THE INFLUENCE OF THE VASO-MOTOR SYSTEM IN THE PRODUCTION OF CERTAIN SYMPTOMS

A CLINICAL LECTURE, DELIVERED AT THE PHILADELPHIA HOSPITAL,

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GENTLEMEN: I shall to-day call attention to the relations of the vaso-motor nervous system to certain diseases and the importance of recognizing the influence of these vaso-motor nerves, in the management of special symptoms which complicate many forms of disease which are met with both in hospital and in private practice.

The first case which I shall present in illustration of this subject is the patient on the table, a man about thirty-five years of age, admitted to the hospital ten days ago. He stated that he had been drinking for some time past and that just before admission had taken a severe cold. He was quite delirious at times and had, when first seen, a temperature of 105°. The physical examination of the chest gave the ordinary signs of pneumonia at the right base, and subsequent examination lead us to believe that this was pleuropneumonia. In other words, we had not only dullness, bronchial breathing, and increased vocal resonance and fremitus, but we also had a greater degree of dullness than is common in pneumonia, even flatness, and at times friction sounds were heard over the consolidated area. Examination of the heart at this time showed that its impulse was deficient in force. The radial pulse was deficient in volume although the pulse rate was not high, about 100. It was rather curious that with a temperature of 105°, the pulse rate should be so low. During the progress of the case, the delirium increased, and it was with difficulty that the patient could be restrained in bed. Within three or four days the delirious condition changed to one of hebétude. The pupils were contracted and the patient lay in a slight stupor. During the stage of delirium, we had used for a single twelve hours, small doses of opium. This was given to control the delirium which we considered to be a complication of the disease dependent on a condition of cerebral exhaustion incident to the man's habits. Ten drops of laudanum only had been taken every three hours, and in all only about thirty drops were given. I do not think, therefore, that the subsequent stupor could be attributed to the opium.

Finding this condition of delirium and stupor with the physical signs of pneumonia, it became an interesting problem to determine whether the cerebral condition was dependent on the pneumonia or whether there was some other condition disturbing the function of the brain to account for the symptoms. I did not regard the delirium in this case as due to the pneumonia, for the following reasons: Firstly, because the pneumonia was at the base. When delirium complicates pneumonia, the inflammation is usually at the apex. Secondly, the area of consolidated tissue was not very large, only one lobe being affected. Thirdly, the man had been a heavy drinker. We therefore ascribed the delirium to the chronic alcoholic habit rather than to the pneumonic condition. The pathological condition

we regarded as one of passive congestion of the brain. The effect of alcohol on the system is depressing. Large amounts of it usually produce distinct cardiac weakness and depression of the nerve centres. We had in our patient in addition to the weak heart, the depressing effect of alcohol manifested upon the cerebral and vaso-motor nerve centres, as the cause of the delirium. In many cases of chronic alcoholism, where there is delirium alternating with stupor, the condition is connected with a state of passive congestion of the brain. If the brain were examined under these circumstances, it would be found that the pia mater was injected and the evidences of venous repletion more marked than in active congestion. The brain would be soft and œdematous and excess of fluid would be found in the ventricles, and in grave cases effusion beneath the membranes.

Recognizing this condition, our treatment was twofold. In the first place, we wished to stimulate the heart and circulation, but although the heart was weak it could not be treated with alcohol because the patient's stomach was very irritable, and vomiting was a constant symptom. This symptom was associated with a tongue which was brown and dry in the middle and did not present the glazed and shining appearance which would lead one to suppose that the patient had been suffering from gastritis; neither was there tenderness over the region of the stomach. The vomiting appeared simultaneously with the delirium, and we connected the two events, regarding the vomiting as a symptom of cerebral anæmia rather than of any local condition.

As we were unable to administer food by the stomach, we resorted to that treatment which is appropriate in chronic alcoholism, that is, the use of food by the rectum. We gave this man, every six hours, four ounces of pancreatized milk. These injections were alternated with the injections of beef tea into which an egg had been stirred. This was continued until the stomach became retentive. We also poured brandy over cracked ice and caused it to be administered.

