Practical Points of Diagnosis and Treatment in Surgery and the Specialities.

THE INDICATIONS FOR SURGICAL TREATMENT IN GOITRE.

BY CECIL A. JOLL, F.R.C.S.,

Senior Surgeon to Royal Free Hospital and Miller General Hospital ; Surgeon to Cancer Hospital.

IT is unfortunately true that the attitude of the public in Great Britain (and not the *lay* public exclusively) towards operations on the thyroid gland is still largely influenced by the grave mortality and the almost equally grave morbidity which were associated with such operations fifty years ago.

The facts which are so often ignored are that in the course of the last half century the surgical mortality in simple goitre has been reduced from 20 to a fraction of 1 per cent—in thyrotoxicosis from 50 to about 2 to 3 per cent. Comparably, the post-operative incidence of myxœdema, tetany and laryngeal paralysis has been cut down to a fraction of what it was in the later years of the nineteenth century. This is not the place to describe the steps which have led to so striking an improvement in operative risks, but a general knowledge of the facts as stated above must precede any attempt to indicate what is the province of surgery in thyroid diseases. It is almost equally important to appreciate that, with a proper technique, the tendency to recurrence after operation in simple goitre, or of the recrudescence of toxic symptoms in the thyrotoxic case, has been minimized as compared with what was to be expected even twenty-five years ago.

Relief of Pressure in Simple Goitre.

In *simple goitre* there are these main indications : (1) for the relief of pressure ; (2) for prophylaxis against toxic or malignant degeneration ; (3) for cosmetic purposes.

There is little room for controversy on the first of these indications. The onset of dyspnœa or of real difficulty, as distinct from mere discomfort in swallowing, unless rapidly controlled by thyroid medication, or in certain cases by radiotherapy, clearly requires the removal of a part of the goitre. If the patient is young and the goitre bilateral, little time should be spent in trying other remedies, for it is in this class of case that acute suffocative attacks may supervene with little or no warning. I know of several unrecorded cases in which fatalities have occurred due to failure to recognize the urgency of surgical treatment under such conditions.

Intrathoracic goitre is also a frequent cause of dyspnœa, often of the paroxysmal, and sometimes nocturnal, type. It is not unusual for such cases to be labelled *asthma*, and for the goitre to be overlooked. In every case of intrathoracic goitre, operation is essential, as, in my experience, medical and radio-therapeutic measures rarely effect more than a temporary palliation, if as much.

In all bilateral goitres causing pressure an adequate portion of both lobes should be removed. Failure to observe this rule may be followed by an even more severe grade of dyspnœa than that existing previous to the operation. The subsequent overgrowth of the intact lobe may kink, rotate or compress the trachea to an amazing degree.

Provision must be made during all such operations so that any subsequent enlarge-

ment of the portions of gland preserved may take place in positions where they will be unlikely to provoke pressure effects. The trachea is more compressible than the larynx, therefore it is desirable to conserve the upper rather than the lower poles of the gland, for the former lie against the thyroid cartilage and if they enlarge subsequently will not so readily interfere with respiration. Ligation in continuity of both inferior thyroid arteries in the course of these bilateral operations assists in preventing recurrent enlargement of the lower and posterior portions of the gland. Conservation of a postero-lateral strip on each side will effectively safeguard the recurrent laryngeal nerves and the parathyroid glandules.

In *unilateral simple goitres* causing pressure the indication is to remove the source of the pressure, usually an encapsuled adenoma or cyst, with the minimum damage to the remainder of the gland. This is commonly done by resection-enucleation of the adenoma or cyst, but when the whole lobe is expanded by the tumour it is often easier to resect the lobe with the enclosed tumour—always, however, preserving the postero-lateral *safety-strip* of tissue.

**Prophylactic
Surgery
in Simple
Goitre.**

Most small colloid goitres appearing at or before puberty in Great Britain disappear at or soon after adolescence, with or without medical or other forms of treatment. Operation is to be condemned in all such cases unless the goitre is accompanied by severe dyspnoea—a rare but not unknown event even in small colloid goitres.

The tendency of all nodular goitres, whether of the localized or diffuse type, is to further degeneration, increase in size, and in an appreciable percentage to the development of toxic symptoms. If, therefore, medical and radio-therapeutic measures fail to check the thyroid enlargement within a period of six to twelve months, operation is desirable in order to avoid the more serious developments referred to above. It must not be forgotten that according to various authorities from 1 per cent. to 6 per cent. of thyroid adenomata become malignant, and that this change may as readily occur in a small as in a large tumour. It has many times happened to me to advise the prophylactic removal of small adenomata in patients who, on receiving this advice, have sought and obtained a contrary opinion elsewhere. In at least three of these cases malignant adenomata have subsequently developed. It has also been my fortunate experience, on removing what had appeared to be a simple adenoma, to find a minute sarcoma simulating a simple tumour. I believe, therefore, that every adenomatous goitre is better removed.

**Cosmetic
Surgery
of Simple
Goitre.**

No patient should be allowed to suffer the chagrin associated with a large disfiguring goitre, and this applies also to the hypothyroid patient with an ugly goitre, because in the latter case very little deterioration, if any, in thyroid function follows a well-conducted operation, and in any case a reasonable addition to the daily dose of thyroid extract will suffice to restore the functional balance. There is every reason, however, to condemn wholesale operations in small diffuse goitres in young people, merely to satisfy a desire for a more elegant neck.

**Thyro-
toxicosis.**

The indications for surgery in thyrotoxicosis are clear and not in dispute in so far as *secondary* thyrotoxicosis is concerned, but in *primary* thyrotoxicosis the matter is still highly controversial.

