GOITER FROM THE STANDPOINT OF THE SPECIALIST.*

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All eye, ear, throat and nose specialists are interested in the general subject of goiter, I assume, much as I am interested in a general way in your management of the accessory sinus and eye conditions. Certain eye and throat manifestations accompanying goiter doubtless interest you and concern you much more than they do me. It is unlikely that I am capable of presenting these goiter questions as they most concern the specialist, but it will be my effort to present data specially concerning the relation of goiter to the eye and throat which I have collected from observation of several hundred cases during the past ten years, together with a few facts regarding the results of partial thyroidectomy and the many stage operation which I hope may have some interest for you. This will at least serve to introduce the subject for discussion, and I anticipate gaining far more information regarding the relation of goiter to the field of the specialist than I can possibly hope to bring to you.

Occurrence and importance of eye symptoms: In my experience eye-symptoms have been the latest to develop of any of the typical symptoms of exophthalmic goiter. In the average case circulatory symptoms are apt to appear earliest, nervous manifestations simultaneously or a little later, while the characteristic eye-symptoms appear only after the disease is well established. Bulging of the eye-ball and widening of the palpebral slit is usually the first symptom to attract the notice of the patient. Exophthalmos has occurred in 23 per cent of the cases which have come under my observation. Failure of the upper lid to follow the eye-ball in its downward movement occurs in 8 per cent of cases; sluggish reaction of the pupil to accommodation is noted in 14 per cent; lack of, or imperfect convergence is seen in 12 per cent; and frequent winking in 14 per cent. Any one or all of these symptoms may occur before there is very noticeable exophthalmos. The presence of any of the eye-symptoms is suggestive and helpful in cases in which the diagnosis is doubtful. In connection with these statistics, several questions must occur to every thoughtful man. What causes the exophthalmos? There are many theories but few facts, and no explanation that is entirely convincing. Why are one or two characteristic eye-symptoms associated in one case and other character-

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istic symptoms lacking? Has this any significance or has it not? So far as I have been able to observe, the eye-symptoms are not associated with any degree of regularity. What is the significance of the eye-symptoms as regards the entire clinical picture? What, if anything, should we do about it?

The disfigurement of extreme exophthalmos is the symptom which distresses many patients, especially young women, more than any other symptoms. The deformity is especially noticeable when it is unilateral, as has been the case with five of my patients.

Severe pain was complained of in only a few cases. Moderate pain is of frequent occurrence, being mentioned in about ten per cent of cases. Conjunctivitis is of common occurrence, but fortunately it is not very acute in the majority of cases. Small corneal ulcers are by no means infrequent and obstinate, bad ulcers injuring the eye have occurred in three of my cases. Exophthalmos, which is not extreme and not of long standing, almost invariably disappears after thyroidectomy. Extreme exophthalmos, especially if it has been present for a long time, is one of the most obstinate of the classical symptoms of goiter. About fifty per cent of my patients in whom the deformity was great, have been permanently relieved of the deformity through thyroidectomy. Where there is about equal bilateral enlargement of the thyroid and only one side is removed, the eye on the side operated on occasionally returns to normal, while the eye on the opposite remains quite prominent. This has occurred in four of my cases. In such cases symptoms have also persisted which seem to demand further reduction in the size of the gland, after which the prominent eye has gone back to match that of the opposite side.

In the treatment of exophthalmos, three operative procedures deserve mention. Resection of the superior ganglion of the cervical sympathetic, osteoplastic resection of the outer wall of the orbit, and the simple operation of tarsorrhaphy. Resection of the sympathetic ganglion has been very highly recommended by Jennesco and Jaboulay, but it has not come into general favor with the surgeons who have had the largest experience in the treatment of exophthalmic goiter. It is possible that benefit sometimes results from this procedure, but even the cuts illustrating the patient's condition before and after operation in certain of Jennesco's articles are not convincing. The operation certainly offers no special difficulties to the surgeon familiar with the surgery of the neck, but the results thus far do not encourage its recommendation in the average case. Kocher states that it has been abandoned.

Resection of the outer wall of the orbit, as first recommended by Kroenlein, offers the only prospect of relief in case there is bulging caused by a tumor back of the eye-ball. The incision used by Kroenlein is disfiguring, the danger of paralysis of important filaments of the facial nerve is great, the exposure of the posterior part of the orbit is not as satisfactory as can easily be secured by other incisions, and splintering of the frail bones about the orbit is certain to follow the use of a chisel in forming the osteoplastic flap as was originally shown. The incision recommended by Kocher has many advantages over the original of Kroenlein. In a recent article I have given the results of rather careful study of the anatomy and technic of this operation. By placing the incision in the eye-brow and the line of the wrinkles radiating from the outer canthus of the eye it is possible to avoid an ugly scar and injury to the facial nerve. Division of the angular process of the superior maxillary and the frontal bones by the use of the Gigli saw avoids shattering the bones, and gives a much more satisfactory exposure. Those interested in this subject I would refer to *The Journal of the American Medical Association*, 1912, Vol. LIX, page 989.

