Modern Surgery - Chapter 32. Diseases and Injuries of the Thyroid Gland

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Wounds cause violent hemorrhage which is difficult to arrest. Ligatures may cut out and forceps will not hold. The hemorrhage is arrested by suture-ligatures, purse-string sutures, the actual cautery, or removal of the bulk of the gland.

The thyroid gland may be absent at birth. Congenital atrophy or congenital hypertrophy may exist.

Acquired atrophy leads to myxedema, a condition characterized by the presence of a firm subcutaneous swelling in the face, neck, and limbs; slow speech; mental dulness; and subnormal temperature. The condition is identical with that produced by removal of the entire gland (cachexia strumipriva).

Cretinism is a form of idiocy due to atrophy of glandular elements in the thyroid, although the size of the gland is often increased. The body is dwarfed; the face, neck, and extremities resemble those parts in myxedema, and a low grade of idiocy exists. Myxedema and cretinism are treated by the internal administration of thyroid extract.

Congestion of the thyroid may be caused by violent exertion, prolonged effort, febrile maladies, and venous obstruction. It is treated by removing the cause and applying heat locally. Tracheotomy may be required.

Inflammation of the thyroid (acute or inflammatory goiter) may be induced by a septic or febrile malady, rheumatism, muscular strain causing vascular rupture, a wound or contusion of the thyroid. But one lobe is affected. The ordinary symptoms of inflammation are present. In addition there are dysphagia, dyspnea, venous congestion of the face, epistaxis, nausea and vomiting, and possibly delirium. It may terminate in resolution, suppuration, or fibrous induration.

Goiter.—A goiter is an enlargement of the thyroid gland not due to a malignant tumor or to inflammation. The enlargement may affect a small portion of the gland, one lobe, both lobes, or both lobes and the isthmus, and it may occur either sporadically or endemically.

There are a number of forms of ordinary goiter. The most common is what is called parenchymatous goiter. In this condition all portions of the gland enlarge, and the goiter is consequently bilateral. It does not appear first in one lobe and at a considerably later period in the other, but each lobe is enlarged equally or nearly equally. Parenchymatous goiter is often spoken of as simple goiter, and is sometimes, though not with entire accuracy, designated hypertrophy of the thyroid gland.

Adenomatous goiter is a condition due to the growth of encapsuled adenomata in the thyroid gland. It may be a single adenoma, but frequently there are multiple growths. One or both lobes may be involved. The goiter, however, seems to begin in one lobe; and if both lobes enlarge, one does so at a period distinctly subsequent to the enlarging of the other. Adenoma may develop in a healthy thyroid gland, but adenomatous growth is usually associated with some parenchymatous growth.

Cystic goiter, or bronchocele, is a condition in which the chief mass of the enlargement is composed of a cyst or of multiple cysts. When cysts form,
Causes of Goiter

the thyroid gland is usually hypertrophied or adenomatous; occasionally, however, cysts form in a non-hypertrophied thyroid. The great majority of cysts are due to cystic degeneration of adenomata, some are formed by the running together of overdistended thyroid vesicles, and some few follow blood-extravasation into the thyroid tissue. The liquefaction is due to mucoid or colloid degeneration, and the fluid of the cyst is sometimes clear and thin, sometimes viscid, and often coffee-ground in appearance.

A fibrous goiter is a fibrous induration. It is likely to arise in old bronchocervices, and may actually pass into a calcareous condition. By the term malignant goiter is meant malignant disease of the thyroid gland, either carcinoma or sarcoma. When hemorrhage takes place into a goiter, the condition is often spoken of as a hemorrhagic goiter. A colloid goiter is a form of parenchymatous goiter in which there is an extremely large amount of colloid material. Exophthalmic goiter is discussed on page 904. Occasionally an ordinary goiter becomes exophthalmic. This evolution gives rise to what the French call a Basedowified goiter (see Moreston, in "Rev. de Chir.," Nov. 10, 1896). A goiter that develops with great rapidity is sometimes called an acute goiter, and one that induces marked dyspnea is designated a suffocating goiter. Syphilitic, tuberculous, and amyloid enlargements are extremely rare, but occasionally occur. Further, a goiter may be back of the sternum, or substernal; within the thorax, or intrathoracic; retrotracheal; or retro-esophageal. When a number of persons in the same region are attacked with goiter, the condition is frequently referred to as epidemic goiter. When the condition is common in a certain district, it is called endemic goiter. When a person living in a district in which the disease is rare develops goiter we speak of the condition as sporadic goiter. It has long been known that accessory thyroids exist. Median accessory thyroids are found about the hyoid bone and are formed from remnants of the thyroglossal duct. Lateral accessory thyroids are found about the greater cornua of the hyoid bone. An accessory thyroid may enlarge with the thyroid, may not enlarge even though the thyroid does, or may enlarge when the thyroid proper remains normal. When cachexia strumipriva does not develop after complete thyroidectomy, the patient has been saved by enlargement and functionation of accessory thyroids.