The main element of the treatment is, however, yet to be considered, and it is for that purpose that I have brought the case before you this morning. Some years ago, an English physician, Dr. Chapman, called attention to the fact that if applications of heat and cold were made to the spine, the vaso-motor system in general and also the sensory nerves were somewhat influenced. He, like most originators of any system of treatment, exaggerated the scope of this valuable measure, claiming, for instance, that by the use of hot and cold applications to the spine one could cure diseases as cholera, sea sickness and the like.

About a year ago my attention was called to the use of this same treatment in certain cases of eczema which occurred in the practice of a Boston physician. This gentleman treated a number of severe cases of eczema with the application of ice bags alternating with hot water bags to the cervical and dorsal spine. The theory on which these applications were made was this. On the one hand cold applied to the spine has a decidedly benumbing effect upon the sensory and spinal centres, and thus peripheral sensibility was lessened, and the measure also has a tendency to determine the blood from the spine and cause its accumulation in the peripheral vessels. On the other hand, hot applications to the spine tend to determine blood to the spine, and associated with this effect there is a

contraction of the peripheral capillaries from vaso-motor action, and thus is accomplished a reduction of the amount of blood in the peripheral capillaries and arterioles. Basing his treatment on these facts the Boston physician found that when cold was applied to the spine, the itching and painful sensations were relieved, but by the increased peripheral circulation it appeared that as much would be lost as had been gained. By a simultaneous judicious application of heat and cold to the spine however, he produced great amelioration of the symptoms in his eczema cases, and cured several obstinate cases without other treatment.

These results put me on the track of what I consider an important means of treating certain conditions associated with the disorders of circulation. One of these was present in this case. I applied to the back of this man's neck, the actual cautery and produced the scars which you see. It is common to apply blisters under these circumstances, but by means of the actual cautery we employed counter-irritation in a more efficient form. We also applied hot water bags to the cervical and dorsal spine. These were applied for three hours, then omitted for the same length of time, and reapplied. We counted upon the influence of this application upon the vaso-motor system to relieve the passive congestion of the brain, favor a more active circulation, and thus remove the symptoms which we ascribed to this condition.

The results of these measures were, I think, very striking. Without other treatment, the patient was decidedly relieved within thirty-six hours. The mental condition began to improve, and from that time the recovery has been uninterrupted. In forty-eight hours from the beginning of the treatment we were able to give food and stimulants by the stomach.

The treatment of pneumonia in this hospital is usually based on the free administration of stimulants, and with excellent results. It consists in the administration of whiskey, carbonate of ammonia, and digitalis. We used these drugs to combat the pneumonia, but as these measures are quite familiar, I do not especially refer to them at this time, but will confine myself more especially to the treatment of the cerebral condition in chronic alcoholism.

In many such cases, then, we observe that the treatment with counter-irritation in the form of the actual cautery and the application of hot water, would be of great service. One of the most successful methods of treatment in chronic alcoholism, added to the above, is by the use of food and diffusible stimulants. Some twenty years ago opium was considered the most efficient drug in delirium due to alcoholism, and was freely given to produce sleep. At the present time there is a great hesitation in using opium in such states, for the respiratory centre once benumbed, it is oftentimes with great difficulty that the patient is kept alive while the effects of the alcohol are passing off. We now regard the delirium of alcoholism as a condition which will frequently pass off spontaneously, if the patient's strength can be maintained; consequently the most satisfactory treatment of these conditions is the administration of food in concentrated form, as beef tea, frequently repeated, together with such drugs as capsicum. Capsicum is a diffusible stimulant and stomachic tonic which takes the place of the alcoholic stimulant of which the patient is deprived. It should be administered in the form of the tincture in quite large doses, twenty to twenty-five minims, every two or three hours.

Sleep should be secured either by combining with the capsicum a certain amount of chloral or by giving chloral separately. Ten or fifteen grains of chloral may be given with capsicum every two hours until from sixty to seventy-five grains are taken. The other plan is to give the capsicum by itself and give the chloral in five grain doses every five minutes until thirty grains are taken. After an interval of two hours these five grain doses may be repeated. Given in this way, the possible danger of depressing effects of chloral on the circulation are avoided and the total amount required is less than when fifteen or twenty grain doses are given every two hours.

