

to forty-four, and in the recently observed cases it concerned adults. Consequently it would seem that an increased resistance must be of considerable importance.

With reference to the prognosis, it may be noted that while epidemic meningitis frequently terminates in a chronic condition with internal hydrocephalus and other serious changes, tuberculous meningitis, even when extensive lesions have formed, may heal without any serious defects. In the case now reported there was an internal hydrocephalus in the early stages.

CLASSIFICATION OF GOITER: AN ANALYSIS OF ONE HUNDRED CASES.¹

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THE classification and nomenclature of goiter have always been unsatisfactory, for the reason that in spite of the large number of cases operated on and the extensive material for pathologic examination no standardization of title has resulted.

It is generally agreed there are two great classes of goiters: The simple goiter, without symptoms other than pressure, and the toxic goiter, with symptoms referable to various organs other than the thyroid gland.

Plummer² and Wilson,³ since 1914, have written regarding the clinical and pathologic difference in cases of toxic goiter, but there is little evidence in the literature that their views have been accepted. Plummer, in a paper from the Mayo Clinic, read in June, 1919, divided the toxic type of goiter into two groups, one of which he called hyperthyroidism and the other exophthalmic goiter. Our experience with goiter is in accordance with this division. Our series of cases is not sufficiently large to prove the points to be made nor is there sufficient accuracy or detailed clinical data to be certain of the proper classification of borderline cases; but we wish to record our experience in line with the above writings.

Simpson,⁴ in a recent article, has classified goiter from pathologic specimens sent to him for diagnosis, and his conclusions are largely in accord with our own observations.

We wish to present the last 100 cases of goiter operated on in St. Luke's Hospital during the period of eighteen months. All

¹ Read before the Richmond Academy of Medicine and Surgery, June 22, 1920.

² Keen's Surgery, vol. vi; AM. JOUR. MED. SO., December, 1913; Collected Papers of the Mayo Clinic, 1914 to 1918.

³ Journal-Lancet, xxiv, 4.

⁴ Surg., Gyn. and Obst., February, 1919.

cases admitted to the surgical service were operated on except 3. One of these was a woman, aged fifty-five years, with extensive myocardial and renal degeneration, who was treated by the roentgen-ray and has since died. The second was a man, aged forty-five years, with thyroiditis following influenza and associated with chronic and severe myocarditis and aortitis. The third was a woman, aged forty-seven years, with a large, very hard goiter and bony metastasis in the lumbar spine. The diagnosis of carcinoma of the thyroid with spinal metastasis was made and she was considered hopeless. These 3 cases are not included in this series. It should be noted here that cancer of the thyroid will occur in about 1 per cent of all goiters and should be considered when dealing with this condition.

We have divided our cases into three groups:

Group I contains the simple goiter, about which there is little to be said. They have few symptoms occasionally complaining of pressure, as evidenced by hoarseness, obstruction to breathing and difficult swallowing. They come to operation for relief of these symptoms, or as is more frequent, for a correction of the deformity.

A summary of the cases in this group is as follows:

Number, 61.

Sex: Males, 4; females, 57.

Age: Twelve to sixty years. Average, thirty-two and a half years.

Duration: Two months to twenty-five years. Average, seven and a half years.

Growth: Gradual increase in size in all cases except 3, these of twenty-five, ten and five years' duration had grown more rapidly in the year preceding operation. The pathologic report in all 3 cases was cystic colloid goiter.

Tachycardia: One case.

Tremor: The fine fibrillary tremor was absent in all cases. A few had a gross tremor. Loss of weight was noted in only 2 cases.

Nervousness: Thirty-six per cent. of the cases were nervous but none were of the toxic type of nervousness.

Recurrence: Two cases were recurrent. The pathologic reports were cystic and cystic colloid goiter.

PATHOLOGIC REPORT.

Simple adenoma	12
Colloid goiter	24
Cystic goiter	10
Fetal adenoma	10
Hematoma	1
Colloid with parenchymatous hyperplasia	1
Adenoma with parenchymatous hyperplasia	1
No report	2
Total	61

In this group it should be noted that 2 cases were recurrent, both of cystic type. One case was a hematoma of seven years' standing, resulting from a severe strain in a wrestling match; the patient was a powerfully built young man. Two cases showed parenchymatous hyperplasia in addition to colloid and adenomatous goiter, and though clinically in this group, must be considered as borderline cases with Group II. Both of these cases had goiter of short duration, and without surgical intervention would have developed hyperthyroidism and have been definitely in Group II.

