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## NODULAR GOITER AND THYROID CANCER

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During the period 1943 to 1952, 435 operations were performed at Henry Ford Hospital for non-toxic nodular goiter. During 1953 there were 180 such operations, more than twice as many as the previous high of 89 in 1952, and more than 3 times the number of the second highest year of 1948. This amazing increase is far out of proportion to the increase in registrations, goiter referrals, or the national income. It may well reflect the emphasis placed on the removal of thyroid nodules by various authors in the past 5 years. The incidence of thyroid carcinoma in nodular goiter has been reported to be between 5 and 25% depending on the degree of nodularity of the gland, and the inclusion of obvious thyroid cancers in the statistics<sup>1, 2, 3, 4, 5</sup>. Through a process of refinement, several authors have reported series based on the incidence of carcinoma in non-toxic nodular thyroids in which malignancy is a surgical and/or a pathological diagnosis.<sup>6, 7</sup> This has produced a more realistic figure of 3-5%, but commonly this is assumed to represent the incidence of cancer in the glands which were not operated upon. By using the lowest figures for thyroid nodules in the general population, and the above assumption, Sokal<sup>8</sup> and Crile<sup>9</sup> have theoretically established thyroid cancer as a disease of almost epidemic proportion. As statistics can be interpreted in numerous ways, and the incidence of nodular goiter is quite variable in different parts of the country, only an analysis of our own experience is entirely applicable to our practice. It is of general value in that the majority of our patients are self-referred and the picture of a disease as we see it is much more that seen by the average practitioner than is that seen and reported by some of the larger specialty clinics.

### NODULAR GOITER

The picture of nodular goiter at autopsy in the Great Lakes area has been adequately presented by Hazard<sup>10</sup> who reports that 42% of all thyroids removed at autopsy are nodular. This is less desirable than a figure based on physical examination for obvious reasons. This condition is seldom indexed in our out-patient department and this, plus the variability of the experience of the initial examiner, makes the perusal of the history unsuitable for determining the incidence of nodular goiter. Accordingly, 300 unselected non-obstetric in-patient women over 20 years of age and 300 medical clinic women patients over 20 were examined by one observer. Positive findings were checked by independent observers. Patients whose presenting complaints were related to the thyroid or who had had a previous thyroidectomy were excluded. In this combined group there was an incidence of nodules of 2 cm. or over of 4.5%. An additional 7% had nodules of 1-2 cm. The former will be the only group subsequently referred to, principally because nodules of this size are readily identified on physical examination, and in the past, the general surgeons have indicated a willingness to remove nodules of this type. (It is, of course, well

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known that primary carcinomas are often one centimeter in size.) 1% of the patients had what seemed to be solitary nodules of 2 cm. or larger. Using appropriate conversion figures,<sup>11</sup> the incidence of 2 cm. nodular goiters in our patient population should be about 3%, and as there were 300,000 non-pediatric and non-obstetric new patient registrations during the 10-year period, there would have been approximately 9,000 nodular thyroids of this type.

#### *UNSUSPECTED CANCER OF THE THYROID*

In the 435 thyroidectomies for non-toxic nodular goiter from 1943 to 1952, carcinoma was a clinically and sometimes surgically unsuspected finding in 16 or 3.7%. All patients in whom a positive preoperative diagnosis of cancer was made, or who presented themselves with metastatic disease, or who were operated because of toxic symptoms, were omitted from consideration. The percentage of malignancy in those glands thought to have solitary nodules was practically identical to that of those thought to contain multiple nodules. Four of the seven multinodular glands, however, had no more than two nodules felt or the disease was confined to one lobe. Our clinical estimation of the degree of nodularity was 60% accurate. That this series had undergone a great deal of selection, is evidenced by the fact that almost half of the patients were sufficiently concerned by the mass in the neck that they were first seen in the General Surgical Clinic and were referred directly to the hospital for a preoperative workup.