Opium should only be used in those cases in which the demand for sleep is urgent and where the delirium is so extreme that the patient is becoming exhausted, or after the food, capsicum and chloral treatment has failed. In these cases the judicious use of a small amount of morphia hypodermically may control the symptoms. Morphia or opium is, however, a dangerous drug in these cases and should only be used with great caution under the circumstances mentioned. With these remarks let me turn to another patient who also serves to illustrate the influence of the vaso-motor nervous system upon the manifestation of symptoms.

EXOPHTHALMIC GOITRE.

The next patient has been seen by the class on a previous occasion, but I wish you to note her condition at this time so that you may compare it with her condition a month or two hence after we have pursued a plan of treatment to which I shall refer. This woman has the three salient symptoms which differentiate her disease as exophthalmic goitre, or Graves' disease. We recognize the lustrous protuding eye-balls, the enlarged thyroid and the rapid action of the heart. There is also general tremulous movement of the body and limbs. With the excited action of the heart there is also heard on auscultation a blowing systolic murmur. The symptoms of this disease developed two years ago. Up to that time she had been in fair health. The period of the onset of the present symptoms was the time of the menopause, and as an evidence of the wave of irritation which passes over the nervous system at that time, she has developed this condition.

The three symptoms which have been noted are characteristic and distinguish this case from simple enlargement of the thyroid body or goitre. This is pre-eminently a disease dependent upon disorder of the vaso-motor and cardiac nervous systems. The protrusion of the eyes is supposed to be due to dilatation of the blood vessels in the orbit, or to the contraction of the involuntary muscular fibres in the orbital membrane which covers the spheno-maxillary fissure, or both causes combined. The enlargement of the thyroid is due to dilatation of the blood vessels which are liberally supplied to that gland, though increased formation of tissue in its substance may occur. The excited action of the heart which is usually unconnected with organic disease is to be explained by a stimulation of the accelerating nerve; and this as well as the alteration of the nerves of the orbit has been ascribed to disease of the lower cervical sympathetic ganglia, in which increased connective tissue and diminution of ganglionic cells have been observed. Exophthalmic goitre is a disease which is very much increased by momentary excitement. I recall the case of a patient almost cured of this affection who saw an individual

suddenly die in the opposite bed. In a few hours, the whole series of symptoms had returned: a similar outbreak often attends the menstrual period. Graves' disease is especially common in woman, and between the ages of twenty and thirty, also in persons poorly nourished anæmic and of a nervous temperament. All these are facts going to show that it is a disease peculiarly dependent upon disorders of the circulating nervous system.

The treatment of this disease is only successful after a prolonged use of the apeutic measures and improvement is often connected with a change in the physical condition of the individual. If the affection develops near the menopause, after that period, the disease recedes. In sewing girls and poorly nourished young women, the affection may disappear as the nutrition is improved, but in many cases the symptoms never entirely vanish.

The most successful methods of treatment have been first, the use of iron in some assimilable form, for instance the more soluble salts which can be kept up for a long time without interfering with digestion: second, the use of digitalis: third, the use of electricity. Iron is used until the condition of the blood is manifestly changed. The digitalis is useful through its stimulative effect on cardiac innervation and upon the vaso-motor nervous system. The electricity applied to the spine in a descending current, either in the form of the constant or the slowly interrupted Faradic current, or one pole may be applied to the nape of the neck, and the other over the sides of the thyroid tumor. The latter remedy is especially designed to increase the nutrition of the vaso-motor nerves. The occasional resort to bromides and arsenic may be necessary.

I propose in this woman to try the treatment with hot water bags applied to the dorsal and cervical spine. A long spinal bag filled with hot water will be applied from two to three hours every morning and for the same length of time every afternoon. In connection with this, we shall employ suitable constitutional remedies to improve the crasis of the blood. I do not see why, if the emotion of fright or of joy can so profoundly influence the vaso-motor system as to bring on the symptoms of this condition, it would not be possible to have improvement by acting on these centres in some positive way as can be done by the application of heat.

I would like to add another fact in this connection which is, in fever the temperature can often be lowered as much as a degree by rubbing up and down the spine, the hands being lubricated by oil applied to the spine. This is another argument to show that the vaso-motor nerves can be influenced in this way, since we know that elevation of temperature is in part a neurosis connected with nervous disturbances near the vaso-motor centres.