Causes of Goiter.—It is known that goiter is extremely common in the valleys at the foot of certain mountain ranges in Switzerland, southeastern France, northern Italy, the Austrian Tyrol, and in the Himalayas, and the Andes. In a portion of England it is so common that it is referred to as the Derbyshire neck. It seems evident that the disease is due to the introduction of some poisonous element into the system; but what this element is, is not positively known. Some writers maintain that individual liability is developed by habits of life; others think that susceptibility depends upon hygienic surroundings; and some attach great importance to hereditary influence. The probability is, however, that the disease is due to the existence of some poisonous substance in the drinking-water. Some observers have blamed snow-water; many have laid the cause of the trouble at the door of water impregnated with salts of lime; but the real cause has not been positively demonstrated.

An ordinary parenchymatous goiter seems to be a species of hypertrophy.
A number of years ago I suggested the view that the gland has undergone such an enlargement and has become distended with colloid material because the human body has demanded more of the secretion of the gland than the normal gland has been able to supply; as a consequence, the normal gland has enlarged its capacity and increased its output.

**Symptoms of Goiter.**—One may determine that a growth is in the thyroid gland or is connected with it by studying a number of facts. A goiter, as a rule, follows the movements of the larynx and the trachea during deglutition, and this sign may be obtained in the great majority of instances. There are, however, rare conditions, such as hyoid cyst, in which a movement of the mass takes place during the act of swallowing, although the thyroid gland is not involved. Then, again, a malignant or an inflammatory growth of the thyroid usually becomes anchored to the surrounding tissues and does not show this mobility. Certainly, however, in the greater number of the cases the goiter moves with the larynx and the trachea during swallowing.

Goiters vary greatly in size. Cases in which the goiter was as large as an adult's head, and some cases in which the goiter hung in front of the breast-bone and reached to below the level of the ensiform cartilage, have been described. A very large goiter may have a stalk.

When the entire gland, as well as the isthmus, is enlarged, or when the isthmus alone is involved, the swelling may appear to be in the median line of the neck. If the condition begins in one lobe, the growth will, for a time at least, be distinctly one-sided; though when such a growth has attained a large size, it may displace the windpipe and come itself to the middle line of the neck.

A goiter of any considerable size pushes the sternocleidomastoid muscle externally and anteriorly, and the muscles that run from the sternum to the hyoid bone and to the thyroid cartilage overlie the front of the growth. The carotid artery is displaced externally and posteriorly. The relation of the jugular vein to the carotid artery is usually profoundly altered. The artery, as already stated, goes externally and posteriorly, while the vein is actually pulled anteriorly and is flattened out upon the side or the anterior surface of the goiter; hence, the vein comes to lie to the inner side of the artery. This curious alteration in relationship is due to the fact that the common carotid artery has no branches, and therefore is pushed externally with ease; but the internal jugular vein receives branches that lie in the tumor, pull upon the vein, and prevent its displacement with the artery (Lücke).

Berry alludes to the fact that the tumor, unless it is very small, usually reaches the upper level of the sternum, and frequently passes below this level; and that only extremely large goiters hang in front of the sternum, but that it is not at all unusual for prolongations from a goiter to extend for quite a distance into the mediastinum. A substernal goiter is productive of very dangerous symptoms and offers many difficulties in diagnosis. A goiter will occasionally wander, now appearing in the neck and again disappearing behind the sternum.

