

DISEASES PECULIAR TO CIVILIZED MAN

GEORGE CRILE, M.D.

CLEVELAND

With the increased pace to which civilized man must adapt himself, there are several diseases accompanying his highly energized manner of living. Frequently the physician is called on to treat diabetes, peptic ulcer, essential hypertension, exophthalmic goiter, diseases of the coronary arteries and nervous and mental diseases. These conditions are exceedingly rare in primitive man and are uncommon in the lower ranks of civilized man. The more highly civilized man becomes, the more prevalent they seem to be.

As man has become less concerned with fighting, hunting and other predominantly physical activities and more concerned with mental activities, the characteristic mental and emotional mechanism has continued to increase relatively in size and in dominance until there are now also increasing the diseases I have mentioned, which are in large part due to overactivity of the kinetic system. Evidence indicates that the kinetic system may, by its excessive activity, interfere with the health and the function of certain other organs of the body. The "brain-adrenal-thyroid-sympathetic system" in an increasing number of cases is becoming hyperactive, establishing a state of such excessive activity as may fittingly be termed hyperkineticism. The background of these diseases is laid in the racial history of man, in man's phylogeny. It is only in this way that it has been possible to understand their causation, for other factors, such as infections, diet, climate and excessive physical work, have proved themselves inadequate of being the primary cause of these diseases.

ELIMINATION OF VARIOUS CAUSES

Infections.—The diseases peculiar to civilized man could not be due primarily to infections, for the same infections affect all races of man, as well as lower animals. There is no evidence suggesting that a specific infection causes any of these diseases in the sense in which typhoid fever and diphtheria are caused by specific bacteria. Infection plays only a secondary role.

Diet.—It can be said that diet is not a primary factor but that it plays a secondary role.

Climate.—These diseases cannot be due to altitude, to humidity or to temperature, as they appear wherever civilized man appears. However,

it is significant that they are more prevalent in the north temperate zone, where man is noted for being more active.

Physical Overwork.—If physical overwork were the prime factor in causing these diseases, then the consistently hard-working horse should have peptic ulcer, hyperthyroidism or neurocirculatory asthenia.

A hereditary predisposition played on by adverse factors in the environment or existing in a normal person under excessive strain in one case may produce hyperthyroidism, in another may pathologically sensitize the adrenal-sympathetic system and in still another may "step up" the brain to the breaking point or so facilitate the digestive mechanism in its activations and its inhibitions as to cause spastic colitis, hyperacidity, peptic ulcer or indigestion. These diseases seem to be largely due to hyperactivity of the group of organs that initiate and continue the transformation of energy. They belong to the diseases of pathologic physiology, bred in man's phylogeny, in which there is a sustained, abnormally high activity of the entire kinetic system. Thus, these mental and emotional states leading up to hyperthyroidism, neurocirculatory asthenia or peptic ulcer may be regarded as the consequence of pathologic activation of the "brain-thyroid-adrenal-sympathetic system."

NEUROCIRCULATORY ASTHENIA

During the World War a certain number of men in service at the front became incapacitated on account of a disorder which was called "soldier's heart." These patients exhibited a rapid heart beat, nervousness and fatigue. In the stress of civilian life there are observed many cases of this same disease, which is usually given the name "neurocirculatory asthenia." This disease resembles, and is often mistaken for, mild hyperthyroidism, especially in those cases in which there are a goiter and a moderate increase in the basal metabolic rate. It is a pathologic state of excessive stimulation of the adrenal-sympathetic nervous system due to changes in facilitation within that system itself or to constant thalamic stimulation, and, since other kinds of treatment have failed uniformly, my associates and I followed the results secured by the surgical treatment of hyperthyroidism and sought in selected cases of neurocirculatory asthenia to reduce by surgical measures the activity of the adrenal-sympathetic system.

This condition is most frequently found in persons in a state of worry about finances or environmental conditions grafted on a background of brilliant achievements in school and college.