To avoid confusion the pathology of goiter, with special reference to our classification, should be mentioned. The simple adenoma is comparable to the adenoma found in other glands. The colloid goiter is composed of multiple dilated tubules filled with colloid material. The fetal adenoma is composed of alveoli lined with a single layer of cells embedded in hyaline material.

The toxic goiter cases we formerly considered as varying degrees of the same pathologic process, but in the light of Plummer's papers and our own observations we would divide them into two groups, with rather decided clinical contrast.

Group II we call hyperthyroidism, as will be described later.

Group III we call exophthalmic goiter.

Group II presents a very interesting picture. The patients are middle age and have had a goiter for a long time without symptoms. These quiescent goiters suddenly begin to grow, and coincident with the growth the patients become restless and nervous; they have attacks of palpitation, the heart-rate becomes accelerated and they lose weight, but they do not have the fine tremor of the third group nor do they have the exophthalmos. One case in this group had the toxic symptoms for two years, but there was no exophthalmos; all cases in Group III of that duration had the typical exophthalmos. Experimentally this group can be reproduced by feeding thyroid extract, and they promptly recover when the feeding is stopped.

A summary of the cases in this group is as follows:

Number: 20.

Sex: Male, 1; females, 19.

Age: Thirty-four to fifty-eight years. Average, forty-seven years.

Duration: Two months to thirty years. Average, eleven years.

Growth: Recent growth of goiter in 10 of 14 cases recorded, 77 per cent.

Tachycardia: Present in 35 per cent.

Exophthalmos: Absent in all cases.

Tremor: The fine fibrillary tremor was absent in all cases. Gross tremor in 35 per cent.

Loss of Weight: 5 to 100 pounds in 40 per cent.

Nervousness: All these patients complained of being nervous. In one case, the only postoperative death, it amounted to a dementia.

PATHOLOGIC REPORT.

Colloid with parenchymatous hyperplasia	7
Fetal adenoma	3
Colloid	6
Simple adenoma	1
Cystic	1
Fetal adenoma with parenchymatous hyperplasia	1
No report	1
Total	20

The patients in Group II have for years had the pathology described for Group I. They still have this pathology, but some of the tubules have papillary projections into the lumina from cellular proliferation, and, besides, there are a few areas of closely packed tubules containing little or no colloid material.

Group III embraces the patients with the classic symptoms of exophthalmic goiter; they present a line of symptoms including all in Group II, but in addition definite points which put them in a separate class. We will not attempt to go into theories of the cause or even the pathology of exophthalmic goiter outside of the thyroid gland. These patients have small goiters; they have had symptoms for a relatively short while and the onset of the toxic symptoms is coincident with or previous to the appearance of the goiter. Two of these cases were clinically put into this group, but the pathologic report corresponds to the picture to be expected in Group II. It is interesting to note that one of these two was a borderline case and had no exophthalmos, while the other is a frank exophthalmic which we consider as developing independently rather than on the existing adenoma. Exophthalmos has been considered as a symptom frequently absent in Graves's disease; of these cases 60 per cent. have exophthalmos, while in the 6 cases without it 5 were of one year or less duration and the sixth was a doubtful Group III. Practically all of the cases have tremor, tachycardia and the typical nervousness. The tremor in these cases is the fine fibrillary motion of the fingers quite distinct from the gross tremor seen in Group II. The tachycardia is much more pronounced in this than in the preceding group.

A summary of the cases in this group is as follows:

Number, 19.

Sex: All females.

Age: Fifteen to fifty-one years. Average, thirty-three.

Duration: Two months to seven years. Average, two years.

Growth: Recent growth of goiter in 8 of 14 cases recorded, 57 per cent.

Tachycardia: Present in 86 per cent.

Exophthalmos: Present in 60 per cent.

Tremor: The fine fibrillary tremor present in 86 per cent.

Loss of Weight: Ten to forty pounds in 30 per cent.

Nervous: All were typically nervous, as evidenced by rapid speech, movement of limbs, excitability, etc.

PATHOLOGIC REPORT.