Some goiters are said to pulsate. This takes place in exophthalmic goiter; but in the ordinary simple goiter, what is called pulsation of the goiter is usually the transmitted pulsation from the carotid artery.

Some of the most important symptoms of goiter are due to pressure and
to the displacing of anatomical structures. Pressure upon the veins at the root of the neck causes great enlargement of the veins above the goiter and in it. Pressure upon the recurrent laryngeal nerve may induce characteristic symptoms; and so may pressure upon the cervical sympathetic or the cervical plexus. Pressure upon the larynx and the trachea may cause very great displacement, and any such displacement is productive of marked dyspnea. This displacement is usually to the side; and it may cause such a flattening out of the tracheal rings that when the tumor is removed, the trachea collapses and the patient perishes of suffocation.

A parenchymatous goiter usually begins insidiously and grows slowly. It occasionally ceases to grow for a considerable period of time, and may even shrink. It frequently enlarges temporarily during menstruation or pregnancy, and occasionally attains an enormous size by changing into the cystic form. Alterations in its consistency and outline may be due to the developing of adenomatous masses.

In making a diagnosis between the different forms of goiter, one should remember that a fairly symmetrical, bilateral growth is probably parenchymatous; that sudden enlargements are produced by hemorrhage; that cyst formation may lead to very great enlargement, and possibly to fluctuation; that if a non-malignant goiter induces dyspnea, it almost invariably does so by pressing upon the larynx and the trachea, whereas a malignant goiter may do so by interfering with the nerves of the part; that a non-malignant goiter very rarely produces difficulty in swallowing, but that a malignant goiter frequently does so; and that cough often exists if there is pressure upon the larynx or the trachea, such a cough being metallic in nature and unassociated with impairment of the voice.

In any goiter there may be cerebral symptoms, such as anemia, syncope, or even convulsions. Rapidly growing goiters are often fatal, and slowly growing goiters are very rarely so. A malignant goiter grows with great rapidity, becomes adherent, infiltrates, and quickly produces metastases, and both sarcoma and carcinoma produce metastases by way of the venous system.

Treatment.—Iodid of potassium and arsenic internally have been advised; ointment of red oxid of mercury locally is advocated by some writers. The administration of thyroid extract may do much good in a case of parenchymatous goiter, but it is useless in other forms of the disease. It should be associated with the local use of tincture of iodin or ointment of red iodid of mercury. In times past it was customary to treat cystic goiters by aspiration and injection with a solution of iodin. Electrolysis may benefit a soft goiter, the negative pole being pushed into the growth, the positive pole being applied to its surface. In considering the propriety of operation remember that a goiter which begins at puberty may pass away. We should operate on every non-malignant goiter which is increasing rapidly in size, and on every goiter which causes much respiratory trouble, but should not operate simply for deformity (Berget). If enucleation or extirpation is performed, do not give ether or chloroform. These agents greatly increase bleeding, and are dangerous. Do the operation with the aid of local anesthesia (cocain, eucain, or Schleich's fluid). It is a great advantage to have the patient conscious, because by asking him to speak during the operation
the surgeon can tell if the recurrent laryngeal nerve is being touched. In many cases intraglandular enucleation is performed, in other cases extirpation. Occasionally these two methods are combined (Bergerat). Some surgeons advise simple division of the isthmus. Ligation of the thyroid arteries has been recommended. Exothyropexy is the operation of exposing the thyroid gland, dislocating it through the wound, and leaving it in this situation. Atrophy of the gland follows the operation. Enucleation, if possible, is the desirable operation. It may easily be employed for the removal of a single adenomatous, colloidal, or cystic area. Thyroidectomy or extirpation is employed when enucleation is impossible. The entire thyroid is not removed for an innocent growth; a portion of the gland is left behind, otherwise myxedema will arise (Kocher). Unilateral extirpation is the usual method. In sarcoma or cancer of the thyroid complete extirpation may be attempted. The operation in malignant disease will occasionally prolong life, but it will rarely effect a cure. In malignant disease thyroidectomy may be rendered necessary by urgent dyspnea. The operation is often very difficult because the growth may cover the trachea, the trachea may be deviated a considerable distance from its proper position, and the veins are very large. After the performance of the operation it is usually impossible to use an ordinary tracheotomy tube, and in such a case Koenig's long, flexible tube is employed (Fig. 505).