Since I considered that the adrenal glands constitute the power station, or the brain, of the sympathetic system and that in the presence of neurocirculatory asthenia this power station is too active, I tested this conception in certain cases by severing the nerves emerging from the adrenal glands.

My first task was to differentiate neurocirculatory asthenia from a group of diseases which have many symptoms in common with it. I excluded the diseases analogous to it, the mechanism of which involves changes in the patient's fundamental personality, such as psychoneuroses, psychoses and constitutional inferiority; in short, I excluded all cases of patent psychic disease and limited my attack to those cases in which a pathologically excessive activity of the adrenal-sympathetic system was manifested and a classic picture of abnormal stimulation of the sympathetic nervous system was produced.

The theoretic and practical indication for denervation is found in the person whose mental and psychic mechanism acts within a normal range but whose system is under an otherwise uncontrollable stimulation analogous to that which produces hyperthyroidism or that which produces Raynaud's disease.

Neurocirculatory asthenia is more frequently found among women than among men and is essentially a disease of early adult life. The more nearly the symptoms resemble those of hyperthyroidism, the better the operative results. As with hyperthyroidism, the physical type of the patient with this condition is the slender, nonathletic type, a fact which indicates that while the kinetic system is rising the rest of the organism is declining, thus following the pattern of orthogenesis. As has been stated, patients with neurocirculatory asthenia are generally intellectually and emotionally outstanding, just as civilized man is intellectually and emotionally outstanding in comparison with primitive man.

PEPTIC ULCER

The seven biologic excitants of the adrenal-sympathetic system are pain, emotion, infection, hemorrhage, asphyxia, thyroid hormone and epinephrine. Pain certainly aggravates a peptic ulcer. Emotion and physical exertion are closely related; both aggravate peptic ulcer, as do equally the toxins of infection. The thyroid hormone my associates and I also believe to be clearly related to peptic ulcer, as we have noted cases of peptic ulcer associated with hyperthyroidism. In these cases thyroidectomy has been followed by cure not only of the hyperthyroidism but of the ulcer.

Accordingly, when there is obstruction at the pylorus it may be assumed that a healed, or at least an inactive, ulcer exists. In this case almost ideal results are secured by a simple gastroenterostomy. When there is an active nonobstructive ulcer in an active, young, high-strung, worrying person, gastroenterostomy is not indicated, because of the tendency to formation of recurrent ulcers. Recurrent ulcers are more resistant to treatment than is the primary ulcer. In the case of a recurrent, intractable ulcer in a young person with a high-strung,

worrying temperament, we seek to change the pathologic physiology by denervation of the adrenal glands; otherwise, gastric resection is the operation of choice.

DIABETES

Cannon has shown that glycosuria accompanies emotion. If the pathologically high stimulation of the pancreas by the highly charged sympathetic system in cases of hyperthyroidism contributes to or causes diabetes, the disturbed carbohydrate metabolism should be abated or cured by thyroidectomy. Dr. Henry J. John found cure or abatement of the diabetes after thyroidectomy in 55 per cent of cases in which diabetes was associated with hyperthyroidism.

ESSENTIAL HYPERTENSION AND HYPERTHYROIDISM

Essential hypertension and hyperthyroidism can perhaps best be taken up as a comparative study. Through my observation and study of the histories of patients with these conditions, I have noticed that with each there is a distinct difference in personality and that apparently there is an inherited type of physical characteristics predominant in the hypertensive patients and distinctly different from that observed in the patients with hyperthyroidism. The hypertensive patients are, in the first place, of a heavier build, usually averaging 20 to 30 pounds (9 to 13.5 Kg.) more than patients of the same height with hyperthyroidism. They have larger hearts, larger celiac ganglions, a larger trunk and an especially large chest. They are endowed with tireless energy, and, although both groups of patients have a capacity for large amounts of work, patients predisposed to hypertension have a greater capacity for *sustained* output of energy. The hypertensive person at school tends to be interested in physical work, and he is a leader in organizing teams and clubs. He is usually the student who makes a name for himself in such athletic pursuits as football, boxing and baseball, whereas the person with a hyperactive thyroid is more interested in such activities as debate, creative writing and the more esthetic subjects and displays a definitely higher scholastic ability. With this ability there is associated a more unstable, excitable type of personality, which is often in conflict with the driving ambition generated by the high degree of intelligence. The hypertensive person throughout life is able to do vast amounts of work, but unlike the person with hyperactivity of the thyroid, he is stable and constant, which aids his high intelligence in fitting him for a prominent position in business.

