AUTONOMIC THERAPY IN THE PSYCHONEUROSES.

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THOUGH detailed knowledge of the autonomic nervous system is comparatively recent, the initial conceptions of its nature have undergone very important modifications during the time it has been known. This is mainly due to the fact that originally the anatomical discovery was taken up by investigators in various branches of clinical medicine, physiology and pharmacology, and made a special subject for detailed research. Especially did the dualism which is so remarkable a feature of the autonomic nervous system give rise to a number of theories about the relationship of the two components.

Eppinger and Hess, basing their views on clinical and pharmacological observations, formulated the conception of autonomic imbalance, i. e., a prolonged disturbance of the normal equilibrium of the two component parts. They pictured the autonomic nervous system as a scale beam which under normal conditions is balanced equally by the tonus of the two antagonists, the sympathetic and parasympathetic systems. If the tonus of one division is absolutely or relatively altered in relation to that of its opponent, a state of imbalance results, which is termed sympatheticotonia or vagotonia as the case may be. They adduced a number of clinical pictures in support of their views.

Laignel-Lavastine regarded the autonomic nervous system as being regulated according to his "battant de porte" scheme. The tonus of the two divisions is simultaneously normal, increased, or diminished. Danielopolu and Carniol developed a technique that allowed of a separate determination of the tonus of each division. Their results showed that the tonus of either of the components may be increased, normal, or diminished independently of the other, and they described a large number of varieties of autonomic imbalance.

A number of authors have raised weighty objections against such simple schemata. Most drugs used in pharmacodynamic tests are amphotrop (acting on both divisions), usually with one action predominating. Different organs in the same individual may react in different ways when subjected to pharmacological tests. There may be an atypical reaction, e. g., a sympathicotrope drug may produce a parasympathetic response. Furthermore, the reaction of an organ is largely determined and modified by its "internal milieu", i. e., the existing concentration of ions and internal secretions within

the cell and the surrounding fluids. These objections lead to the conclusion that it is not possible to describe the state of the autonomic nervous system by a simple scheme. It can be adequately represented only by a more complicated formula.

Fortunately it is not, as a rule, necessary to determine the complete "autonomic formula" of a patient, especially in an out-patient department in which all kinds of psychoneurotic disorders are treated. The nature of the leading symptoms and main complaints give sufficient indications of the underlying autonomic disturbance, and the final diagnosis can be corroborated by a few clinical or pharmacodynamic tests.

Some regard for the state of the autonomic nervous system in cases of psychoneurotic illness is of very great importance. The close relationship between the emotional life and the autonomic nervous system is well known. As long ago as 1892 Van Noorden recognized the important role played by the parasympathetic system in certain cases of hysteria (hysterical vagal neuroses), and the similarity of the symptomatology of an anxiety state with that of sympathetic hypertonus is too close to be accidental.

An at least approximate determination of the "autonomic formula" in these patients is important, because most symptoms directly attributable to some autonomic upset respond quite readily to pharmacological treatment by sympathicotropic or parasympathicotropic drugs. Although, of course, severe or deep-seated psychoneurotic illness cannot be cured by tablets or a bottle of medicine, the alleviation of the symptoms is exceedingly helpful in three ways: (1) it relieves the patient's suffering; (2) it assists in promoting contact or "rapport" between patient and doctor, and facilitates further psychological treatment, and (3) it breaks a vicious circle, for a symptom which originally may have been secondary in nature may become the focus of the patient's attention, and thus the cause and starting point of further psychological upset.

Source of Data.

The data on which the conclusions set forth in this paper are based had two sources. On the one hand, a limited group of in-patients, 21 in number, comprising 7 female patients suffering from hysteria, together with 12 male and 2 female cases of anxiety neurosis, were fully investigated under hospital conditions as to the state of their autonomic nervous system, and the results of this investigation correlated both with their symptomatology and with their subsequent reaction to therapy. This therapy was directed to the rectification by pharmacological measures of the type of upset discovered.