Exophthalmic Goiter (Graves's Disease; Basedow's Disease; Pulsating Goiter).—In a typical case there are rapid pulse, protrusion of the eyeballs, and enlargement of the thyroid gland; but any one of these conditions may be absent. The enlargement is bilateral. Supposed unilateral enlargements are instances of Basedowified goiter—that is, are cases in which an ordinary bilateral goiter gives rise to the symptoms characteristic of Graves's disease. A systolic bruit is usually audible over the thyroid region. Von Graefe's sign may be present; this consists of retraction of the eyelids, and inability of the lids to follow the eyes in looking down. The lids in some cases cannot be completely closed, and when the eyeball is suddenly turned up the lid and brow may fail to act together. In some cases ocular palsies exist, in others there is photophobia or nystagmus. Patients may suffer from neuralgia, colic, choreic movements, tremor, flushes of heat, and gastric crises. Dyspnea often exists, and albuminuria and polyuria are not uncommon. Hemoptyysis, hematemesis, or mental disturbance is sometimes noted.

Exophthalmic goiter may arise after emotional excitement or depression, during pregnancy, or during the existence of locomotor ataxia, paresis, epilepsy, neurasthenia, hysteria, and other nervous troubles. Its real cause is uncertain, but is probably the action upon the sympathetic system of some poisonous product of thyroid activity.

Treatment.—Thyroid extract does harm. Medical treatment in a severe case should comprise rest in bed, the use of an ice-bag over the heart, and the administration of adrenalin. When the patient gets about again,
he must avoid alcohol and all forms of excitement. Gentle exercise is desirable, but never violent exercise. Diet is to be nutritious, but non-stimulating. Electricity is said to be of benefit. Thymus extract has been used. Bilateral extirpation of the cervical ganglion of the sympathetic, and division of the nerve below the ganglion, have been employed, and it is alleged with benefit (Jaboulay). Ligation of the thyroid arteries may do good. Partial thyroidectomy is the operation commonly employed in severe cases; it has cured 80 per cent. of the cases operated upon. In some cases thyroid intoxication follows operation. In other cases very rapid growth follows incomplete removal, and the operation seems actually to have done harm. Sudden death occasionally follows the operation. The removal of an exophthalmic goiter is difficult; the capsule and blood-vessels rupture from slight force, and sudden death may take place. All cases should not be operated upon; in fact, only those cases should be operated upon in which medical treatment has proved futile, or in which there is profound toxemia or excessive dyspnea. If the operation is performed, neither ether nor chloroform should be given, as either of these agents will greatly increase bleeding and prove dangerous. Operation is to be done under local anesthesia (eucaïn, cocain, or Schleich’s fluid). The younger Kocher reports the experience of the Berne Clinic ("Mittheilungen aus den Grenzgebieten der Medizin und Chirurgie," Bd. ix). He reports 74 cases of true exophthalmic goiter, 59 of which were operated upon. Every operation was done with the aid of local anesthesia (1 per cent. cocain). In some cases partial thyroidectomy was performed; in some the thyroid arteries were ligated; in 3 cases not only were the arteries tied, but the sympathetic ganglia were resected. In these 59 cases there were 4 deaths within ten days from tetany, and in 39 of the cases there were marked disturbances (tremor, irregularity and palpitation of the heart, vomiting, sweating, and elevated temperature). These abnormalities were possibly due to forcing diseased thyroid secretion into the circulation. Forty-five of the 59 cases were cured and 8 were greatly improved. In 3 of the fatal cases autopsy was made, but did not disclose the cause of death. Kocher believes in operation. He thinks, however, it removes but one element of the disease, and that medical treatment may remove the others. He advises strongly against operation during an exacerbation until relief has been sought, but not obtained, by medical means.