The simple operation of tarsorrhaphy is all that is needed considerably to relieve deformity and to prevent serious injury of the eye from exposure in a number of the less extreme cases of exophthalmos.

Occasionally failure of vision and temporary blindness occur as the result of pressure of a large goiter, as was very strikingly seen in a case operated on by my former associate, Dr. Prince. Turning the head to one side caused complete blindness, which was relieved immediately when the head was turned back; it was probably caused by interference with the circulation. Occasionally temporary blindness not caused by pressure is noted, being mentioned by two of my patients.

Ear symptoms are relatively very infrequent in my experience. Three of my patients have complained of very severe neuralgic pain in the ear. This was probably caused by pressure on the branches of the cervical plexus or the nerve-trunks forming it. During the operation of thyroidectomy under local anesthesia, the patients frequently complain of severe pain in the ear, when the upper pole of the gland is being isolated, the vessels clamped and tied; also frequently when clamps are applied to the sterno-hyoid and sterno-thyroid muscles, as they usually are before division in order to expose the gland. It has occurred to me that this pain might come from tension on the stylo-hyoid muscles and the stylo-hyoid liga-

ment, which are in close relation to the Eustachian tube. Similar transitory pains in the ear have been noted by several of my patients. Partial deafness which has cleared up after operation was noted in one case.

Throat symptoms occur as the definite result of pressure in a very large majority of the cases that I have seen. A growth need not necessarily be very large to produce serious symptoms, provided it is located in the right place. The intra-thoracic and plunging goiters, compressing trachea and great vessels of the neck within the bony ring formed by the sternum and ribs in front and laterally, and the vertebrae behind, are most certain to cause trouble. In nearly one-third of my cases the growths have extended below the level of the clavicle, in many cases as far as it was possible to reach with the finger, and this considered, it seems remarkable that so few serious results of pressure occur. In a recent case a troublesome goiter the size of a large goose-egg was tethered just below the aperture of the thorax by elongated and tortuous superior thyroid vessels, and only appeared in the neck on swallowing. In another case a large growth was constricted and grooved deeply by the first rib, the surface protected by a well-developed bursa and the constriction, giving a somewhat dumb-bell shape. Both patients made satisfactory recoveries and have had entire relief. The origin of these forms of goiter is perhaps best explained by Kocher. A nodule developing in the inferior horn encounters less resistance to the surrounding parts when it grows downward behind the manubrium, may produce direct pressure on the trachea and marked dyspnea; more frequently it may grow behind the sterno-hyoid, sterno-thyroid and sterno-cleido-mastoid muscles, displacing the trachea backward and to the other side and extend in the opening of the thorax in the form of intra-thoracic goiter. The extension of such a tumor into the thorax is aided by two factors. In the first place, the thyroid gland moves downward during inspiration and is sucked into the thorax during deep inspiration; in the second place, the gland is forced into the thorax when the head is inclined forward. At first a deep goiter moves up and down with every inspiration, but when it extends underneath the first rib, having passed the narrowest portion of the thorax, it finds more room and the goiter continues to grow. A constriction is formed at the level of the upper opening of the thorax. When the goiter has reached this stage it no longer escapes from the thorax except during forced respiration, during deglutition and especially during cough, so-called *goitre plongeant*, diving or plunging goiter of the French. With the fluoro-

scope the tumor can be seen to rise during deglutition. A skiagraph shows a distinct shadow with a characteristic round border with convexity forward. An intra-thoracic goiter may attain enormous dimensions. It usually grows on one side, depending on the starting-point and rather more in front and to one side of the trachea, extending downward into the anterior mediastinum, where it is usually placed in front of, rarely behind, the innominate artery and arch of the aorta. The position is also determined by inspection and palpation.

With the diffuse forms, especially the soft, follicular and parenchymatous goiters, when the tumor is not large and the muscles of the neck are strongly developed, the patients are often unaware of the growth, and the functional symptoms, which chiefly attract attention, are referred to a great variety of causes and often treated accordingly. In cases in which it is difficult to feel the goiter, the examiner must never neglect to have the patient cough, as this renders the tumor much more distinctly visible and palpable. Diving and plunging (retro-sternal) goiter often can be seen or felt only when the patient coughs, and intra-thoracic tumors are often rendered much more distinctly palpable.