We shall try this treatment thoroughly, and in a month I shall bring her before you in order that you may see the result.

CEDEMA DUE TO VASO-MOTOR DISTURBANCE.

Here is another case in the same line. As you see, there is marked swelling of the legs. This man is forty-seven years of age, and states that he was perfectly healthy until seven days before admission, when this swelling made its appearance. When first observed, the swelling affected the face and upper extremities as well. The urine has been examined and albumen

found, but the microscope reveals no evidence of renal disease. We have been unable on repeated examination to discover either casts or epithelial cells. The appearance of the patient is well nourished and of good color, is also against this view. He asserts positively that he never had any swelling before.

He is equally free from any cardiac lesion. The heart is normal in its valvular structure, for although the force of the cardiac action is weakened, there are no evidences of fatty degeneration.

On examining the lungs, there are heard in different places some harsh and also some moist râles, but no such general distribution of râles as would lead us to suspect bronchitis. There is but little cough and no expectoration, no fever. The inference is that there is a certain amount of œdema of the lungs as is plainly evident in the limbs.

I think that this dropsy may be reasonably ascribed to a condition of deficient vaso-motor tonus. The fact that there is such a condition, is undoubted. It has been shown experimentally on animals, for if the vena cava is compressed to a certain extent, dropsy will not occur unless the sciatic nerve is cut, for the veins and lymphatics are able to take up a certain amount of effusion. If the sciatic nerve is cut, dropsy occurs, for the sciatic is a mixed nerve containing vaso-motor filaments. Exudation then occurs after its section beyond the ability of the absorbents to remove. This has been shown to be due to the section of the vaso-motor filaments, because if the sympathetic filaments which enter the sciatic are cut in the lumbar region, there will be no paralysis of motion, but the limb will become rosy and warm and there will be dropsy, just as occurs when section is made lower down, but in which there is also motor-paralysis.

Then another fact. It is known that if a hypodermic injection be given to an individual suffering with a serious brain lesion, there is a likelihood of suppuration, and bed-sores occur in persons whose nervous system is affected, for instance, in paralytics. This is due to interference with the trophic or vaso-motor nerves, as the case may be. In the same way, it has been shown that water injected into the cellular tissue of the frog will be absorbed so long as the brain and spinal cord remain intact. If these are damaged, the water will not be absorbed. With these facts before us, we cannot but admit that vaso-motor dropsy is possible. It becomes our diagnosis in this case because we can exclude renal, hepatic, and cardiac disease, and also any of the forms of anæmia. While at first it involved all the tissues, it is at present limited to the most dependent parts, the limbs and the lungs, since the patient habitually reclines on his back.

It is obvious that if the diagnosis be correct, rest and nerve tonics should be sufficient to relieve the patient. I should be willing to limit the treatment to these measures if time were no consideration, but in our patient, the mechanical effects of the vaso-motor dropsy are inconvenient, and moreover, the action of the heart is enfeebled by his indulgence in alcohol, we desire, therefore, to relieve the dropsy as soon as possible. The best remedies would be either digitalis or caffeine. Of the two, I should prefer caffeine, because besides being a cardiac tonic, its effects upon the nervous system are stimulative, and it has a decided diuretic effect. Two grains of caffeine, three times a day may be given. This should be combined with an equal quantity of benzoate of sodium to render the mixture clear.

If necessary, heat may be employed by the pharmacist in making a clear mixture, the bulk of which might be this elixir of orange, or syrup and water. About twelve or fifteen grains per day, of caffeine should be the limit of dose, but much smaller amounts are often sufficient. Abroad, as much as thirty grains a day have been given without damage.

Has caffeine any bad effect? It has one. In the treatment of a case of dropsy in which I advised caffeine, it quickly removed the effusion, but in four or five days the patient began to exhibit that kind of delirium which is seen in connection with belladonna poisoning. This is the only bad effect that I have noticed, and these symptoms have been most infrequent. It (caffeine) is a cardiac stimulant; it is not cumulative, and does not injuriously affect the kidneys. The unpleasant cerebral effect is easily avoided with a little care, and the disturbance of the nervous system can be quickly removed by stopping the administration of the drug.

This patient will be kept in bed and the caffeine administered, and four weeks from to-day, I shall show you the result.