Operations on the Thyroid Gland.—Intraglandular Enucleation (Socin’s Operation).—By this operation an adenoma or cyst of the thyroid gland is removed, the encompassing glandular tissue being left in place. The capsule of such a growth is glandular tissue. The operation of enucleation is not suited to the removal of multiple tumors and it cannot be performed for parenchymatous goiter or exophthalmic goiter. Intraglandular enucleation is performed as follows: The thyroid is exposed by an oblique or by a horseshoe-shaped incision. An incision is made through the capsule of the thyroid gland and through the glandular tissue until the cyst or solid tumor is reached. As a rule the tumor can be recognized from the fact that its color differs from the color of the thyroid tissue. The tumor is turned out by the fingers, a special scoop, the knife handle, or a dry dissector. In some cases a cyst can be most easily evacuated if, after exposure, it is incised and emptied and its wall is then grasped with strong forceps. A solid
tumor should, if possible, be removed intact. The wound is packed temporarily with gauze, the edges of the cavity are grasped with forceps, the gauze is removed, and every bleeding point is carefully ligated. The wound is closed by three layers of sutures—"one in the gland, one in the muscles, and a third in the skin" (James Berry on "Diseases of the Thyroid Gland"). If the tumor was large, drain for twenty-four hours; otherwise, do not drain.

Enucleation is a very successful operation if performed upon properly selected cases, and can be performed rapidly, but the arrest of bleeding is often tedious and troublesome. During any operation for goiter sudden death may occur. In some cases a general anesthetic is responsible. In others, suffocation arises from pressure upon or bending of the trachea or collapse of the trachea as the goiter is lifted from its bed. In rare cases dangerous dyspnea arises from irritation of the laryngeal nerves and cardiac inhibition may be induced in the same manner.

When colloid from the thyroid leaks into the wound, it is absorbed and may produce serious symptoms or even death. In some cases in which this
Operations on the Thyroid Gland

happens the patient never reacts from the operative shock, but develops a very rapid pulse and intense dyspnea, and dies in a few hours. In less severe cases there is a period of circulatory excitement, dyspnea, and elevated temperature (thyroid fever).

**Extrirpation.**—This term means removal of the entire gland (complete thyroidectomy) or a portion of the gland (partial thyroidectomy) with the glandular capsule, the operation being an extracapsular procedure. Usually but one lobe is extirpated. This method enables the operator to tie the chief vessels before he cuts them, and as his vision is not obscured by bleeding, he can avoid cutting the glandular capsule, which would be sure to provoke copious bleeding, and he keeps a safe distance away from the recurrent laryngeal nerve.

If the patient suffers from dyspnea a general anesthetic is contraindicated. It is best in any case not to use one. Local anesthesia is reasonably satisfactory and is far safer. The patient is placed recumbent, with the shoulders a little raised and the neck laid upon a sand-pillow so as to throw the head back as far as is consistent with comfortable respiration.
An oblique incision, a horseshoe-shaped incision, or a transverse incision (Fig. 506) may be made. I usually employ an incision shaped like an incomplete horseshoe, the convexity being downward. Layer by layer the tissues are divided, each layer being infiltrated with the local anesthetic before it is cut. Vessels are carefully tied as divided or before division. The muscles which run from the sternum to the hyoid bone may in some cases be separated, but the extirpation of a large goiter requires transverse division of the muscles high up. The capsule of the lobe is exposed, and is separated from external parts (Figs. 507, 508, and 509). The upper portion of the gland is cleared. The superior thyroid vessels are found, tied with two ligatures each, and divided between the ligatures (Fig. 510). The clearing of the gland is carried on toward the median line and some rather large veins are encountered and tied (Fig. 512). The lower portion of the lobe is cleared and the inferior thyroid vessels are found. Near this point the recurrent laryngeal nerve can be located. If it is pressed upon or touched with a blunt instrument, the patient's voice becomes metallic. A deliberate attempt is made to locate it and the patient is engaged in a conversation requiring answers while the surgeon is investigating. The lobe is lifted from its bed and dislocated from the wound and the inferior thyroid vessels are tied close to the border of the gland in order to avoid the recurrent laryngeal nerve (Fig. 511). The vessels are tied and cut across as were the superior thyroid vessels. The isthmus is next exposed, ligated, and cut across, every care being taken to prevent colloid from being squeezed into the wound (Fig. 513). After dividing the isthmus, any bleeding point is ligated. The divided muscles are sutured with catgut, a drainage-tube is inserted, and the superficial wound is closed with sutures of silkworm-gut.