As Kocher states, dyspnea may be produced by pressure on the trachea; this is by far the most frequent form. It may be produced secondarily by pressure on the blood-vessels and consequent disturbance of the circulation; and by pressure on the recurrent nerve and paralysis of the laryngeal muscles, which is rare in ordinary goiter. It may be constant or paroxysmal and is increased by exertion; in the beginning it is present only during exertion but is increased with greater need of air. When the lumen of the trachea is greatly narrowed, especially when the pressure is circumscribed and unilateral, loud whistling inspiration and expiration result, the characteristic tracheal stridor. When the trachea is greatly constricted, certain positions of the head cause complete closure of the lumen of the trachea; sudden pressure from without or sudden exertion may produce attacks of asphyxia. This is particularly apt to occur when there is catarrh, which, owing to the diminution in the lumen of the trachea, is apt to become chronic.

In the examination of a goiter it is important to note the influence on the respiration of pressure applied to different portions of the tumor. In this way that portion of the goiter which exerts the greatest pressure can usually be recognized (Kocher). In the case of large goiters, which cause considerable displacement of the trachea, it is found that pressure on the sound side produces dyspnea

of greater intensity, or brings it on more quickly than pressure on the diseased side. Sometimes very slight pressure on the sound side suffices to produce complete occlusion of the trachea. In such cases, swallowing the wrong way, an attack of violent cough, or a hemorrhage into the goiter may be followed by sudden death from asphyxia.

Another condition of great gravity and of interest to the laryngologist is the so-called *saber trachea*. The lumen of the trachea is frequently narrowed by compression between two enlarged lateral lobes, with resultant difficulty in breathing. A number of my patients and some of their medical advisers have called the trouble *asthma*. Extreme and long-continued bilateral pressure may cause absorption of the cartilage of the tracheal rings and collapse of the trachea when the compressing growth is removed. In case of intrathoracic growths with collapse of the trachea after removal, tracheotomy is of little avail. I have seen one death from collapse of the trachea. The difficulty is much more easily prevented by early thyroidectomy than treated after such a serious complication arises.

Hoarseness and persistent cough are very obstinate symptoms in a few cases. As regards the frequency of the special throat-symptoms, cough has been noted in three-fourths of my cases; the voice has been more or less affected in two-thirds; there has been some difficulty in swallowing in about one-third of the cases, and more or less serious choking in one-fourth of the cases. One patient of mine had coughed almost constantly night and day for several weeks and was in an extremely serious condition. By free use of bromids and opiates, it was possible to relieve her somewhat and put her in shape for ligation and the stage operation, after which she made satisfactory recovery. In several such cases a diagnosis of tuberculosis of the lung has been made by the attending physician. In one case, tuberculosis actually co-existed with the goiter, and now after a year of over-feeding and rest in the open air, the tuberculosis seems quiescent and the patient is planning to come for an excision of her goiter within a short time. In cases up to date, the persistent cough has been entirely relieved by the operative treatment of the goiter.

As regards the relation of goiter to the voice in a considerable number of patients, especially those who have good-sized goiters, it has been shown that there is paralysis of one vocal cord from pressure of the growth before operation. These patients may speak fairly well except when they are over-tired or have some inflammation. They will tell you that they formerly used to sing, but are

now unable to do so; that after prolonged use of the voice they get hoarse or that when they have a bad cold they are hoarse or lose the voice entirely. This usually comes from pressure, but the decided general muscular weakness, from which almost all who have been long affected with exophthalmic goiter suffer, may effect the vocal cords and musculature of the larynx.

In simple goiter, injury to the recurrent nerve during operation, followed by permanent hoarseness is exceptional. Temporary hoarseness, on the other hand, is frequent, and as a rule comes from somewhat rough handling of trachea and larynx, unavoidable during operation.

Injuries of single fibers or branches of the recurrent laryngeal are rare also; the posterior crico-arytenoid muscle and inter-arytenoid muscle paralyzes occur in isolated lesions of the posterior branch of the nerve, and are observed only in retro-tracheal goiter. Kocher states that paralysis produced by partial injury to the nerve causes a permanent hoarseness, while hoarseness due to unilateral total paralysis of the recurrent may disappear by the swinging over of the healthy vocal cord to the paralyzed side. Singing, however, is impossible in this condition. This restoration of the voice does not occur so long as the goiter, which is responsible for the paralysis, persists, but may occur after removal of the goiter, and also after a paralysis of the recurrent, caused by operation. Paralysis of the recurrent increases in already existing dyspnea, but in itself does not necessarily cause dyspnea unless posticus paralysis is produced. Whenever there are signs that the recurrent nerve is involved in a goiter, inflammation or malignant change should be suspected.