The investigation of the autonomic nervous system was carried out according to the intravenous atropine method of Danielopolu (1). In addition, clinical tests, particularly the oculo-cardiac and solar reflexes, were done, and blood-pressure observations were made simultaneously with those of the pulse while

carrying out Danielopolu's technique. To obtain the true resting pulse-rate it was charted at 4-hourly intervals for a week.

The second source was a much larger group, comprising all the sufferers from psychoneurotic illness seen in the course of work at two out-patient clinics, one attached to a general and one to a mental hospital, during the past three years. The examinations of these cases were made within the limits of ordinary out-patient procedure, and were confined to clinical autonomic tests as described, for instance, in Wulf Sachs's study (2), and a detailed history of autonomic symptomatology. All these patients were then treated pharmacologically by drugs with a corrective effect on the autonomic abnormalities diagnosed.

Types of Upset.

The cases treated can be classified from two aspects, the psychological and the physical. From the psychological point of view the majority of the patients belonged to the extensive group known as anxiety states, which are characterized by fatigue, inability to concentrate, apprehension, insomnia, and a great variety of symptoms referred to the internal organs and indicating a severe disturbance of the autonomic nervous system. A fair number of hysterias, obsessional states, and post-traumatic neuroses were investigated. It is not the object of this paper to go into details about the psychopathology of these conditions or the psychotherapy applied, although these played, of course, an important part in diagnosis and treatment. The main aim in the diagnostic field was to obtain information about the state of the two divisions of the autonomic nervous system, i. e., to find the patient's "autonomic formula" describing the tone and irritability of the sympathetic and parasympathetic systems and to arrive at a physical classification.

In almost all the cases showing psychoneurotic symptoms there was also a more or less profound disturbance of the autonomic balance. All types of Danielopolu's classification could be distinguished—most frequently of all, the amphotonic. It was very tempting to correlate the various psychological states with certain autonomic types; this, however, proved impossible, although, of course, the well-known relationship between anxiety symptoms and sympathetic overaction was obvious.

It has to be mentioned that a large number of amphotonias showed marked improvement under treatment by drugs influencing only one division of the autonomic nervous system. This fact can be explained by the assumption that the disturbance affects primarily one part, while the other is only altered in a self-regulatory attempt of the organism to re-establish autonomic harmony. The clinical picture in these cases is usually a reliable guide to the division primarily at fault.

In the seven cases of hysteria which were fully investigated five were found to have an amphotonic type of upset predominantly para-sympathetic in

character, one presented a pure parasympatheticotonia, and one a sympatheticotonia. The fourteen cases of anxiety state on investigation showed the following types of autonomic upset: seven amphotonias, five sympatheticotonias, one parasympatheticotonia and one hypo-amphotonia.

These figures indicate the diversity of kinds of disturbed balance that occur in the psychoneuroses. Though the numbers are very small, they are fairly representative of the proportions in which they are encountered in out-patient practice.

Pharmacological Therapy.

The drugs used included both depressants and stimulants of the autonomic nervous system. As overaction is the more common type of upset, those drugs with a sedative action were chiefly used, and luminal, with its central action on both divisions, was widely given. In some cases this proved sufficient, but in a large proportion the addition of ergotamine or belladonna, according to the division of the autonomic system chiefly affected, was necessary, and in a few cases the addition of depressants of both systems appeared to be indicated.

In a smaller number of cases stimulation was called for, and results were obtained with benzedrine and ephedrine or the choline preparations, according to the division exhibiting symptoms of underaction. These drugs also proved useful auxiliaries in combating overaction of the other division, i. e., good results were obtained with benzedrine in vagotonia and with the choline preparations in sympatheticotonia.