When one sees these two different groups of patients in the clinic, the mental and emotional variations are apparent. The hypertensive patient, who calmly discourses on his symptoms, is rarely alarmed in the least when it is suggested that he should have an operation, often

showing less concern than the surgeon. On the other hand, the patient with hyperthyroidism is so excitable and unstable that the whole hospital must be organized to keep from him the details as to when his operation is scheduled, in order to prevent the development of a thyroid crisis.

Essential Hypertension.—Barker and Graham¹ claimed that approximately 15 per cent of all adults have hypertension and that 23 per cent of patients who are more than 53 years of age die of hypertension. Ascroft,² from a survey in England, says that, after the age of 50, 1 death in 4 is due to arterial hypertension, and he claims further that “whatever the initial cause of raised blood pressure, in ‘essential arterial hypertension’ the hypertension itself is the dangerous factor and the commonest cause of death.”

The racial distribution of hypertension indicates that the highest known incidence of high blood pressure is among those who struggle with the complexity of civilization. Thus, in the aboriginal native whose ceremonies protect him against social struggle, the incidence of hypertension appears to be low. On the other hand, in the urban American Negro, who has been removed for several generations from his protective aboriginal society, the incidence is higher. This seems to be true also of the recently westernized Japanese, who now appear to have a high incidence of hypertension as compared with a presumably similar stock, the calm Chinese, who have not yet been influenced by the pressure of Western civilization.

It is important to determine what levels of blood pressure should be considered hypertensive before any other steps are taken. It is generally considered that in middle-aged or young persons a systolic blood pressure of 140 to 150 mm. of mercury and a diastolic blood pressure of 90 to 95 mm. is either borderline or indicative of early hypertension. In older patients a systolic pressure of 150 mm. is usually accepted as the minimal hypertensive level.

It has been observed that the sympathetic system has an important function in the production and maintenance of high blood pressure. I have already reported that in the course of denervation of the adrenal glands and division of the splanchnic nerves if the sympathetic nerves are manipulated there is a rise in the blood pressure, both systolic and diastolic, sometimes to such a height that it cannot be measured by a manometer, while, on the other hand, if the field is first flooded with procaine hydrochloride there is no rise but rather a dramatic fall in

1. Barker, N. W., and Graham, R. W.: Treatment of Hypertension, *M. Clin. North America* **22**:1021 (July) 1939.

2. Ascroft, P. B.: Surgical Treatment of Arterial Hypertension, *Lancet* **2**: 113 (July 15) 1939.

the blood pressure. The adrenal-sympathetic complex is the only tissue in the body the manipulation of which can thus specifically affect the blood pressure.

On the basis of these observations my associates and I resected the celiac ganglions and broke up the sympathetic complex. It was hoped that the operative procedure based on these findings might enable us to reduce the high blood pressure of a patient with essential hypertension to normal on the operating table, and it was felt that, since postganglionic fibers cannot regenerate, there should follow a reduction in the blood pressure.

We have treated hypertension by 535 operations on 314 patients, of which 434 were celiac ganglionectomies on 260 patients. Sixty-one patients were operated on three or more years ago. The average blood pressure of the patients living at the time of this report (55 per cent) was 213 systolic and 130 diastolic on admission to the hospital; at present the average blood pressure is 187 systolic and 116 diastolic. Symptomatic relief has been experienced in 88 per cent of our total series; precordial pain has been relieved in 83 per cent, and 82 per cent of the patients have gone back to work.