In *secondary thyrotoxicosis* we are dealing, almost without exception, with a

nodular goitre, localized or generalized. Such goitres are little, if at all, to be influenced by medical treatment or by radio-therapy, and although there are one or two radiologists who claim beneficial results the majority admit the futility of such measures. Surgery provides the only real remedy for this type of the disease. The operation should aim at the removal of the adenomatous or nodular material, the preservation of sufficient thyroid tissue for functional purposes, and the prevention of recurrence of nodular degeneration. If the nodular lesion is localized the three indications can readily be met, but if generalized it is impossible to remove all traces of nodular tissue without destroying the thyroid function, and what is more serious, jeopardizing the functions of the parathyroids and of the vocal cords. The *safety-strip* of gland tissue must be preserved on each side, at all costs, and recurrence avoided as far as possible by cutting off the blood-supply through the main thyroid arteries. Under these conditions the thyrotoxicosis is even better controlled than in the primary form of the disease, the tendency to recurrence is negligible, but there is an appreciable danger of myxœdema which if it occur must be controlled by thyroid medication. The operative risks are stated by some American authors to exceed those of the primary form of the disease, but this is contrary to my own experience in Great Britain.

In *primary thyrotoxicosis* it is impossible to ignore the claims made by physicians and radiologists to control or even to cure the disease under certain conditions. It is, however, in many cases primarily an economic problem. If medical and radiotherapeutic measures *combined* fail to restore the patient to economic efficiency within six months *at the maximum* then surgical measures should be given a trial.

No patient with Graves' disease should be allowed to pass into the chronic invalidism of imperfectly controlled thyrotoxicosis without an attempt to apply such surgical treatment as will reduce the activity of the gland to a reasonable level.

There are, however, forms of the disease or rather stages in its course in which no surgical treatment is to be contemplated. Patients who are rapidly losing weight in spite of rest and good feeding, those who are intensely excitable or semi-delirious, those with uncontrolled glycosuria, those with diarrhoea and vomiting or ketosis are never to be regarded as suitable for thyroidectomy and seldom for the minor operation of ligation of arteries. The most thorough preparation of the patient by iodine therapy, rest and intravenous saline-glucose infusions, insulin therapy, &c., is necessary before surgical measures can be applied to severe cases.

In cases where such measures are only partially successful preliminary *ligation of one superior thyroid artery* under local anæsthesia is the most that should be attempted, and even so an appreciable mortality is to be expected. Such ligations are to be regarded as the test of the patient's response to surgical trauma. If the reaction is only moderate a second artery should be tied a week or so later.

In less grave cases both superior thyroid arteries should be tied at one sitting. In very few instances have I practised ligation of the four thyroid arteries, but this method is of value I believe in the large and exceptionally hard goitres seen occasionally after prolonged iodine therapy.

The operation of choice in primary thyrotoxicosis is a *bilateral symmetrical resection-extirpation* of seven-eighths to nine-tenths of the total thyroid tissue. The operation aims at reducing the activity of the thyroid gland to a level approximating to that of the normal gland.

If carried out with skill and gentleness and the functions of the recurrent laryngeal nerves and parathyroid glandules preserved the patient can be restored to economic efficiency within three months, and provided that the disease is not of more than twelve months' standing the primary mortality should not exceed 1·5 per cent. and the eventual cures should approximate to 98 per cent. The essential cause of a high mortality in primary thyrotoxicosis is the severity of the myocardial and visceral disease which follows prolonged thyrotoxicosis.

It is a matter of individual judgment whether the operation of thyroidectomy should ever be conducted in stages. Personally I reserve the *stage operation* for the large hard rigid gland which is the outcome of excessive iodine medication. A bilateral thyroidectomy in such cases involves the special danger of tracheal collapse and the two-stage operation helps in avoiding this.

Malignant Goitre.

The results of surgical treatment in malignant goitre are by no means encouraging. In the infiltrating type of *carcinoma* few cases reach the surgeon in an operable stage. Incomplete operations rarely succeed in palliating the symptoms and tracheotomy is both hazardous and unsatisfactory.

In the early cases resection of the affected lobe, with the corresponding sternomastoid and infrahyoid muscles, the internal jugular vein and the associated fasciæ and lymphatic glands sometimes yields temporarily favourable results. Some improvement in these results follows a combination of surgical extirpation and radio-therapy.

In *malignant adenoma* the nature of the lesion is rarely recognised until after extirpation of the tumour, but visible involvement of the issuing thyroid veins may indicate the necessity for a wide removal of tissue on the lines mentioned above. Radio-therapy is advisable after operation.

In *papilliferous adeno-carcinoma* the growth is relatively benign and even when palpable lymphatic glands are present it is justifiable to make an attempt at extirpating all the affected tissue. Even when the operation has been manifestly incomplete, recurrence is often considerably delayed. Secondary operations on recurrences are often justifiable and deep X-ray therapy applied to remote metastases often helps to prolong life for several years.

In *sarcoma* the most complete "block" extirpation should be performed and radio-therapeutic measures added, but permanent cures are almost unknown.

Ligneous Thyroiditis or Riedel's Disease.

This disease starts usually in one of the lobes and invades the extra-thyroid tissues at an early date. Pressure symptoms dominate the clinical picture. Since radio-therapy is seldom helpful in this disease, the mass, including the affected muscles, should be excised, but there is danger of injury to the trachea and recurrent laryngeal nerve—indeed the latter is frequently already involved. Riedel advised against extensive operation and held that a partial extirpation of the diseased tissue sufficed—this is contrary to my own experience.

In *lymphadenoid goitre*, which is so frequently confused with Riedel's disease, there is no involvement of extra thyroid tissues and pressure symptoms are less urgent. The tendency is to myxœdema owing to the diffuse nature of the destructive process. Operation should be avoided at all costs unless pressure symptoms are severe, in which case sufficient tissue must be excised and thyroid medication instituted.