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### THYROID NODULES AND THE FALLACY OF "ALL OR NONE" TEACHING

GUEST EDITORIAL

George Crile Jr., M.D.

**E**LSEWHERE in this issue of THE JOURNAL, page 405, is presented a reasonable plan of treatment for asymptomatic thyroid nodules. The line of thought therein contrasts sharply with the opinions of some who believe (and can prove by statistics) that nodules in the thyroid are of no consequence. It contrasts also with the opinions of others who believe (and can prove by statistics) that all thyroid nodules should be removed. The author of the plan believes (and can prove by statistics) that some thyroid nodules should be removed and that others should not.

The confusion of opinions and statistics in medical teaching is not limited to nodules of the thyroid. The treatments for gallstones, gastric ulcers, and polyps of the colon also have been subjected to the "all-or-none" principle. Yet to these and to many other problems there may be reasonable clinical and statistical approaches.

Although it is not known whether gallstones cause cancer of the gallbladder or are caused by cancers of the gallbladder, it often is said that in order to prevent the development of cancer all gallstones should be removed. In patients with the type of cancer of the stomach that clinically, radiologically, and cytologically resembles a benign ulcer, it is not known whether or not a month of medical treatment reduces the chances of surgical cure, yet some ad-

vised immediate resection of all gastric ulcers because of the possible presence of cancer. Despite our ignorance of the natural history of these and other diseases, some physicians boldly urge their patients to undergo major operations for the removal of lesions that either are causing no symptoms or could be treated successfully by medical means.

The opposite extreme in teaching may be equally ill-advised. When patients who are good surgical risks have both gallstones and persistent abdominal distress, it seems unreasonable not to advise them to have the gallbladder removed. When gastric ulcers recur or do not heal completely it seems unwise to persist in medical treatment. If a patient who is a good surgical risk has a definite polyp of the colon, it seems inconsiderate to subject him to the anxiety of repeated examinations when the polyp could be removed so simply. Between these extremes the best solution must lie. The appropriateness of this middle course is nowhere more apparent than in the treatment of the thyroid nodule.

It is difficult to believe that those who urge the removal of all thyroid nodules really believe that this course should be followed as a mass-production, public-health principle. Clinically, nearly 5% of all adults have palpable nodules in their thyroids. Pathologically, almost all persons beyond middle age have nodules. The surgeons who say that all thyroid nodules should be removed mean that most of the patients who are referred to them have the type of nodules that should be removed. They sometimes forget that they are asked to examine patients with nodules of only such a special nature that they are thought to be of clinical significance.

Although the feeding of desiccated thyroid does not often cause nodular goiters to disappear or to shrink significantly, it does stop most goiters from growing larger. It is cheap and easy to take. Doses of 1 or 2 grains (60 or 120 mg.) daily usually stop the growth of goiters and cause no side-effects. If instead of treating multinodular goiters with desiccated thyroid a total thyroidectomy is performed, the patient still must take thyroid for the balance of his life. Also, if subtotal thyroidectomy is performed the patient should take thyroid permanently if he is to avoid recurrence.

In laboratory animals, administration of thyroid hormone protects against all types of experimentally induced cancer of the thyroid. In man, many cancers of the thyroid have been shown to shrink or to disappear when desiccated thyroid is given. Both laboratory and clinical evidence suggest that feeding of desiccated thyroid affords as much protection against the development of cancer of the thyroid as does any operation short of total thyroidectomy.

An experienced observer who has followed nodules of the thyroid from the operating room through the pathology laboratory usually can suspect the presence of cancer in a thyroid nodule. A young patient with a hard area of infiltration in a

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lobe of the thyroid, a patient with a nodule and enlarged cervical lymph nodes, or an old patient with a hard, rapidly enlarging, infiltrating tumor should be suspected of having cancer. Soft, multinodular goiters, on the other hand, rarely are malignant.

It is dramatic to teach by generalization—to say that all thyroid nodules, all gastric ulcers, and all gallstones should be removed. Students enjoy this type of teaching; it is easy to learn. Clinical judgment, on the contrary, is hard to learn.