Injury to the recurrent nerve during operation is easily avoided in most cases by keeping away from the dangerous territory. The goiter is first isolated, except the deep part of the lower pole and the inner and posterior surfaces. The isthmus is then divided and the dissection carried down to the inner border of the trachea, the growth then hangs by a small portion of the capsule which is attached to the trachea along the inner and posterior surface. By dividing the capsule and separating the gland from the capsule of this small attached surface, injury to the nerve can be certainly avoided in the vast majority of cases. The nerve is in direct relation with the inner and posterior capsule; if this portion of the capsule is left intact the nerve will be uninjured, except in the case of deep-seated and intra-thoracic goiter, in which there is sometimes stretching of the nerve in bringing it up out of the cavity. In case of loss of voice after operation, it would be great comfort to the

surgeon to know about the existence of paralysis of one cord previous to operation, on the diagnosis of a competent specialist.

As is well known by all interested in the subject, there is, in the embryo, thyroid tissue extending from the neck to the base of the tongue. In certain lower animals it always persists as the thyro-glossal duct, while in man it normally forms only a fibrous remnant. In fully one-fourth of my cases some remaiinder of the thyro-glossal duct can be seen in the neck. In a few, good-sized growths develop in it high in the neck. Enlargements of the lingual portion are exceptional, although an occasional growth has to be removed from the base of the tongue, and myxedema following removal of large lingual thyroid has been reported.

Medical and surgical results compared: A number of surgeons feel very strongly that surgical treatment should be advised for goiter patients much more frequently than is now the case. In order to come to any intelligent decision, we should have at hand definite facts with regard to the ultimate results of both medical and surgical treatment. Unfortunately, few internists have furnished facts regarding the ultimate outcome of patients who have been under their care. The only definite figures which have come to my notice are those reported by Kuttner, who was able to get information regarding the late results in twenty-one cases conservatively treated at the Breslau Clinics during eighteen years. Two died under medical treatment in the clinic; three who had been medically treated died later of heart failure. The total mortality in these conservatively medically treated patients followed for fifteen years proved to be 35.7 per cent, a figure as high as the worst results of surgical treatment in the hands of inexperienced operators. Of the survivors, not a single patient considered herself cured, and only one was able to follow her usual occupation; of the remainder a few were simply only improved, while a large portion were very much worse than when their treatment was first instituted. It would be very interesting and a highly important contribution if some of our own internists would follow up their cases and give us the ultimate outcome as has been done by Kuttner.

I have personal knowledge of eighteen medical deaths from goiter, a number nearly three times as great as my total fatalities during the past seven years, in which the great majority of my cases have been operated on. In recent years the results of surgeons who have had considerable experience has greatly improved, and the number of fatalities under medical treatment of which I have knowledge is greater than the total number of fatalities from the clinics of Koch-

er, Crile and myself during the past three years. At first sight this is a pretty bad showing for medical treatment of goiter, but it is quite possible that some of our progressive men could show much more encouraging results. We all await with much interest the reports of their ultimate results.

Permanent results: In order to get definite information about the ultimate results in operation for goiter, I have selected from my card-index of patients' addresses, 100 names of patients, most of whom live not far distant from Ithaca, and from all of whom I have been able to get very reliable information as to their present condition. There was no intentional selection of these names, except to take as large a proportion as possible of those who could be actually examined. Nearly one-half of my patients I have seen personally; most of them several times following the operation. Two of these patients died, one a few months after operation from apoplexy, another three years after operation from pneumonia. Both of these patients were in good condition as far as their recovery from the goiter operation was concerned. Of most of the patients who have not been examined by me or my assistants personally, I have received reports from physicians whom I know personally and whose opinion I consider reliable. In a few cases I have only succeeded in getting information by letter. With the exception of the two deaths mentioned, all are living from two to nine years after operation. None of these patients are worse than before the operation; all have been either greatly benefited or entirely cured. All of them are able to follow their usual occupations, and three have stated that they were in better health than at any previous time during their lives.

It is very certain that a very large number of goiter-patients first consult a specialist; sometimes the eye specialist for symptoms which the patient does not recognize as being in connection with the thyroid, more frequently, probably, the laryngologist for throat symptoms. In a large proportion of these cases the patient will need a partial thyroidectomy before recovery is effected. I believe that the operation is best performed in the vast majority of cases by the general surgeon experienced in the surgery of the neck. The preliminary examinations of many of these patients to determine whether the vocal cords are affected, the treatment of corneal ulcers and refractive errors should certainly come under the care of the specialist. Co-operation between the specialist and the general surgeon is certain to be of the greatest value to the patient.

The importance of early thyroidectomy can scarcely be exaggerated. By early operation, disfiguring exophthalmos with the at-

tendant risks of ulcer and perforation can surely be prevented, the growth can be much more safely removed, the contour of the neck will not be affected by displacement and pressure on the muscles, and of greatest importance, the risk of life will be reduced to a minimum. In uncomplicated cases the risk should not exceed that of the interval operation for appendicitis. It is true that a certain number of these patients exist as nervous wrecks for a good many years. It is equally certain that most of these patients could be made useful members of society and a considerable number of deaths avoided by early thyroidectomy.

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