(Four weeks later.) I have the satisfaction to-day of showing the case of Graves' disease, and you observe that the improvement of the general symptoms has been marked. The exophthalmos and enlargement of the thyroid have manifestly lessened. One may feel sufficiently encouraged by the results to persevere with the treatment, for we may reasonably conclude that two months' treatment will produce even more positive effects. You will remember that before using the hot-water bags, many other plans of treatment had been tried and signally failed.

I can also exhibit one case of vaso-motor dropsy as cured, and the patient will be discharged to-day.

Original Articles.

THE TREATMENT OF CHRONIC BRIGHT'S DISEASE.¹

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A FEW considerations seem naturally to claim attention as preliminary to that of treatment.

By chronic Bright's disease I mean the affection, first described by Dr. Richard Bright, in 1827, characterized by albuminuria, dropsy and uræmia, the urine usually containing, also, casts of the renal tubules, and showing a deficiency of urea. The acute form of the disease, so often seen as a complication of pregnancy, or a sequel of scarlet fever, and which so commonly terminates in recovery, is not included within the scope of this paper.

In its anatomical relations chronic Bright's disease is a complex affection, at least three forms of structural disease are usually reckoned as underlying it. The first of these is that of tubal, or desquamative nephritis, the inflammation beginning in, and for a time being confined to the epithelial cells, which line the tubules, later becoming diffuse, and producing the so-called large white kidney. The second is that of interstitial nephritis, the inflammation commencing in the connective tissue of the organ, and finally inducing the small,

hard, contracted, cystic, or gouty kidney. The third is that of amyloid degeneration, the small arteries and capillaries of the kidneys being first attacked. One common result obtains, at last, in all the forms, that is, destruction, or atrophy of the parenchymatous elements of the kidneys, with consequent failure of function.

It may be well also to glance at some of the most prominent theories, that have prevailed in explanation of the disease, as having had an important influence upon the philosophy of the treatment. These theories have been brought forward chiefly in answer to two questions, namely, first, how is the large escape of albumen by the kidneys to be accounted for? second, at what point in the system does the disease originate? By some the escape of albumen in the urine has been regarded as the result of a true eliminative action on the part of the kidneys, by which the blood is happily relieved of an accumulated excess of albumen. By others, on the contrary, it has been looked upon as a disastrous leak of the kidneys, due to the double condition of abnormal blood pressure within the renal capillaries, and of impaired vitality of their walls, the blood being believed to be thereby robbed of its serum-albumen, and impoverished. By some the kidney lesion has been regarded as primary, and the albuminuria, the dropsy and the uræmia as consequences. By others the blood has been looked upon as the primary point of trouble, with the albuminuria, the dropsy and the kidney lesions as secondary. By yet others it has been held that the starting point of the disease is somewhere in the nerve centres, that it is of ganglionic origin. They claim that the disease is primarily a neurosis, and that the albuminuria, the dropsy and the renal troubles are of secondary development. The alleged fact that albuminuria, as well as glycosuria, can be induced by irritation of certain portions of the medulla is brought forward as giving plausibility to this view. While the theories have differed widely as to the point at which the morbid process commences, they are well agreed to this, that structural change in the kidneys constitutes the most characteristic autopsical lesions.

In a disease so generally fatal in its issue as chronic Bright's disease, the question of the value of treatment naturally arises in the mind. Does it make much difference how it is treated, provided no mischief be done, or, whether it be treated at all? I believe that good treatment is of immense value. By the exercise of constant and intelligent supervision, the adoption of a suitable general plan, and the adoption of measures of relief to the shifting phases, and emergencies of individual cases, not only can much suffering be prevented or relieved, but great prolongation of valuable and effective life may sometimes be gained. It is then alike the privilege and the duty of the physician to throw more of hopefulness and cheer into the treatment of this disease than is generally done.

The first duty of the physician is to investigate each particular case by itself. This is as important as it is for the teacher to study the peculiarities of individual pupils. It is not only desirable to determine the form of the disease present, its stage of development, as shown by the symptoms, and by chemical and microscopical examination of the urine, and any peculiarities of manifestation, but also to inquire into its probable causation. He must therefore make himself acquainted with the personal and family history of the patient, as

¹ Read before the Maine Medical Association.