It should be emphasized that the essential procedure is the steady administration of small doses over a prolonged period. The dosages found most useful were as follows: luminal gr. $\frac{1}{2}$ *t.d.s.*, tincture of belladonna ♏x *t.d.s.*, ergotamine tartrate (femergin) one tablet two or three times daily, and benzedrine in doses varying from 2·5 mgrm. to 10 mgrm.; but dosage is an individual matter and must be adjusted to suit the varying degrees and phases of upset encountered. A preliminary period of trial therapy is frequently necessary before the ideal combination is found. The best effects with the choline preparations were obtained under hospital conditions by injection methods. One point which we should like to emphasize is that the use of drugs influencing the autonomic nervous system should be appropriate to the type of upset present. For example, administration of benzedrine to a sympatheticotonic sufferer from an anxiety state or agitated melancholia can only do harm.

Results of Therapy.

In recent cases with symptoms of autonomic upset the effect is in some instances dramatic. Immediate relief of symptoms with spontaneous expression of gratitude and appreciation occurs. Even when the symptoms have lasted for a considerable time, definite benefit is occasioned, but the results

are less dramatic and treatment requires a more prolonged course with reassurance and simple explanation of the symptoms. In some cases, when the symptomatology is predominantly psychological, treatment of the underlying, though little in evidence, autonomic upset causes marked improvement and an ability (previously lacking) to deal with the psychogenic factors.

Frequently secondary psychological maladjustments have occurred, encouraged in some instances by certain lines of therapy, and these require psycho-therapy with encouragement and reassurance over a lengthy period in addition to the pharmacological therapy.

Where an anxiety state is resistant to therapy, and this non-reaction is not explainable by the above-mentioned psychological maladjustments but is predominantly autonomic in its expression, search must be made for any undetected form of focal sepsis, especially in relation to the teeth or nasal sinuses.

In our experience treatment of anxiety states carried out on those lines affords us a method of attacking these illnesses which produces results superior to those attained by other methods of treatment. In fact, it may be said that the prognosis is definitely improved, and that such treatment, judiciously carried out and combined where necessary with psycho-therapy, should cure any anxiety state, provided there is no complicating factor, e.g., psychopathic constitution or a psychological maladjustment of such duration as to be for practical purposes constitutional in character.

Two cases which illustrate the different reactions of recent and old-standing illness may be mentioned. The more recent case, E. B—, is that of a lorry driver, aged 22. For the past four months he had seemed to lose control of himself and his lorry. He was generally apprehensive and especially frightened about going to bed. Several times he had had to jam on the brakes of his lorry without any reason, and finally had to give up work. He said he had always blushed easily, but that this had been much more marked during the past four months. There was excessive perspiration under the arms. He had difficulty in going off to sleep, but slept well afterwards. He complained of " indigestion " of about ten years' duration, waterbrash, burning in his mouth, and " wind round his heart ", but his appetite was good. This case of an anxiety state with autonomic disturbance of the amphotonic type was treated by luminal and belladonna. He improved steadily and after two months was able to resume work. Administration of luminal and belladonna was continued for another three months, and he then discontinued attendance. He has kept well since (for over a year), and the other day when he accidentally met his doctor he spontaneously expressed his gratitude.

The course of more old-standing illness is illustrated by H. H—, a bus driver, aged 27. He had always been " nervous ", but his complaints became so severe in 1936 that he had to give up work. When we first saw him in December, 1937, he complained of a feeling of tension and of " faintness " in the sternal region, palpitations, breathlessness, and flushes rising up to the face. He perspired excessively on hands, feet and under his arms, and he suffered from sleeplessness. He complained of poor appetite, dyspepsia, heartburn and loose bowels. He had lost some weight. He was unable to concentrate, lacked interest, and felt weak and listless. This case of an anxiety state with an amphotonic upset improved so much under

luminal treatment given for about four months that the drug was discontinued prematurely, and the patient relapsed in September, 1938. He was now given at first luminal together with another more hypnotic member of the barbiturate series (soneryl), and subsequently luminal combined with belladonna. He then made a steady recovery and was able to resume work in January, 1939. Administration of luminal was continued for another four months. He is now keeping very well and fit, and is keenly interested in his work.

