

## TWO YEAR RESULTS OF THE TREATMENT OF ESSENTIAL HYPERTENSION BY CELIAC GANGLIONECTOMY

GEORGE CRILE, M.D.

In the treatment of essential hypertension we have performed 476 operations on the adrenal sympathetic system in 285 patients. These have included 325 celiac ganglionectomies in 199 patients. In the latter series 35 patients were operated upon two or more years ago. From the study of the results in these 35 cases we have drawn certain conclusions as to the indications for operation.

The calendar age has no effect upon the results of celiac ganglionectomy. It is the physiological, not the calendar age, that counts. What happens to the blood pressure as a patient grows older? It tends to rise secondary to advancing sclerosis. That progressive increase in the blood pressure cannot be cured, that is, there is a cardiovascular age, and that age may be established in younger individuals for there is a certain stage in hypertension in which there is an irreversible condition due to sclerosis alone. Wherever there is molecular injury and repair, as in scars and burns, which are subjected to pressure or irritation, the scar grows. By the same process when there is a certain amount of scar tissue or sclerosis in the vascular tree it will grow, just as does a scar in the esophagus, in the intestines, or a scar from a burn at the elbow. Such scars grow larger because of continuous molecular injury and repair.

In a case in which sclerosis is present the blood pressure may fall after celiac ganglionectomy, but the extent to which it will fall is limited by the cardiovascular age of the patient. Existing sclerosis cannot be taken out any more than old age can be cured. We have had one child of nine years whose physiological age was ninety years as judged by the degree of sclerosis in his blood vessels. The blood pressure of this child was 220/140. The calendar age, therefore, has nothing to do with the indications for operation. From our experience we have become able to judge how much sclerosis can be present and not prevent good results from the operation.

I have been astonished at the large number of young people who have this disease. Not only do they have the disease but a goodly number of them have passed the period of any possible help.

Among our older patients operated upon more than two years ago was a surgeon sixty-five years of age with malignant hypertension. His blood pressure has been reduced from 220/110 to 165/95. He now has no heart consciousness. His improvement has been so great that he is now quite active, whereas before his operation he was unable to

do anything at all. He suffered from frightful headaches and dyspnea—from all the symptoms that accompany malignant hypertension. All these symptoms have disappeared.

An exceedingly significant fact is that the celiac ganglion in this case weighed 4000 milligrams, whereas the normal ganglion weighs from 250 to 350 milligrams or less.

In our cases of essential hypertension, all the ganglia have been found to be much larger than the ganglia in such diseases as hyperthyroidism and neurocirculatory asthenia. At first I thought this large size was due to a hypertrophy, but we couldn't conceive how that could occur in nerve tissue—and then we considered that in people like this surgeon, who is a very forceful person, in people who are active, in highly strung individuals, this mechanism is not enlarged—as the thyroid gland is enlarged in exophthalmic goiter—but rather, that the large celiac ganglion is peculiar to people of this type, that there are families which have a common characteristic, and that characteristic is that they have the power to do much work, they are tireless people due to the possession of a large celiac ganglion.

Other similar cases might be cited but this one is sufficient to show that the calendar age has nothing to do with the indications for operation. Our sixty-five year old surgeon is better off than some patients who were only in their twenties. Everything depends upon the physiological age and the degree of sclerosis in the vessels. Some of our very good results are in patients in the sixties, but not in patients with senile sclerosis.

If a patient has had a cerebral accident, is he then a suitable candidate for celiac ganglionectomy?

We have had a patient who had such an accident and who was operated upon over two years ago with an excellent result. For quite a long time we did not recommend any operation for any patient who had had a cerebral accident until a patient came along who had made a very good recovery from his hemiplegia, had a very clear mind, and was young, and I thought we should give him a chance. I find that the indications for operations are still present after a cerebral accident, provided only that there is no deterioration of the brain. If there is deterioration of the brain cells there is no more reason for believing that the operation would be successful than for believing that we could return to the patient a sound and an active brain, than for believing we could return a senile brain to its earlier status. We never consider operation after a cerebral accident excepting in those patients who still have a quite normal cerebral activity and who with respect to certain other standards present no contraindications to the operation.

## ESSENTIAL HYPERTENSION

Is celiac ganglionectomy indicated in the presence of nephritis? If the hypertension is secondary to glomerulonephritis, operation is of course contraindicated. On the other hand, if the nephritis is secondary to the hypertension and the urea clearance remains above 50, celiac ganglionectomy may be performed.

Is celiac ganglionectomy effective in the malignant phase of hypertension? Many of our patients, including the elderly patient whose case has been described have had malignant hypertension as indicated by the ocular findings, even advanced malignant hypertension, and the edema of the discs has disappeared after the operation together with the other symptoms. Sight that is lost is not restored, but the edema disappears.

Among the thirty-five patients operated upon two years or more ago ten have died at varying periods after they left the hospital. One of these died from uremia, the other nine from cerebral hemorrhage.

It is generally accepted that approximately 60 per cent of patients with essential hypertension die from cardiac disease. According to this percentage six of these ten patients would have died from heart disease if they had not been operated upon, but there was not one cardiac death. Moreover, in our whole group of patients there has not been a single cardiac death in the hospital following the operation.

It should be borne in mind that the heart is an integral part of the dynamics of the circulation of the blood and that it is controlled by the sympathetic system just as are the blood vessels throughout the arterial tree. It should follow that the heart and the coronary artery should be protected by celiac ganglionectomy. That the heart is directly affected by the operation is indicated not only by the fact that none of our patients has died from heart disease, but also by the fact that following celiac ganglionectomy the patients have been relieved of the cardiac symptoms—of heart consciousness and coronary pain.

Advanced age, the duration of the disease, the presence of the malignant phase of the disease, the presence of coronary disease, the presence of nephritis secondary to the hypertension provided that the urea clearance can be controlled—none of these is a contraindication to operation.

What is the effect of celiac ganglionectomy upon the blood pressure?

In the series of thirty-five patients that we are considering the average decrease in the blood pressure has been 39/20. The extent of the decrease is indicated by the following table:

# GEORGE CRILE

<i>Pressure Reduced</i>	<i>Systolic</i>	<i>Diastolic</i>
20 points or more.....	78.6%	57.1%
30    "    "    " .....	57%	35.7%
40    "    "    " .....	42.9%	14.3%
50    "    "    " .....	21.4%	7.1%—60 points
75    "    .....	7.1%	

Syptomatic improvement was registered in 91 per cent of these thirty-five patients. Precordial pain was relieved in 83 per cent. Eighty-one per cent have returned to their regular occupations.

In the long run the value of any surgical procedure and medical measure is told by the patient himself. If the patient is able to return to his former occupation, if he is relieved of his subjective symptoms, then that determines, and that only, the value of operation.