through the paternal ancestry—three generations in one instance. Consanguinity in marriage probably owes its evil effects to the presence in the family of one of the deteriorating diseases mentioned. Conversely, marriage of a girl suffering from a mild type of functional hypothyroidia sometimes brings on recovery if pregnancy occurs, the increased activity of the thyroid apparatus this entails causing it to develop its functional powers to the maximum needs of the subject. That the adrenals are also overactive under these conditions—thus sustaining from another direction my view that the adrenals are stimulated by, and concomitantly with, the thyroid—was recently emphasized by the observation of Neu,⁷ who found an excess of the adrenal product in the blood throughout the entire period of gestation.

The *acquired* form is often due to the identical factor just referred to as a curative one in some instances. The repetition of pregnancy too many times may not only cause recurrence of hypothyroidia by exhausting the thyroid apparatus, but it may likewise do so in a woman previously free of any disorder of the ductless glands. Prolonged lactation acts in a similar way, the maternal milk serving, we have seen, to protect the nursling against infection. Infectious diseases, especially those of childhood, including the milder ones, measles and mumps, and likewise variola and typhoid, may also produce hypothyroidia by

⁷ Neu: Medicinische Klinik, Nov. 3, 1910.