In hysteria, although the occurrence of autonomic upset is almost invariable, therapy based on treatment of those upsets does not produce the same results. A large proportion of our cases were complicated by a psychopathic personality, and in this type of person treatment of autonomic imbalance by pharmacological means is of no avail. In three cases of hysteria definite benefit occurred, and one case was sufficiently interesting to merit quoting. The patient was a girl, aged 22, of fairly high intelligence. The symptomatology comprised typical hysterical fits during the last seven years, recently becoming more frequent, headaches for the past eight months, and somnambulism. The patient gave a clear history of feelings of emotional tension caused by family upset, with usually subsequent headache which might or might not go on to a hysterical fit. The headache was severe and almost continuous. The administration of luminal for some weeks removed the feeling of tension and emotional upsets, but the headache persisted unchanged. The addition of femergin gradually cured the headache, with a complete change in the outlook of the patient to an optimistic and cheerful one. There has been no somnambulism or hysterical fits for a period of seven months without any therapy.

It is not suggested that pharmacological therapy should replace psychotherapy or that it renders it unnecessary, but that it ought to take an important place, almost a primary one, in the treatment of anxiety states, and that neglect of it will render psycho-therapy in some cases of no avail. It is merely logical that when a symptomatology indicative of a disordered autonomic nervous system is found to be present that upset should be treated pharmacologically by sedatives or stimulants, or combinations of them, according to the type of upset present.

In some cases this form of therapy is sufficient. We deliberately abstained for a period from any form of psychotherapy or suggestion, applied the pharmacological treatment in a purely objective and critical manner, and satisfied ourselves that certain early cases recovered without any other form of therapy being necessary. In others the relief of the physical symptoms enabled them to tackle their psychological difficulties and to relate spontaneously how they were now able to deal with them. In those cases simple explanation and reassurance were sufficient once the initial "swamping" by their disordered autonomic nervous systems had been controlled.

Within limits and with certain reservations, the duration of the treatment necessary varies directly with the previous duration of the illness. In cases of long-standing, secondary psychological maladjustments have to be dealt

with. The improvement in these cases and, in fact, in all cases of autonomic upset, is not uniform but intermittent—a "wave-like" progress of alternate improvement and relapse, the improvements gradually becoming more and more definite and prolonged. During this period the patient needs reassurance, especially during the relapses, and does not regain confidence until recovery is well advanced and a definite continuous period of well-being can be looked back on. The patient is the last person to realize that recovery has occurred.

It is not intended to suggest that pharmacological treatment of autonomic upset is limited in its scope to the psychoneuroses. On the contrary, a very much wider field is affected, extending from complaints usually classified as physical in nature on the one hand, to the psychoses on the other. In the former, so-called physical ailments, the most striking and immediate successes with this form of therapy are attained. Migrainous headaches or disorders of the gastric secretion with inco-ordinate contraction of the intestinal musculature respond sometimes in a dramatic manner. The more stable the nervous system of the individual basically and the healthier the attitude to the complaint the better the result.

In the psychoses disordered action of the autonomic nervous system is extremely common, but the response to therapy is very variable. In some autonomic therapy is a most valuable adjuvant, in others therapy on the present recognized lines has no effect on the progress of the illness.

Summary.

The purpose of this paper is to indicate that many psychoneuroses are essentially upsets of the autonomic nervous system, that in many cases we are not dealing with an emotional upset, but with the secondary autonomic disorder caused by that upset, and that this autonomic disorder is to the patient the essential part of his or her illness and the suffering from which he or she desires relief. Accordingly in such cases therapy should be pharmacological by drugs specific for the type of upset present. Such therapy gives excellent results, especially in early cases. Toxic or psychological factors which are still operating must, of course, be dealt with by appropriate measures, but even in such cases pharmacological therapy proves a useful auxiliary. If, after elimination of those causal factors the resultant autonomic upset persists, pharmacological therapy is essential to bring about a complete cure. This has been proved to us by observation of the failure of persistence in psychotherapy in such cases with subsequent relief by pharmacological therapy.

(1) Danielopolu and Carniol.—*Archives des Maladies du Coeur*, 1923, xvi, p. 181.
(2) Sachs, Wulf.—*The Vegetative Nervous System*, 1936.