A physician is fortunate if in a lifetime he can study enough patients with one type of disease to attain a high order of judgment in this disease. That is why specialists are needed. The primary role of the surgical specialist in thyroid disease should not be to remove nodules, but to decide whether or not they need to be removed. The primary role of the internist specializing in thyroid disease should not be to treat thyroid nodules medically, but to decide which nodules should be treated medically and which should be removed. In decisions of this type, the judgment of well-trained surgeons and well-trained internists should be the same. Both surgeons and internists should be biologists at heart.

### VENTRICULAR FIBRILLATION IN HEARTS TOO GOOD TO DIE

So much has been learned about ventricular fibrillation in recent years that in the future it may be possible to reduce its incidence. However, ventricular fibrillation is still a mystery in that it has no anatomic identity. It leaves no trace when it kills. It confuses the medical intellect by killing when it should not, when anatomic disease is mild and when life appears to be safe. It stops a good heart as readily as it does a damaged heart, in infants as well as in adults. It has no respect for sex or age. It kills with or without warning.

Nevertheless, positive gains have been made to prevent death and to restore life after ventricular fibrillation has occurred. One of the first encouraging signs came in 1899 from Prévost and Battelli, French physiologists, who described a method for the defibrillation of the heart of a cat in which a large electrode was placed on each side of the heart and an electric shock sent through the heart. The electricity made all the muscle fibers contract at the same time and when the current was broken the convulsive movements disappeared and the heart was ready to beat again. The heart of a dog is readily thrown into fibrillation by contact with an electric wire and it is just as readily defibrillated with use of the same electricity but more of it and spread over a larger area.

Cases of fibrillation and defibrillation were presented by motion picture to the American Surgical Association in 1937, along with records of patients whose hearts fibrillated during operation. The

method for defibrillation also was presented. Ten years later, June 16, 1947, *THE JOURNAL* reported the case of the first human heart successfully shocked out of fibrillation with complete recovery. Application of the method was extended later to the wards and other parts of hospitals with success. It has been tried without success in concert halls and churches, on the roadside, and on golf courses. Regardless of where electric death occurs the requirements for success are the same.

Fibrillation of the ventricle in the human is produced by an electric charge made within the heart itself. The term "fatal heart attack" might be replaced by "self-electrocution of the heart." A checkerboard distribution of coronary artery blood produces these electric charges. They do not appear when the heart is uniformly deprived of oxygenated blood as in the "blue-baby" but when only part of the muscle is deprived of oxygenated blood as in the presence of an anomalous coronary artery. Children with anomalous coronary arteries cry out with anginal pain and die. Anginal pain and fibrillation are based on the same physiology. Generalized anoxia of the heart is tolerated even when it is severe; localized anoxia is painful and kills even when it is mild. The development of fibrillating charges is independent of an infarct. Conversion of oxygen differentials into electric charges requires further investigation. The old concept of "current of injury" implies that injury of muscle is involved when this current is produced. This concept is not valid. It implies that cyanosed muscle is injured muscle. The fact that a deeply and uniformly cyanosed heart is not injured and does not produce "current of injury" is evidence against this concept. A deeply cyanosed heart maintains electric equilibrium and while its contractions become weakened it does not fibrillate. The key point is the difference between localized anoxia and generalized anoxia.

Coronary heart disease is complex. Hearts with severe reduction in arterial inflow require more blood. Hearts in failure require better muscle. Hearts with adequate inflow but with checkerboard distribution require even distribution. These requirements dictate three approaches to treatment. The first and second are related, respectively, to structural disease in arteries and in muscle. Treatment of structural disease is a difficult research problem. The third yields to treatment by the creation of intercoronary channels. If these channels can be produced, then the treatment of this aspect of coronary heart disease will yield to that procedure which produces them. The physiology and treatment of this aspect of coronary artery disease deserve careful scientific analysis because positive steps in protection and treatment are in the realm of probability. They wait to be understood and applied.