#### *TOXIC NODULAR GOITER*

Most authors emphasize the low incidence of carcinoma in toxic nodular goiter and eliminate such cases in determining the incidence of unsuspected thyroid cancer. This point of view has been challenged by Sokal,<sup>12</sup> who arrives at the conclusion that cancer is more frequent in the toxic gland. If we ignore the theoretical aspect of the effect of toxicity on the development of malignancy, and on the probable degree of differentiation of possibly one of the nodules, then the incidence of cancer in these glands should be about the same as that in unselected nodular goiter. These goiters have been largely 100% removed and the size, rate of growth, or obstructive symptoms did not primarily bring the patient to the physician. We had one case of unsuspected cancer in about 250 cases of toxic nodular goiter.

#### *CANCER OF THE THYROID*

During the 10 years being studied, there were tissue diagnoses made on 32 cases of thyroid cancer. The pathologic diagnoses were 56% papillary, 10% malignant adenomas, 31% adenocarcinomas, and 3% other. These represented 0.7% of all the cancers seen during the same period. They fell into 3 groups. The first, that consisting of 7 cases in whom a preoperative diagnosis of cancer was made. All were dead of the disease within 2 years. The second, that consisting of 8 cases who presented with metastatic cervical nodes. None were dead of the disease or known to have recurrences in 1953. The third, that consisting of 17 cases whose cancers were found unexpectedly. All of these were living and free of recurrences in 1953.

An attempt was made to assay the importance of thyroid cancer as a cause of death by comparing it with other more common types of cancer during the same period. All deaths of people known to have died of their disease in the 10-year period were counted regardless of when the tissue diagnosis was made. These are compared to the new diagnoses made during the same period in Table I. Non-papillary cancer of the thyroid resembled cancer of the breast, rectum, and cervix in its behavior while the papillary cancers did not.

### DISCUSSION

If we assume that most of the thyroid cancers in our patient population came to surgery during 1943 to 1952, then the incidence of thyroid cancer in nodular goiter in our practice would be 0.2%. This corresponds to the identical figure calculated by Sokal<sup>12</sup> from nation-wide statistics. It also approximates the incidence of cancer in toxic nodular goiter in this hospital. We do not, however, have a significant number of cases with these combined diseases for this figure to be accurate.

The cancer removed unexpectedly is apt to be curable. Unlike some other types of cancer, this thyroid cancer is apt to also be of low malignancy and curable at a later date. Our follow-up on the papillary cancers with node metastases is admittedly short, but others have indicated that a 10-year survival after adequate surgery carries an excellent prognosis<sup>13, 14</sup>. It is significant that of the six unsuspected cancers found in 1953, all were papillary, and this represented 3 times the number of people known to have died from this disease in the 37-year history of this institution. Prophylactic removal of nodular goiter is a controversial subject, but probably not more than 20 per cent of the very malignant tumors occur in old goiters,<sup>14</sup> and a 100% thyroidectomy is required for adequate prophylaxis. The lifetime risk of a nodular goiter is estimated under 1%,<sup>12</sup> making this a doubtful surgical indication.

TABLE I

Type of Cancer	Number of Pathologic Diagnoses, 1943-52	Number Known Dead of the Disease, 1943-52	Ratio of Cases Diagnosed to Deaths
Thyroid, papillary	18	2	9:1
Thyroid, non papillary	16	6	2.3:1
Thyroid, total	32	8	4:1
Stomach	308	237	1.3:1
Breast	448	224	2:1
Cervix	246	143	2:1
Rectum	349	170	2:1

### SUMMARY

The incidence of nonclinical carcinoma of the thyroid in nodular goiter in our practice is probably about 0.2%. Surgical removal for pathologic diagnosis of all thyroid nodules would seem to be a procedure of a limited usefulness in attempting to improve our cures of this disease. The method of obtaining the 20 fold concentration of this disease in surgical material is worthy of further study. The degree of nodularity of the gland is often clinically indeterminable and is probably not an accurate guide to the possibility of malignancy.

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