Among the patients who left the hospital three or more years ago, 33.3 per cent have died after varying periods. It is generally accepted that approximately 60 per cent of patients with essential hypertension, if not operated on, die from cardiac failure. Of our series of patients on whom celiac ganglionectomies were performed, only 11.8 per cent died from cardiac failure. Also, in our whole group of patients there has not been a single "cardiac death" in the hospital following the operation.

Hyperthyroidism.—Denervation of the adrenal glands can convert a hyperplastic thyroid into a colloid goiter, thus abating the symptoms, reducing the patient to a normal state and sustaining this normal state. Since denervation can accomplish this, hyperthyroidism is not due to a dysfunction of the thyroid or to a change in the iodine molecule, nor does it originate in the thyroid itself. It is imposed on the thyroid from influences outside the gland and is not due to diet or to changes in the blood.

The curative effect on hyperthyroidism produced by adrenal denervation clearly demonstrates that the hyperthyroidism is definitely related to the brain-adrenal-sympathetic system and does not stand alone as an isolated phenomenon. It is an excessive functional or pathologic stimulation of the entire mechanism of civilized life. The background of civilization and the background of hyperthyroidism are identical, whereas among the wild and the domestic animals, among the primitive races of man and among the drifters, the morons, there is generally neither hyperthyroidism nor civilization.

Through results obtained from our research laboratory my associates and I concluded that nothing but epinephrine can cause the crisis of hyperthyroidism. It followed that if we could sever the connection between the adrenal glands and the organism, not only would this body-wide stimulation be reduced but the activity of the thyroid gland and of the brain would be diminished.

The effects of adrenal denervation in a case of hyperthyroidism may be favorably compared with those of thyroidectomy. After thyroidectomy the patient is at first extremely nervous and difficult to quiet, while after denervation, to the extent that preoperative excitation is avoided, the patient usually is calm and rests well. More sedatives are required after thyroidectomy than after adrenal denervation. After thyroidectomy the pulse rate is usually increased and remains so for several hours; after adrenal denervation the pulse rate gradually drops. Excessive perspiration is noted after thyroidectomy, and little or none occurs after adrenal denervation.

The immediate beneficial results are thus obvious; the remote results should be just as obvious, since the power of the adrenals to excite the thyroid to increased activity is permanently lessened. In our series of cases of hyperthyroidism associated with hyperplasia of the thyroid in which adrenal denervation has been performed, we have seen the entire picture of hyperthyroidism disappear promptly, the basal metabolic rate return to normal and the hyperplasia undergo transformation to the safe colloid state.

CONCLUSIONS

The diseases peculiar to civilized man would seem to be due to excessive use of those organs that through their development have distinguished civilized man from primitive man and, in turn, have distinguished primitive man from the domestic and wild animals. The real background of these diseases is the background of the power and personality of man—the brain, adrenal, thyroid, sympathetic nervous system complex, which has evolved to its highest development in civilized man. The principle is analogous to the mechanical effect of putting into an ordinary motor car an engine twice as powerful as the car was designed to handle. If the car were not used there would be no difficulties, but if in addition to having high-powered equipment it were driven excessively, as civilized man is, then complications could be expected. Civilized man has the most highly energized formula of all the animals in the world, and his life in the north temperate zone is such that he is driven at a speed as though life were a race. Consequently, pathologic physiologic change develops which may produce diseases of the coronary arteries, diabetes, peptic ulcer, hyperthyroidism or essential hypertension.

Naturally, the African native with his low energy equipment could not qualify either for civilization or for these diseases of civilized man.

An important part of treatment is clearly prevention. One may hope that some day civilized man will understand the limitations of his equipment, so that by training and education he may adapt the coming generations to the risk of these diseases. When this has developed, there will also evolve better modes of treatment. The present surgical treatment of interference with the sympathetic nervous system's influence on the thyroid gland in conditions of neurocirculatory asthenia, hypertension, hyperthyroidism etc., although as yet with an undetermined effect in some cases, is leading the way in this evolution.