I. THE EXCISION OF BOTH LOBES OF THE THYROID GLAND FOR THE CURE OF GRAVES'S DISEASE. II. THE PRELIMINARY LIGATION OF THE THYROID ARTERIES AND OF THE INFERIOR IN PREFERENCE TO THE SUPERIOR ARTERY.*

BY WILLIAM S. HALSTED, M.D.,
OF BALTIMORE, MARYLAND.

I. In 39 cases of Graves's disease for the cure of the hyperthyroidism it has been necessary to excise, at two or more operations, the greater portion of both lobes of the thyroid gland. Several of these patients, operated upon as long ago as 1902 and 1903, are still under observation and in quite perfect health.

In all of these cases the second lobe was removed because excision of the first had been followed by insufficient improvement. In several instances in which the ligation of three arteries plus the excision of one lobe had been attended with almost negative results, relief from all symptoms followed immediately upon the removal of the remaining lobe; hence the advisability, repeatedly emphasized by Dr. Halsted in his publications, of operating upon the first lobe in such manner that the second may be excised without danger of tetany. A small slice of each thyroid lobe is left in order to protect the circulation of the parathyroid glandules. The operation is performed in an absolutely bloodless manner, all of the blood-vessels supplying the lobe being clamped (but not ligated until after the lobe has been cut away) at a safe distance from the parathyroids.

No muscles are divided in the course of the operation except a few of the fibres (usually the posterior fibres) of the sternothyroid. Hæmostasis is attended to with scrupu-

* Read before the American Surgical Association, May 7, 1913.

lous care and the wounds are closed without drainage. There has been no death in this group from operation although, in general, it includes the most serious cases, so serious that, in the majority of them, preliminary ligation of one or more arteries was done. In one case the four arteries were tied, at as many operations, before the lobectomy was hazarded.

Kocher having emphasized the importance of lymphocytosis in hyperthyroidism, a differential leucocyte count has been made. Almost invariably the proportion of lymphocytes was increased, once being as high as 65 per cent. But in one case, the most serious of all, the total percentage of lymphocytes was only 9. It has particularly interested Dr. Halsted to observe that there has been a gradual reduction, after operation, of the lymphocytosis in these cases.

The role of the thymus in Graves's disease is probably of great importance. With the advances in skiagraphy it has become possible to detect enlargement of the thymus too slight to be determined by percussion. It seems probable that in a very considerable large percentage (75 per cent. or more) of the pronounced cases the thymus is enlarged.

The hyperplastic thymus may be in great measure responsible for the disproportionate number of the mononuclear leucocytes. In one of the cases, a boy, aged sixteen years, with only mild hyperthyroidism, the lymphocyte percentage was 56, and there was enlargement of the thymus so great that Dr. Halsted could easily remove a part of it from the ordinary collar incision of Kocher.

In none of the cured cases which returned for observation during the past winter was evidence of persistence of the thymus found skiagraphically, and in none of these was the percentage of lymphocytes above 33.

The tendency, after removal of one lobe, is toward lessening the hyperplasia in the other. This tendency is probably greatest in the cases which improve most. In these, unfortunately, we have no opportunity to see the other lobe, for there is no indication to excise it.

When the second lobe is removed it is always because

patients are not sufficiently benefited by the removal of the first lobe.

In some the second operation is done promptly (two to four weeks after the first) and in these the interval is so short and the improvement from the first operation so slight that great change in the histological picture is not to be expected.

And when the interval has been long the second operation may have been delayed by the patient until she is in worse condition than originally, and the hyperplasia has become correspondingly advanced.

Sometimes the second lobe has been removed several years after the first and when the patient was still vastly better than before the first lobectomy. In these patients the improvement in the histological picture may be considerable.

II. It happens that in no instance have we found that the preliminary ligation of two, three or even of the four arteries sufficed to cure the patient seriously ill with Graves's disease, although we have observed that considerable improvement, for a short time at least, may follow the ligation of even a single artery. Ligation in our clinic has been practised only in the most serious cases and always with a view to improving the patient's condition to such an extent that lobectomy might safely be performed and to testing her resistance to operation, hence I have endeavored to reduce the preliminary procedure to the simplest possible terms, ligating each artery through a space just large enough to admit of exposure of the vessel—a space too small, as a rule, to admit more than one finger. For the past two years or more I have tied the inferior in preference to the superior arteries and for the following reasons:

1. The cosmetic effect is better. The incisions for ligation of the superior vessels have to be made at a higher level than the Kocher collar incision, which is invariably employed for the lobectomy, and there results, in consequence, a well-like band of skin between the two horizontal cuts which is a pronounced disfigurement.

In tying the inferior vessels the incisions correspond, as I

have said, precisely to the line of the lobectomy wound of the skin; and in the making of the latter the fine scars of the former are excised.

2. The wounds made for ligation of the inferior arteries are partly outside of the field of the lobectomy operations, whereas, when the superior arteries have been ligated, a considerable part of the operation for removal of a lobe is through freshly healed, matted tissues whose resistance to infection is lowered. Although suppuration is not very likely to take place even when two or three operations are performed at short intervals through the same tissues, the reaction is greater and breaking down of the wound quite possible.

3. As the inferior thyroid artery is usually larger than the superior, the effect of the ligation may be greater.

4. The superior artery, or arteries, are regularly tied in the course of lobectomy; hence when both inferior arteries have been tied and a double lobectomy is performed all four of the thyroid arteries will have been occluded. On the other hand, if the superior arteries had been ligated at the preliminary operation, the portions of both lobes remaining after a double lobectomy would receive a fuller blood supply.

5. The location of the inferior artery is less variable than that of the superior vessel, which is subject to great changes because of the inconstant position of the superior pole.

The ligation of all the structures of both superior poles through an incision which stretches across the neck—a procedure which has considerable vogue—does not seem quite rational to me for the reason that the results would not be likely to be adequately proportionate to the magnitude of the operation. The ligation of all four of the arteries through small incisions such as I have described, would hardly be more formidable than the operation just referred to and the benefits would, I believe, be greater.

The danger of tetany from the occlusion of the four arteries is probably not so great as I formerly supposed, provided that the ligations are done neatly and at safe distance from the parathyroid glandules. Ligation of the four arteries

in close proximity to the parathyroids and through large incisions might result quite differently. In three instances, in which I have ligated the four arteries in two or more acts and subsequently removed the greater part of both lobes in the manner about to be described, transient symptoms of tetany manifested themselves.

The inferior thyroid artery is ligated as follows: A transverse cut, from 4 to 4.5 cm. in length, is made over the tendon of the omohyoid muscle precisely in the line of the Kocher collar incision as contemplated for the subsequent lobectomy. The fibres of the sternomastoid muscle are separated in line of the common carotid artery at the level of the omohyoid tendon. The thyroid lobe is exposed behind the posterior fibres of the sternothyroid muscle and drawn inward by a retractor designed for this purpose. The common carotid is retracted outward by a similar though somewhat shorter instrument and the layers of fascia covering the inferior thyroid artery are divided at the level of the omohyoid tendon. The dissection is then carried out solely with the two long, delicate, blunt dissectors, for the artery is sometimes at a great depth (greatest when the Graves's disease has been engrafted on a colloid goitre), and the space is only large enough, as a rule, to admit one finger between the deeply concave retractors. A special aneurism needle is used for carrying the fine silk ligatures around the artery. The wound is, of course, not drained. The operation, if performed precisely in this manner, is not difficult. Only once have we failed to find the artery in its usual situation; this was about five years ago.