Severe papillary hyperplastic parenchymatous	14
Simple adenoma with parenchymatous hyperplasia	1
Colloid with parenchymatous hyperplasia	1
No report	3
Total	19

The pathology typical of Group III is the hyperplastic parenchymatous goiter, which is composed of closely packed tubules lined with multiple rows of large cells with little or no colloid material.

We will dismiss the case in Group I, the simple goiter with the brief discussion already given. We believe, however, that the demonstration of hyperthyroidism developing in the simple goiter will give additional importance to the removal of this quiescent but potentially dangerous pathology.

It has been our custom until recently to classify all the other cases with toxic symptoms as varying degrees of the same process, and although we have used a variety of terms we have meant the same disease, and, as a rule, have simply called it hyperthyroidism. We now believe, however, that there are two very definite groups of these cases and propose to call one, Group II, hyperthyroidism to signify that the cause of the toxemia is an increased secretion and absorption of the thyroid secretion. In Group III we adhere to the time-honored title exophthalmic goiter, because we have no better name. We feel that this condition is a clinical entity, and although we want to avoid the mooted questions of pathology and etiology, we believe neither is limited to the thyroid gland.

The clinical grounds for this grouping we believe to be sufficient. The patients in Group II are older women, forty-seven years of age against thirty-three in Group III. They have had the goiter for a number of years, eleven as opposed to two. The goiter has given no symptoms for long periods; the toxemia has been present from six months to two years, and is coincident with the recent growth of the gland, while the exophthalmic, or Group III, has had the symptoms as long as the goiter, and in some cases even without apparent enlargement of the gland. Perhaps the most striking difference in symptomatology is the exophthalmos; it is absent in all cases in Group II but present in 60 per cent. of Group III, being absent only in early cases or in cases doubtfully classified. We believe that cases in Group II will never develop exophthalmos while all cases in Group III will have it if of long enough duration. A larger percentage of cases in Group III have tachycardia, 86 per cent. against 35 per cent. in Group II, but no other practical difference was noted in this symptom. The tremor in the two groups bears the same percentage ratio as tachycardia, but the tremor of the exophthalmic is more definitely beyond the patient's control and more rapid with shorter excursions than that of the hyperthyroid.

Pathologically the grouping is quite interesting. The tissue was examined by Dr. Hopkins, and in his absence by Dr. Budd, quite independently of any clinical data, and although the reports are by no means positive proof of our position, we feel that for routine examination they are confirmatory, and with more detailed study we believe they will tally more exactly. In Group II all cases originally had a goiter of simple type; 40 per cent. of these goiters showed an active hyperplasia in addition to the old goiter, 15 per cent. were fetal adenomata and 40 per cent. showed only the simple type of goiter.

In some of these last cases the same slide would show an old pressure atrophy and a recent hyperplasia of the cellular elements, which has been described fully by Wilson.

In Group III only two specimens, 10 per cent., showed goiter of simple type with hyperplasia of the cellular elements, and of these one was doubtfully classified. Fourteen, 74 per cent., showed the typical papillary hyperplasia of the parenchyma.

Conclusions. Toxic goiters should be regarded as belonging in two definite groups, first, those in whom the intoxication is due to a recent proliferation of parenchyma in an old goiter, our Group II, and second those in which the thyroid hyperplasia is primary and probably associated with other pathology, our Group III.

The simple goiter, Group I, should be surgically removed not only for relief of pressure and for cosmetic improvement, but also to remove the danger of hyperthyroidism and cancer which may develop as the patient and the goiter become older.

The patients in Group II can be relieved by removing the goiter; they may expect perfect recovery unless the operation is delayed until thyroid stimulation has seriously damaged other vital organs. They will become progressively worse if not treated, but will not develop into Group III, the exophthalmic goiter.

Group III cases are improved by surgical treatment; the prognosis, however, is not comparable to what may be expected in Group II. We believe that the best results claimed in treating exophthalmic goiter have been due to operations on cases in Group II which is not exophthalmic goiter. The converse, however, is true—that is, that the poor results are in cases which we would classify in Group III. In spite of this, however, we believe that surgery is the best treatment now known for exophthalmic goiter.

The roentgen-ray and radium treatment of goiter should be confined to cases in Group III, and it is possible that with further development the radiologist may be able to take precedence over the surgeon in Group III cases.

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