

Thyroid nodules and cancer

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In the early 1900s surgeons boldly undertook the surgery of patients with endemic goiter and those who had Graves' disease. Many patients were relieved by the operation. The introduction of iodine into our foodstuffs, the development of drugs for Graves' disease, and the use of radioactive iodine have largely diminished the need for surgery in the treatment of these two entities. Nevertheless, the surgeon has a continuing role in the diagnosis and treatment of benign and malignant conditions of the thyroid.

Congenital lesion

Failure of closure of the lumen of the thyroglossal tract may result in the formation of a thyroglossal cyst which appears in the anterior portion of the neck above the thyroid gland. If the tract communicates with the pharynx, contains bacteria and is infected, an abscess forms and drains externally, forming a sinus tract in the anterior portion of the neck. Proper treatment consists of complete excision of the intact cyst, or if there is a communication with the pharynx, complete excision of the entire tract including the central portion of the hyoid bone up to the foramen cecum.

Thyroid cysts

Needle aspiration cures or controls approximately 90% of all thyroid cysts. If they recur

and require a second aspiration, we have found that after aspiration the injection of the sclerosing solution, such as that used to obliterate varicose veins, is of value. If the cyst is persistent, and in younger patients, if it is of cosmetic significance, it may be removed surgically.

Nodular goiter

Most important in the definitive diagnosis of nodular goiter is how the lesion feels. Is it hard? Does it have the infiltrating qualities of a tumor? If so, it should be removed. Review of autopsy data reveals that about 50% of the adult population will have thyroid nodules that are nonpalpable, with fewer than 4% of these having any histologic evidence of malignancy.¹ This, and the fact that fewer than 1,000 patients a year die from thyroid carcinoma, suggest that the mere appearance of a palpable thyroid nodule does not indicate the necessity for surgical removal.

If a thyroid nodule is stoney hard but smooth, occasionally a lateral roentgenogram of the neck will reveal a calcified ring which is simply calcification of an old hemorrhage in a benign adenoma. For calcifications that are more stippled, one should suspect a papillary carcinoma and surgery is indicated. Characteristics of a nodule which assist in determining a definitive diagnosis are the size of the nodule, its rate of growth, and the age of the patient. If the nodule is of recent origin, and is slowly and progressively enlarging, especially in younger patients, one is more suspicious, and such nodules should be removed. Nodules in patients younger than age 30 are much more likely to be malignant than nodules in patients

who are older than 50. The mere fact that a nodule takes up radioactivity indicates that it is probably not a neoplasm; however, if it is a cold nodule, this is of minor significance because most cysts and adenomas are cold.

Close questioning of the patient or parent may reveal whether there is a history of radiation of the neck. Ionizing radiation given to younger patients for a supposedly enlarged thymus, acne, lymphadenopathy, or enlarged tonsils and adenoids may give rise to benign adenomas as well as to papillary cancers.

As the incidence of benign nodules is two to one in favor of females, one is more suspect of a thyroid nodule in male patients. Patients who have a nodule and recurrent laryngeal nerve palsy should have surgical exploration. It is rare for a patient with a benign thyroid nodule to have recurrent nerve palsy. If uncertainty still exists regarding the treatment of the thyroid nodule, it is acceptable to give the patient 3 grains of desiccated thyroid daily and to follow the patient for 4 to 6 months. If the nodule shrinks and disappears, no surgery is indicated. If it continues to grow, exploration is warranted. When in doubt, the low mortality for thyroid surgery, which is less than 1 in 1,000, would justify removal of all nodules that are suggestive of cancer and enlarge despite thyroid suppression. These principles apply especially to nodules in younger patients and in male patients.

Struma lymphomatosa

The surgeon has a responsibility to spare the patient surgery. Symmetrical and slowly growing lesions are most often struma lymphomatosa or one of

its variants. Needle biopsy may often confirm the diagnosis if the internist is unable to obtain a positive thyroid antibody test. For needle biopsy we prefer local anesthesia, a no. 11 scalpel blade to pierce the skin, and then, either the Vim-Silverman, or the so-called "true cut" needle biopsy is employed.

Multinodular goiter

For patients who have multinodular goiters, the needle biopsy previously described may be useful in obtaining a diagnosis, or aspiration biopsies may also be useful.²

If there is encroachment of a thoracic inlet due to multinodular goiter, and if there is deviation of the esophagus or obstruction of the airway, surgery is indicated. Patients with tracheal narrowing have characteristic gasp breathing. These lesions may be removed entirely through a transverse cervical incision. A median sternotomy is not necessary. The blood supply of these lesions comes from the neck and once controlled, the colloid goiter can be removed from above and lifted out of the superior mediastinum.

Graves' disease

The treatment of Graves' disease still evokes controversy among internists and among surgeons. The thiourea drugs control hyperthyroidism, but it usually recurs after the patient no longer takes the drug. The goiter often persists and occasionally there is severe bone marrow suppression. There are also problems with the surgical treatment of Graves' disease. These patients may experience tetany, recurrent laryngeal nerve palsy, and the insidious development of hypothy-

roidism in 10% to 50%, depending upon the length of follow-up. Hyperthyroidism recurs in at least 5% unless a practically total thyroidectomy is done. Occasionally an operative death may occur. Despite the fact that thyroid surgery for Graves' disease was by far the commonest operation performed at the Cleveland Clinic in the days of its founders, we have rarely operated upon patients with Graves' disease in the past 25 years. More than 5,000 patients have been treated with radioactive iodine. There have been no deaths and no serious complications with this treatment. Patients are told before treatment that hypothyroidism will occur and that treatment with thyroid must be maintained for life. The dose of ¹³¹I (10 to 20 mc) is sufficient so that by the time these patients return in 8 weeks for a follow-up visit, 95% of them are euthyroid and are given a lifetime prescription for thyroid feeding. The dose of radiation to the gonads is no greater than that of a gastrointestinal series, and even in this day the yearly cost of thyroid feeding is but \$8 to \$10, much less than that of periodic rechecks to determine if the patient is hypothyroid.

Patients with hyperthyroidism from a multinodular goiter with poor uptake of radioactive iodine should be treated surgically. Small solitary hot nodules can be successfully treated with radioactive iodine, but large hot nodules so treated do not always shrink.

Subacute thyroiditis

Perhaps there is no group of patients who are more grateful for an accurate diagnosis than those with subacute granulomatous thyroiditis. These patients have often been treated for fever

of unknown origin, for earaches, sore throats, or cervical myalgia. When these patients are acutely ill, they will hardly let you examine their thyroid gland. The thyroid scan shows no uptake. More frequently they are seen at a later stage of the disease. A 1- to 2-week course of steroid therapy usually will control all symptoms and cause the induration to subside. Often there is complete relief of symptoms within the first 24 hours of treatment. Recurrences are common and should be treated by further administration of steroids until the disease, a viral infection, runs its course and subsides.

Thyroid malignancies

The Cleveland Clinic and the Mayo Clinic agree on simplified classification of the thyroid malignancies in order of ascending aggressiveness. Papillary tumors are the most common and occur in patients of all ages. More than 70% of patients in our series had nodal involvement at the time of surgery. The lesion ranges in size from that of a small microfocus to one which may occupy the entire gland. The prognosis is favorable, especially in younger patients in whom the malignancy is often endocrine dependent. These patients, in addition to surgery, should have thyroid feeding for life. A nonencapsulated, well-differentiated thyroid cancer, whether predominantly papillary or follicular, behaves clinically like a papillary cancer, metastasizing usually to regional nodes. However, the encapsulated angioinvasive carcinomas metastasize to lung and bone and almost never to the nodes. The papillary cancers may be pure papillary or mixed papillary and follicular cancers, but in the nonencapsulated, invasive variety

with metastasis to nodes, the prognosis is the same, regardless of whether it is pure papillary or mixed. The papillary cancers have the characteristic so-called "owl eye" or "Orphan Annie eye" cells. These cells can be seen in a characteristic papillary arrangement or at times in a follicular variant of this pattern, but it is still the same papillary cancer cell. This confusion in nomenclature accounts for the controversy in the literature. I doubt that surgeons will settle this problem; perhaps pathologists can decide on the precise terminology.

The angioinvasive follicular carcinomas do not have as favorable a prognosis as the papillary tumors except in patients under 40 years of age. Metastasis is rarely to lymph nodes but mostly through the bloodstream. The encapsulated lesions in younger patients have a more favorable prognosis than in older patients, because even with encapsulation in the elderly, there may be systemic metastases. It is the invasive follicular carcinomas that are the least favorable of this group.

The most recently described thyroid cancer is the medullary cancer which arises from the parafollicular cell and produces thyrocalcitonin. The lesion metastasizes by both lymphatic and vascular pathways. The fascinating thing about these tumors is that their production of thyrocalcitonin can be assayed. This knowledge coupled with a strong familial tendency necessitates testing of all siblings and offspring of patients with medullary carcinoma for thyrocalcitonin levels. Early detection and surgery significantly improve the cure rate of this infrequent lesion. There is an association of medullary carcinoma of the thyroid with hyper-

parathyroidism and with pheochromocytoma.

Anaplastic cancers of the thyroid are most often found in patients who are in their 6th and 7th decades of life. This is one of the most lethal neoplasms of the body. These patients usually have a 2- to 3-month history of a growth in the neck with pressure symptoms. We rarely operate on these patients. Diagnosis is established by needle biopsy. Radiation therapy usually controls the local disease, but unfortunately metastasis occurs so early and so widely that it is unusual for a

patient to survive 6 months from the time of diagnosis.

The type of surgery selected for the neoplasms which have been discussed is the subject of another review by this author.³

References

1. Wright HK, Burrow GN, Spaulding S, et al: Current therapy of thyroid nodules. *Surg Clin North Am* 54: 277-288, 1974.
2. Crile G Jr, Hawk WA: Aspiration biopsy of thyroid nodules. *Surg Gynecol Obstet* 136: 241-245, 1973.
3. Esselstyn CB Jr: A technique for thyroidectomy. *Surg Clin North Am* 55: 1975. In press.